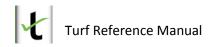


Reference Manual





Support, Distribution:

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Individuals or organizations who would like to obtain an extended or commercial license to the software can contact the Office of Technology Management at The University of Texas Health Science Center at Houston. If you require continuous use of the software, please contact the Office of Technology Management early in your trial period to avoid interruption in your access to the software. The cost of Turf 4.0. software starts at \$500 per seat license.

The University of Texas Health Science Center at Houston Office of Technology Management

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1. Welcome

Welcome to Turf, the EHR usability toolkit developed by SHARPC. Turf is the first all-in-one, integrated software program designed specifically for safety-enhanced design validation. You can use a variety of features for usability testing of an EHR, including Summative User Testing, Formative User Testing, Heuristic Evaluation, Expert Evaluation, Descriptive Analysis, Inferential Statistics, etc. Our toolkit streamlines User Testing and Heuristic Evaluation and generates reports in the format required for Safety Enhanced Design certification.

A unique feature of user testing in Turf is Autoflow. With Autoflow, you can semi-automate the testing process by prompting the user through selected tasks. Autoflow is fully customizable to specific task actions, including displaying text files, playing short video clips, capturing images, recording media and filling in forms. Customized moderation of Turf allows for a streamlined assessment of the user experience. In addition, Turf captures keystroke events and task execution times.

Turf also allows for quick and easy documentation of critical usability problems during the Heuristic Evaluation module. Expert evaluators can record a video to demonstrate violations of heuristic principles or capture screenshots that further define the problematic areas. Evaluators can then identify violations and actionable design concerns by clearly marking up the screen with a violation box.

Visit our website <u>www.SHARPC.org</u> for a free 30 day trial and experience the all-in-one integrated software system.

2. System Requirements

Please note that administrator privileges are required to install Turf 4.0.

Operating System:	Windows [®] 8.1, and 10
Prerequisites:	.NET framework version 4.5.3 or higher
Processor:	1 gigahertz (GHz) or faster
RAM:	4 GB or above
Free disk space:	250 MB (for application install only)
Screen Resolution:	Up to 1920 x 1080
User Access Control Privileges:	Local system administrator or higher

Note:

- a) Turf 4.0 has been tested in Window[®] 8.1 and 10.
- **b)** The storage requirements depend on usage. A typical recording with audio, video, and keystroke events will generate approximately 5-10MB data per minute. For seamless recording and playback, a dedicated video memory (GPU) is preferred.
- c) To use OneDrive functions, an active Microsoft[®] Account with OneDrive[®] is required.

System requirements to install Turf for Android in your smartphone or tablet

Operating System:	Android [®] 5.0 or higher		
Free disk space:	2 GB (to store the recorded video)		

System Privileges:	Enable developer mode, USB debugging and install of
	third party apps.

Note:

- a) Turf for Android in Turf 4.0 has been tested in a Nexus® 9 device with Android® 5.0.
- **b)** The storage requirements depend on usage. Recording of android device screen is initially saved in the device. For this we recommend at least 2 GB of free space. To recover used space, the recordings can be manually deleted from the device once they are saved in Turf 4.0

3. Step by Step Guide

- a) Download the Turf software (available as a zip archive) from the Turf website
- b) Go to the extracted folder and click the Turf 4.0 Setup.msi file
- c) Click Next to proceed
- d) Read the Research and Evaluation License Agreement and accept the terms to proceed by marking the checkbox and clicking the **Next** button
- e) Click Next to continue to install Turf
- f) Choose if you want to install Turf for all users or just for you. Click the **Install** button to begin installation
- g) Installation will begin and the process is indicated in the progress bar
- h) When the installation is completed, click **Finish** to close the setup window

4. Turf Interface

4.1 Panels

4.1.1 Projects Panel

The **Projects** panel displays the list of all documents and folders, each user is working on separated by a **Heuristic Evaluation** project or a **User Testing** project. The **Add New Product** button allows the user to enter the name and version of the product, software, website or application they will be testing. Once the product has been created, it will show up in the **Projects** panel and new folders can be created that will organize the many documents and sessions. The folders are arranged in a tree fashion to allow for easy navigation and location of the correct folder.

4.1.2 Details Panel

The **Details** panel shows each individual files that are in the folders in the **Projects** panel. The documents can range from audio files, video files, imported PDFs, exported XML documents, screenshots, etc.

4.1.3 Heuristic Evaluation Problem Panel

The **Classify Problems** panel contains three features that streamline the heuristic evaluation process. The **New Problem** button allows a user to create a new problem and link it to multiple user-defined marks. The **Audit Problems** button allows a user to agree, archive, or discard saved problems in a chosen location. The **Rate Problems** button allows a user to rate approved or agreed upon problems.

4.1.4 User Testing Forms Panel

The **User Testing panel** contains four forms often used in user testing. The **Demographics** form has many fields for collecting background information about a user including experience and education. The **Usability Survey** form is a usability survey with numerous radio buttons that resembles the commonly used system usability scale (SUS). The **Moderator Notes** form provides a large space for a user testing moderator to record his observations and other notes. The **Performance Evaluation** form contains numerous metrics for gauging user performance during a task, including task time, task success, and path deviation.

4.2 Tab Functions in Turf

4.2.1 File Tab

The **File** tab in the Turf interface organizes and contains access to all files created during Turf sessions and those that have been imported for evaluation. It contains 5 buttons located on the left side of the Turf interface to help locate and navigate documents. The **Recent** button shows files, folders and projects the user has worked on most recently. Clicking the **About TURF** button will load a webpage where you would be able to watch different Turf video tutorials and learn more about the Turf software. The **Activate** button activates the full version of the product for legal use by the end user or enterprise. The **OneDrive** button allows you to log in to OneDrive and be able to view the files that you have already shared on OneDrive. The **Exit** button will immediately exit the Turf program.

4.2.2 Home Tab

The **Home** tab allows users to quickly create new **Projects**. Click on either the **Heuristic Evaluation** or **User Testing** button to begin creating each session.

TIP Before you click on **Heuristic Evaluation** or **User Testing** button, make sure you have added a new product by clicking on the **Add New Product** button in the **Projects** sidebar and make sure your new Product is selected before clicking a new Project.

4.2.3 Heuristic Evaluation Tab

The **Heuristic Evaluation** tab gives users the control to both organize folders, capture media and classify problems based on heuristic principles. Folders can be organized by clicking on the **New Folder**, **Edit Folder** and **Delete Folder** buttons represented by the yellow folder icons. Media can be captured in five different ways via **Audio**, **Video**, **Keystroke**, **Screen**, and Android buttons, either individually or in groups as decided by the user by checking or unchecking checkboxes assigned to each media type. **Settings** buttons for each media type allow for

deeper customization and show icons that reflect each type of media. According to heuristic principles, a **New Problem, Audit Problems** and **Rate Problems** buttons allow users to evaluate problems found in documents and screenshots with ease. A **Report** button with a printing icon allows users to print the problem descriptions, captured images, with or without marks, and the severity ratings for each problem.

4.2.4 User Testing Tab

The **User Testing** tab, similar to the **Heuristic Evaluation** tab, allows the user to assign folders and capture media. The **User Testing** tab, however, also has icons specific to its unique function that include forms for a testing session and **Autoflow**. The **Demographics** button brings up a mini tab with a sample form which a creator can add to an **Autoflow** session prompting the user to enter personal information. The **Usability Survey** button brings up a mini tab with questions for the user after the testing session. **Moderator Notes** button shows a mini tab that has a blank textbox for the moderator of the user testing session to record his or her thoughts. The **Performance Evaluation** button shows a form that a moderator can use to evaluate the results of the user testing session.

Autoflow, a customizable user testing process, is a format of testing that prompts the user through a testing procedure using a series of forms and media to record, evaluate and survey user performance. Clicking the **Set Up Autoflow** button brings up an **Autoflow** settings popup window where the moderator can create and edit the order and content of the testing session. Clicking **Run** will start the recording and the **Autoflow** session will begin.

4.2.5 Analyze Tab

The **Analyze** tab offers a plethora of features for analyzing heuristic evaluation and user testing data by statistical and more basic means. A user first selects the data using the Query Files button. The data is then displayed on a pivot table. Columns can be re-grouped or re-ordered by dragging and dropping columns as desired.

4.2.6 View Tab

The **View** tab allows the user to customize the window layout according to their preferences. The **Show Product Tree** checkbox will expand the list of products in the **Projects** panel to show all documents and files. The **Show Detail Panel** checkbox will display or hide the **Details** panel on the bottom of the Turf interface. The **Show Properties** checkbox will show or hide the **Property** panel on the right side of the Turf interface. Clicking the **Reset Window Layout** button will reformat all panels to revert to the default sizes and locations.

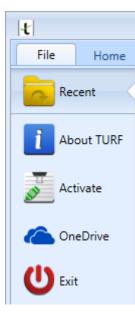
4.2.7 Settings Tab

The **Settings** tab allows the user to adjust the color theme of Turf and the high level content detail of the system configuration. Clicking on any of the different icons in the **Theme** box will change the color and font of all Turf windows and panels. Under the **System Configuration Management** panel on the left side, 8 different settings are available for modification and customization. The **Use Cases** setting allows users to create a **New Use Case**, create a New Folder to organize use cases, Modify old folders, Delete folders, and Upload different files to a use case. The **Descriptive Template** setting allows user to create a **New** template, **Load** another template from file,

Export a template from an XML document and **Delete** a template from the list. The **Widget Definitions** setting allows users to specify the type of the mark in heuristic evaluation by specifying Button, TextBox, Check Box, List Box or ComboBox for both Windows and Android systems. The **Color Definitions** setting allows users to specify Name, Color, and Description. The color can be set to active by checking the **Active check box** for both the Windows event color and the Mark property color from the dropdown menu list. The **Hot Keys** setting allows users to Modify Hotkey Value associated with the Home, Heuristic Evaluation, User Testing, Analyze, and View tabs by specifying the ActionName, Action, Hotkey, and status of the key using an Active checkbox. The **Video** settings allow users to specify the maximum number of video tabs that can be opened at the same time. **OneDrive** settings allow you to customize the way that you want Turf interact with your OneDrive account. The **Install Turf for Android** button allows you to install Turf on your android smartphone or tablet device.

4.3 Icons

4.3.1 File Tab Icons



The **File** tab is the welcome tab when the user first opens up Turf. It stays highlighted blue at all times to represent the main tab for finding recent files, folders and projects.

Recent - Shows all file types recently opened.

About TURF - Provide you with different Turf video tutorials

Activate - The **Activate** button shows activation information of the product for legal use by the end user or enterprise.

OneDrive - Shows the files/folders that you have uploaded to your OneDrive from your Turf application.

Exit – Closes Turf with a popup window to confirm.

4.3.2 Home Tab Icons



Heuristic Evaluation - Opens a popup to create a Heuristic Evaluation project under a user chosen product folder.

User Testing - Opens a popup to create a User Testing project under a user defined product folder.

4.3.3 Heuristic Evaluation Tab Icons

File Home	Heuristic Evaluation User Testing Analyze View Settings				
New Edit Delete Folder Folder Folder	Image: Constraint of the second (F3) Image: Constraint of the second (F3) Image: Constraint of the second (F3) Image: Constraint of the second (F3) Image: Constraint of the second (F3)	New Audit Rate Problem Problems Problems	Report		
Folder	Capture Media Classify Problems Repo				

The **Heuristic Evaluation** tab has buttons and checkboxes that assist the user to identify and analyze heuristic violations using heuristic principles. The tab is divided into 4 sections: **Folder**, **Capture Media**, **Classify Problems** and **Report**.

4.3.3.1 Folder



New Folder – Creates a new folder under the Heuristic Evaluation project name

Edit Folder - Renames the folder

Delete Folder – Deletes a folder in the project

4.3.3.2 Capture Media

File Home	Heuristic Evaluation User Testing Analyze View Settings
New Edit Folder Folder	Image: Audio Image: Video Image: Keystroke Image: Settings Image: Keystroke Image: Settings Image: Keystroke Image: Ke
Folder	Capture Media

Audio Settings – When checked, audio will be recorded through the microphone selected in the **Audio Settings** button.

Video Settings – When checked, video will be recorded using the webcam selected in the Video Settings button.

Keystroke Settings – When checked, capture events and capture controls are captured using the **Keystroke Settings** button.

Screen Settings – When checked, a screenshot or video of the display chosen in the Screen Settings is captured.

Android Settings – When checked, screenshots and events on the chosen android device will be recorded.

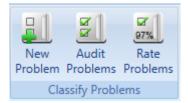
Capture Image (F5) – Captures the image on the monitor screen based on the parameters selected in the Screen Settings. The hotkey F5 can be also be used to capture an image.

Record (F7) – Records video of the screen as specified by the Screen Setting button. The hotkey F7 can also be used to start recording.

Pause/Restart Record (F8) – Pauses and restarts the recording. The hotkey F8 can be used to pause a recording and then restart the recording.

Stop Record (F9) – Stops and ends the recording. The hotkey F9 can be used to stop recording.

4.3.3.3 Classify Problems



New Problem – The **New Problem** button allows a user to create a new problem and assign it to multiple images.

Audit Problems – Opens a popup where the user can choose which problem marks to audit and evaluate.

Rate Problems – Opens a popup where the user can choose which problem marks to rate using heuristic principles.

4.3.3.4 Report



Report – Opens a popup where the user can select the problem descriptions, captured images, with or without marks, and the severity ratings for each problem to print out a report.

4.3.4 User Testing Tab Icons



The User Testing tab has buttons and checkboxes that assist the moderator in customizing and conducting user testing. The tab is divided into 4 sections: **Folder**, **Capture Media**, **Forms** and **Autoflow**.

4.3.4.1 Folder

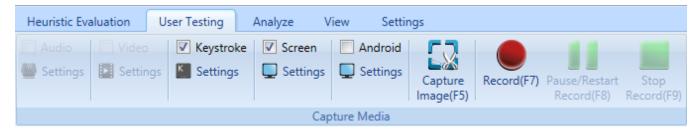


New Folder – Creates a new folder under the User Testing project name

Edit Folder - Renames the folder

Delete Folder – Deletes a folder in the project

4.3.4.2 Capture Media



Audio Settings – When checked, the audio will be recorded through microphone selected in the **Audio Settings** button.

Video Settings – When checked, video will be recorded using the webcam selected in the Video Settings button.

Keystroke Settings – When checked, capture events and capture controls are captured using the **Keystroke Settings** button.

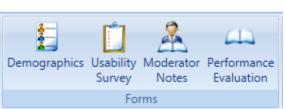
Screen Settings – When checked, a screenshot or video of the display can be chosen in the **Screen Settings** is captured.

Capture Image (F5) – Captures the image on the monitor screen based on the parameters selected in the **Screen Settings**. The hotkey F5 can also be used to capture an image.

Record (F7) – Records video of the screen based on the parameters specified in the **Screen Setting**. The hotkey F7 can also be used to start recording.

Pause/Restart Record (F8) – Pauses and restarts the recording. The hotkey F8 can be used to pause a recording and then restart the recording.

Stop Record (F9) – Stops and ends the recording. The hotkey F9 can be used to stop recording.



Forms

4.3.4.3

Demographics – Opens a tab with a form containing boxes for a user to enter their demographics (e.g., Full Name, Gender, Age, etc.)

Usability Survey – Opens a tab with a survey containing radio buttons for a moderator to give to a user at the conclusion of a user testing session.

Moderator Notes – Opens a tab with a form containing a box where a moderator can add notes from the user testing session.

Performance Evaluation – Opens a tab with a form containing boxes and radio buttons for the moderator to enter values at the conclusion of the user testing session.





Set Up Autoflow – Opens a popup that allows creation and customization of an **Autoflow** session by choosing various contents specified in the designated dropdown list.

Run – Starts the Autoflow session.

4.3.5 Analyze Tab Icons



The **Analyze** tab has buttons and checkboxes that perform detailed analytical functions on the heuristic evaluations and user testing data. The tab is divided into 7 sections: **Data**, **Process Raw Data**, **Descriptive Analysis**, **Compare Means**, **Calculate**, **Regression**, and **Correlation**.

The Analyze tab allows the user to query the data they collected and to analyze the data using statistical methods. The Query Files button brings up a pop-up dialog box with a tree view of all the products, projects, folders and files. Users can select files by the file type and the data will be displayed on the sheet. The Load Files button allows user to open the files with the following extension ".csv, .rtf, .xls, and xlsx" into the Turf and perform analytical functions on them. Click on the New Sheet button will create an empty sheet, users can enter their data manually or copy and paste data into this new sheet from other files, such as excel sheet. The **Convert** to Numeric Variable button will convert the selected data to the numeric type. Users can do simple descriptive analysis by checking the checkbox in front of the descriptive statistics and clicking the Run button. The Two-Sample T button brings up a pop-up dialog box which allows users to choose the grouping variable and test variable(s) from the variable(s) list and to run the Two-Sample T test by clicking the OK button. The Mann-Whitney U button brings up a pop-up dialog box which allows users to choose the grouping variable and test variable(s) from the variable(s) list and to run the Mann-Whitney U test by clicking the OK button. The **One-way** ANOVA button brings up a pop-up dialog box which allows users to choose factor and dependent variable(s) from the variable(s) list and to run the one-way ANOVA test by clicking the OK button. The **Count** button allows users to count the frequency of the selected item in the data. The SUS Score button allows users to calculate the SUS score from the original SUS survey data. The Linear Regression button brings up a pop-up dialog box which allows users to choose the factor and dependent variable(s) from the variable(s) list and run the linear regression by clicking the OK button. The **Pearson Correlation coefficient** button brings up a pop-up dialog box which allows users to choose the dependent variable(s) from the variable(s) list and run the Pearson Correlation coefficient by clicking the **OK** button.

4.3.5.1 Data



Query Files – Opens a pop-up dialog box with a tree view of all the products, projects, folders and files. User can select files by the file type and the data will be displayed in the sheet.

Load Files – Allows users to open the files with the following extension ".csv, .rtf, .xls, and xlsx" into the Turf and perform analytical functions on them

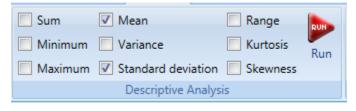
New Sheet – Creates an empty sheet, where users can enter their data manually or copy and paste data into this new sheet from other files, such as excel sheet.

4.3.5.2 Process Raw Data



Convert to Numeric Variable - Convert the type of the data to numeric

4.3.5.3 Descriptive Analysis



Sum – Adds all data values

Minimum – Finds the lowest data value

Maximum - Finds the highest data value

Mean - Finds the average of the data values

Variance – Measures how far a set of numbers is spread out.

Standard deviation - Shows how much variation or dispersion from the average exists.

Range – Shows the difference between the largest and smallest values.

Kurtosis – Measures the "peakedness" of the probability distribution of a real-valued random variable.

Skewness – Measures the asymmetry of the probability distribution of a real-valued random variable about its mean.

Run – Analyzes the mathematical functions checked. Users can do simple descriptive analysis by checking the checkbox in front of the descriptive statistics and clicking the **Run** button.

4.3.5.4 Compare Means

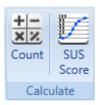


Two-Sample T – Determines if the mean of two sets of data are significantly different from each other. The null hypothesis is that the means of the two populations are equal.

Mann-Whitney U – A non-parametric test of the null hypothesis that two populations are the same.

One-Way ANOVA – Compares means of three or more samples, test the null hypothesis that samples in two or more groups are drawn from populations with the same mean values.





Count - Counts the frequency of the certain values in data.

SUS Score – Converts the responses of the 10 item questions to a SUS score.

4.3.5.6 Regression



Linear Regression – Models the relationship between a scalar dependent variable y and one or more explanatory variables denoted X. The case of one explanatory variable is called simple linear regression.

4.3.5.7 Correlation



Pearson Correlation coefficient – It is a **measure of the strength of the association** between the two variables, giving a value between and including +1 and -1, where 1 is total positive correlation, 0 is no correlation, and -1 is a total negative correlation.

4.3.5.8 Analysis Report Board

		proprinter rea	as more			
Analysis Report Board						
🚠 🚳 🗁 💾 🔮	🖶 🗟 🛃 🍳 1009	% • 🕀				
Document Map	₽ ×					<u> </u>
Table of contents						
Win_1 of Linear Regression an	nalytics_1					
		·/////////////////////////////////////	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	
		Win_1 of Linear Reg	ression analytics_1		,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	
		Name	Estimate	Std Error	t	PValue
		Constant	6.3735	1.38899982225761	4.5885535029377	0.0443587196840788
		Number of steps	0.0836854838709677	0.0384943240597487	2.17396943354755	0.161756137635864
						J

Users can export their data and analysis results to the **Analysis Report Board** (storyboard). There you can view, search, load an external .XML file, save, print, export, Email and add watermark to the content in the analysis report board.

4.3.6 View Tab Icons

Show Product Tree	
Show Detail Panel	Reset Window
Show Properties	Layout
Show	

The **View** tab has a button and checkboxes to help the user configure the side panels. There is only one section, the **Show** section that provides control over the Turf interface.

4.3.6.1 Show

Show Product Tree – Shows or hides the Projects panel on the left side of the interface.

Show Detail Panel – Shows or hides the Detail panel on the bottom of the interface.

Show Properties – Shows or hides the Property panel on the right side of the interface.

Reset Window Layout – This button resets the panels to the original viewing setting.

4.3.7 Settings Tab Icons



The **Settings** tab has buttons and a panel to customize the Turf experience. It has one **Theme** section and one side panel, **System Configuration Management**.

4.3.7.1 Theme Icons

The **Theme** icon buttons change the color and font of the Turf interface during the duration of the Turf session. The user can choose from 14 unique themes to overlay the Turf interface.

4.3.7.2 System Configuration Management

Use Cases – Opens a tab for users to create and modify use cases.

Descriptive Template – Opens a tab that allows users to alter and customize the User Testing forms.

Widget Definitions – Opens a tab that allows users to specify the type of mark chosen during Heuristic Evaluation for both Windows and Android systems

Color Definitions – Opens a tab that allows users to customize the color for window event color and mark property color for Heuristic Evaluation and User Testing.

Hot keys – Opens a tab that allows users to choose and activate hotkeys for each of the 6 Turf tabs.

Video Settings– Opens a tab that allows users to specify the maximum number of video tabs that can be opened at the same time.

OneDrive Settings - Opens a tab that allows users to customize OneDrive related functions

Install Turf for Android – Opens a tab that allows users to install Turf Android app on their desired android device

4.3.8 Details Panel Icons

etails: My product\User Testing\7_9\									#)
					🛃 Import Files	Export Files	🔟 Delete	Detail	•
Name	Туре	Creation Data Time	Creator	Size					
Cont_3	Record Container	7/10/2014 11:40:04 AM	msalimi	692.49 KB					
Win_3	Window Events	7/10/2014 11:40:04 AM	msalimi	557 B					
Cont_4	Record Container	7/10/2014 11:40:24 AM	msalimi	700.3 KB					
Win_4	Window Events	7/10/2014 11:40:24 AM	msalimi	778 B					_
Chrysanthemum_t_1 (27)	Image	7/16/2014 11:37:57 AM	msalimi	762.53 KB					

The **Details** bar is located on the bottom of the Turf interface and organizes the varying files contained in each project folder. It can be temporarily hidden by clicking the black push pin in the top right of the bar. To promote organizations it orders the details of the files by **Name**, **Type**, **Create Data Time**, **Creator** and **Size**.

Import Files – Opens a popup window where users can select any file type to upload to Turf.

Export Files – Opens a popup window where the user selects which folder to export the document(s).

Delete – Deletes the selected file.

Dropdown box – Allows the user to choose the file view in the tab in either tree, detail or thumbprint format.

Image Files – Blue and green landscape icon represents the image files

Video – Black and white icon with a headphone and movie reel represents video files

5. Media Capture Procedures

5.1 Adjusting Settings

Turf allows for customization of recording media settings, allowing the user to choose what type of media to capture and specify the settings to their individual case and need.

5.1.1 How to Adjust Audio Settings

The **Audio Settings** checkbox and icon allows the user to decide whether or not to record audio from the user testing session. When clicked, the microphone icon opens a popup where the user can click on a dropdown menu to choose which **Microphone**, if any, they would prefer to use for the recording. If many microphones are attached to the computer, this dropdown will have all those that are recognized and ready for record. If not, the default computer microphone, (if available) will be used.

5.1.2 How to Adjust Video Settings

The **Video Settings** checkbox and icon provides the user with the option to opt out of using the webcam. Clicking on the filmstrip icon for video settings opens a popup where users can choose their own options for **Webcam Device**. If many webcams are connected to the computer, the user can choose their webcam from the dropdown menu. Also, the user can assign different qualities to video files by checking on the any of radio buttons listed in the "**Quality**" section.

5.1.3 How to Adjust Keystroke Settings

The **Keystroke Settings** checkbox and icon allows the user to decide whether to Capture Event(s) and/or **Capture Controls**. **Keyboard Events** captures keystrokes on the keyboard. **Mouse Events** capture mouse clicks and scrolls. Users can choose to use **MSAA** (Microsoft Active Accessibility) or **UI automation** (user interface automation) in full or compact mode. To complete capturing keystroke controls, users can either **Capture Widget Container Structure** or **Capture the image of the control under each event**.

5.1.4 How to Adjust Screen Settings

To adjust **Screen Settings**, choose which **Monitor**, **Region** and **Quality** of the screen you wish to capture. Clicking on **Identify Monitors** briefly shows a large number on the screen of the Turf assigned monitor number if more than 1 monitor is connected. Clicking on **Customize Region** minimizes Turf and allows the user to highlight their specified region to record or capture by dragging the red dashed line to encircle the desired area of the screen. The **Minimize Turf** checkbox will minimize and open Turf when the **Capture Image (F5) is clicked** or keep Turf minimized when the **Record (F7)** button is clicked. The **Delay (sec)** checkbox issues a countdown on the screen until Turf either captures a screenshot or begins recording. The **Display immediately after Capture** checkbox immediately brings up the image or video just captured in the large tab screen and also in the **Details** tab. The **Show mouse hot spot** check box shows the spot of the mouse on the screen. The radius and color of the spot can be set in the corresponding boxes. You can modify the quality (and file size) of image(s) or video(s) captured in Turf by checking on the corresponding radio buttons specified in the **Quality** section.

5.1.5 How to Adjust Android Settings

The Android Settings checkbox and icon allows the user to capture the screen and events of an android device running Turf application.

5.1.6 How to Capture an Image

To capture an image, the **Screen Settings must be configured**. The **Screen Settings** icon opens a popup window where the user selects the monitor screen to capture, the region of the screen to capture and the quality of the image(s) to be captured. Click **OK** to save changes and close the popup and click **Capture Image (F5)** to take a screenshot.

5.1.7 How to Record Video

To record a video, first configure settings by clicking on the **Video Settings** button, specifying the webcam, and choosing the desired video quality.

6. Heuristic Evaluation Procedures

6.1 Launch and Set Up a New Heuristic Evaluation Project

6.1.1 Launch Turf

After loading the software on the computer, a user will launch Turf by double clicking on the Turf desktop icon. Then the user will see the File interface where she can create a new product for the heuristic evaluation.

6.1.2 Create a New Product

a) Create a new product evaluation folder

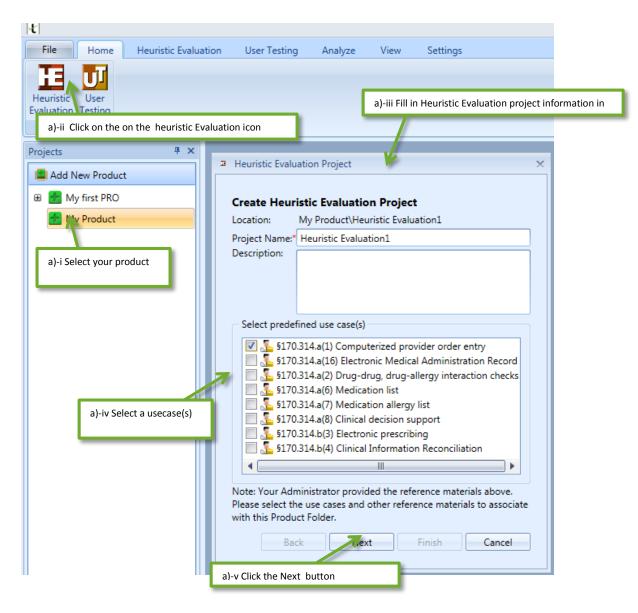
- i) Go to Home tab
- ii) Click the Add New Product
- iii) Enter the product name (e.g., Alpha)
- iv) Enter the product version (e.g., Alpha)
- v) Enter the vendor name (e.g., SharpC)
- vi) Click the Save button

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File Home	Heuristic Evaluation	User Testing	Analyze	View	Settings
T3 T3					
Evaluation Te	o Home tab				
New Project				_	
Projects	₽×			a)-iii nam	Enter the product e
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	n)-ii Click the Add New Product	Product:			a)-iv Enter the produ
_					version
		Vendor:			
			Save	Cancel	
	a)-v Enter t name	he vendor			
1				a)-v butt	i Click the Save ton

6.1.3 Set up a New Heuristic Evaluation Project Folder

After you set up a new product, choose the type of usability method (e.g., Heuristic Evaluation or User Testing) to conduct. In this case, choose Heuristic Evaluation.

- a) Create a heuristic evaluation project
 - i. Select your product
 - ii. Click on the Heuristic Evaluation icon
 - iii. Fill in Heuristic Evaluation project information in the pop-out window
 - iv. Select a usecase (s)
 - v. Click the Next button
 - vi. Select predefined heuristic evaluation template (e.g., select Expert Review)
 - vii. Click the Finish button



3	Heuristic Evaluation Project ×						
	Select Evaluation Template(s):						
	Name	Order					
	Demographics		Preview	-			
	上 🔽 Expert Review	1 🗘	Preview				
	🔲 🛃 Moderator Notes		Preview				
a)-vi Select predefined heu	uristic evaluation template		Preview				
	y Scale (SUS)		Preview				
	Note: Please select template options he made a)-vii Click the Finish button	ere. Furthe	Advanced Sett	ings			

6.2 Capture a Screen Shot and Physically Mark Problems

6.2.1 Capture a Screen Shot

Screenshots can be captured to inspect interface design violations. **First, you need to create a folder**. You can create a folder to hold all of the evaluation projects on a product. For example, you may want to test multiple tasks (e.g., e-prescribing, creating a patient record and medication reconciliation) for a single EHR (electronic health record) product.

a) Create a new folder

- i. Select the HE project
- ii. Click on New Folder in the Heuristic Evaluation tab
- iii. Rename the folder to reflect the project and product (e.g., HE SharpC EHR)

	I.		
	File Home	Heuristic Evaluation	
a)-ii Click on the New Folder in HE tab	New Edit Delete Folder Folder Folder	Audio 🔽 Vide	
	Folder		
	Projects	# ×	
	Add New Product	t	
	 		
a)-i Select HE project	B II My Heuris	tic Evaluation	
	<u></u> §170.3	14.a(1) Compute	
		onic Prescribing	
		a)-iii Rena	ame folder to r

b) Configure Screen Settings

- i. Click Settings under the Screen checkbox
- ii. Click Identify Monitors button, then select the monitor that displays the image to be evaluated
- iii. Select a region (e.g., click Full Screen button)
- iv. Click OK button

t	
File Home Heuristic Evalu	ation User Testing Analyze View Settings
	 ✓ Video ✓ Keystroke ✓ Screen ✓ Settings ✓ Settings ✓ Settings ✓ Settings Capture Image(F5) Record(F7) Pause/Resta Record(F8)
Folder	b)-i Click Settings under the Screen checkbox
Projects 4 ×	Screen Settings ×
Add New Product	Select Monitor Monitor 1
My Product	Select Region
My Heuristic Evaluation §170.314.a(1) Compute	Top b)-ii Click Identify Monitors button, then select the monitor that displays the image be evaluated
Electronic Prescribing	Height Full Screen Customize Region
	 Delay(sec): 3 Display immediately after Captu. Show mouse hot spot
	Hot spot radius: 40 ‡ pixels
	Quality 🔘 Low 🔘 Medium 🔘 High
	Note: TURF will minimize its own window and capture the resulting frame after a specified delay.
	OK Cancel
'	b)-iv Click OK button

c) Capture Image

i. Click the Capture Image (or press F5 on the keyboard), (e.g., Click the Capture Image (F5) button to capture the Medication Search screen)

t						
File Home	Heuristic Evalua	ation U	ser Testing	Analyze V	/iew Set	tings
New Edit Folder		Video Settings	Keystroke	Screen	Capture Image(F5)	Record(F7)
Folder				Capture M	erlia	
				c)-	i Click Capture	Image

6.2.2 Physically Mark Problems

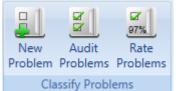
After you inspect the user interface, drag the mouse over the problematic widget to mark it on the screenshot.

a) Mark a Problematic Widget

- i. To mark the problem, **drag the mouse over the widget** (e.g., mark the medication search textbox)
- ii. Click Save to save the mark

	alyze View Settings					
er Folder Folder	Settings Capture Record(77) Pause/Restart Stop Record(78) Record(79) Poblem Problem Spoblem Spoblems					
Folder	Capture Media Classify Problems Report					
jects 🕴 🗶 📑 IMG_1* × 📑 IMG_2*	×					
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My Product Clinic : Clinic Name				Wt : 77.5 kg BMI :		
Last login 12 Oct 20 My Heuristic Evaluation	12 05:45 pm Address1: 1170 Fannin St. • Phone&Email: 777-888-9999 • Allergens: Kr	nown Allerge	ns • Smo	king Status :	io data Directive	e: <u>On File</u>
5 \$170.314.a(1) Compute	and the Handland Lat					
Electropic Describion						
Demographics						_
Allergies	51arch: Add to Order					
Problem list	Drug Details	Quantity 14 tablets	Duration 2 weeks	Begin 26-Oct-2012	End 09-Nov-2012	
Medication list	Atorvastatin 40 mg table - Grat	14 tablets	2 weeks	26-Oct-2012	09-NOV-2012	Edit
Vitals						
Dinical Encour	a)-i drag the mouse over the widget					
Follow-up Note		14 tablets	2 weeks	26-Oct-2012	09-Nov-2012	Edit
Research Stud						
 Je Report Review Reports 	Notes for IS0.1 Left ventricular Failure, 110 Essential Hypertension	14 tablets	2 weeks	26-Oct-2012	09-Nov-2012	-
 A B Pathology 	50 mg tablet - Oral	re capie o	2 meens	20-000-2012	07-101-2012	Edit
Biopsies	Take 1 tablet everyday for I10 Essentalal Hypertension					
Hematology	Aspirin	14 tablets	2 weeks	26-Oct-2012	09-Nov-2012	Edit
Cvtology	75 ma tablet - Ocal					
	100	•••		Marks Unlock	ed 📃 Marks IDs	Prov. 14
				a)-ii Clic	k Save but	ton

6.3 How to classify problems



assity Problems

6.3.1 New Problem

This button creates a new problem file form and allows a user to assign design violation to user-defined marks. After selecting the marks, the location can be further specified in the Problem Location field. The Problem Description field provides a space for describing the heuristic violation in detail. The Design Violation field contains options to specify the heuristic being violated. There are two methods to perform this task:

a) Method 1

- i. With your mouse on the marked problem, right click on the mark, and then left click to select the "Add a problem about this mark" option.
- ii. A problem description form is open. Fill in the required information
- iii. Click the Save button at the bottom right of the screen

■ IMG_1* × 1 ■ IMG_2 ×	
Dr. Physician Name <i>Clinic</i> : Clinic Name Last login 12 Oct 2012 05:45 pm	NAME, Patient (Mr.) Date of Birth : Mar 15, 1960 (52y) State Preferred Name : Patient Last Visit : Oct 30, 2012 Gu Address1: 1170 Fannin St. Phone&Email: 777-888-9999 I
Patient Chart	Medication List
 Patient Summary Demographics Allergies Problem list Medication list Vitals Vitals Clinical Encounter Notes Follow-up Notes Follow-up Notes Follow-up Notes Research Study Notes Report Review Notes Reports Biopsies Hematology Cytology 	S1arch: Drug Details Add to Order Drug Details Add a problem about this mark Atorvastatin Atorvastatin Atorvastatin Atorvastatin Atorvastatin Atorvastatin Add a problem about this mark arks (Take 30 min before for E78.0 Pure hype Losartan 40 mg tablet - Oral Take 1 tablet everyc Send to Back for I50.1 Left ventricular Failure, 110 Essential Hypertension Atenolol 50 mg tablet - Oral Take 1 tablet everyday for I10 Essentaial Hypertension Aspirin 75 mg tablet _ Oral

Untitled ×						• ×				
d Select user-defined marks	Gelect user-defined marks on image(s)									
Image Name	Mark Num	Widget 1	Гуре	Ma	rk Path					
> 🔤 IMG_2	1	Button		My Product\My	Heuristic Evaluat.					
a)-ii Fill in the required infor	nation					Ŧ				
Problem Location	*									
Problem			4	L						
Description				r.						
Design Violation				•						
		a)-	iii Click the Save b	utton		Save				

b) Method 2

- i. Left click the New problem button from the menu panel, this will open a new screen
- ii. Left click on "Select user defined marks on image (s)" at the top of the screen

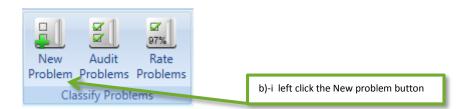
This opens a pop up window that shows all marks on the system. You must limit the scope for the problem description by identifying which marks or widgets this description should be attributed to.

- iii. Select the mark(s) you would like to add description to
- iv. Click on the OK button

Once clicked, a single problem description form is opened. The items displayed on this form are determined by what is built into your template. In our form, we included problem location, problem description, and design violation.

- v. Fill in the required information
- vi. Click the Save button at the bottom right of the screen

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Select user-defined n	narks on image(s)		
Image Name	Mark Num	Widget Type	Mark Path
b)-ii Left click on "Sele	ct user defined marks on image (s)	"	
			~
Problem Location			
Problem Description			^ ·
			v
Design Violation			•
			🛗 Save

Turf Reference Manual

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	Θ	1] 🛃 My Product	Preview:
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			🗉 📝 🔤 IMG_2	
			b)-iii Select the mark(s) you would I	ike to add description to
,				
				b)-iv Click on the OK button
				OK Cancel

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Select user-defined marks on image(s)									
Image Name	Mark Num	Widget Ty	pe	Mark Path					
) 🔤 IMG_2	1	Button		My Product\My Heuristic Evaluat 🔶					
b)-v Fill in the required info	rmation								
Problem Location									
Problem			1	▲					
Description				•					
Design Violation				▼					
		b)-vi Click the Sav	re button					

Note: The design violation list can be modified by the system administrator. See Section 9 of this manual. After entering all the information, please save using the Save button at the bottom.

6.3.2 Audit Problem

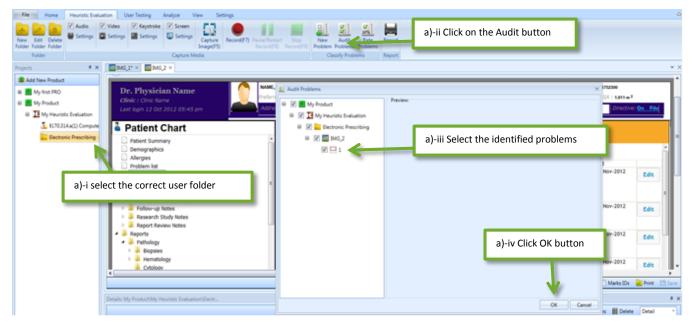
This button displays an Audit Problem tab that allows users to approve, discard, or archive problems. A user must first choose problems to evaluate by selecting a location in the Project Tree. The problems list display can be filtered using the checkboxes at the top. Unclassified problems will have a yellow-orange color that will change colors upon classification. There are three options for classification: archive, agree, and discard. Selecting the archive radio button will save the problem for later consideration and the color will change to purple after saving. Choosing the agree radio button will allow the problem to be rated and change the color to green after saving. Clicking the discard radio button will prevent the problem from being rated and displayed on the report. The color will change to gray after saving. Please be sure to save once you've chosen an option.

a) Audit Problem

i. Select the correct user folder

Turf Reference Manual

- ii. Click on Audit Problem button
- iii. Select the identified problems you want to perform the Audit function on
- iv. Click OK button
- v. Classify each problem as either being agreed to, discarded, or archived
- vi. Click on the Save button





6.3.3 Rate Problem

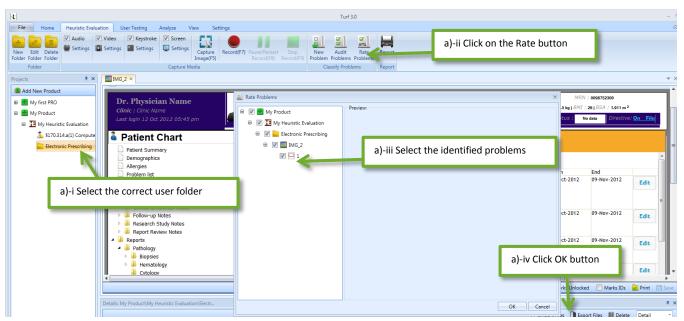
This button provides a place to rate the problems that have been agreed upon. A user must first choose a location with agreed upon problems in the Project Tree. A display similar to the one found in the Audit Problem section will appear with the reference image on the left and list of approved problems on the right. Rating options include 1 (minor), 2 (moderate), 3 (major), and 4 (catastrophic). Review the agreed upon problem and choose the most appropriate rating. Please be sure to save once you've chosen an option.

a) Rate Problem

- i. Select the correct user folder
- ii. Click on Rate Problem button
- iii. Select the identified problems you want to perform the Rate function on
- iv. Click OK button
- v. Classify each problem as either being agreed to, discarded, or archived

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vi. Click on the Save button



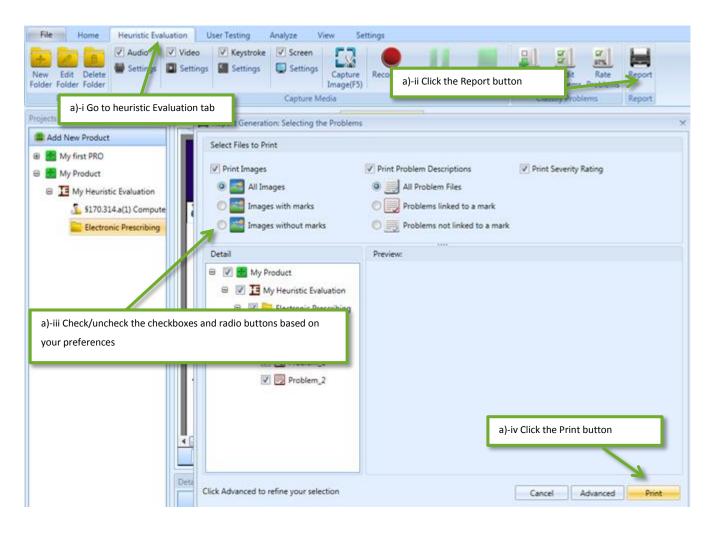
Result		
Mark1 Type:Button Path:N	fy Product\My Heuristic Evaluation\Electronic Prescribing\\IMG2	Ê
 Problem2(msalimi 8/: 	15/2014 10:27:57 AM)	
Problem Location	Search Widget	
Problem Description	Search	^
		≡
		×
Design Violation	04 Minimalism a)-v Review the agreed upon problem and choose the most appropriate	rating
	1(Minor) 2(Moderate) 3(Major) 4(0	Catastrophic) Save
 Problem1(msalimi 8/2 	15/2014 9:45:43 AM)	
Problem Location		a)-vi Click Save button
Problem Description		

6.4 How to print a report

This button allows a user to print a report of the captured problem descriptions, images, and the severity ratings of each problem. Clicking on the Report button will open up a window where the user can choose different options based on his preferences. For example, if you are only interested in generating a report that shows images with identified marks, you will need to check the ckeckbox for the "Print Image", and select "Images with Marks" radio button. Additionally, you will need to uncheck/de-select the other checkboxes and radio buttons. So, based on your preferences, click on the appropriate check boxes and press the Print button at the bottom of the window for your paper report.

a) Generate Heuristic Evaluation Report

- i. Go to heuristic Evaluation tab
- ii. Click the Report button
- iii. Check/uncheck the checkboxes and radio buttons based on your preferences
- iv. Click the print button at the bottom of the page
- v. Print the report or export it in your preferred format by clicking on the correspond buttons





7. Installing Turf for Android-Capture events using Turf Android

7.1 Installing Turf for Android

The **Install Turf for Android** button allows you to install Turf on your android smartphone or tablet device. Once you have Turf installed on your device, you can start capturing the screen and events of your android device. To learn more about using Turf in an android device, please click here.

7.1.1 How to setup your device

The number of steps or the suggested configuration may vary depending on the devices. The following are suggested steps for any devices with Android 5 or greater. Here, we will present the instructions for Nexus 9 tablet.

Step 1: Check your android version

Setting >> System >> About tablet >> Android Version

The version of your Android device OS must be at least 5.0. If the OS version is less than 5, please upgrade it to Android 5.0 or later.

Step 2: Enable Developers mode

- i. Go to Settings
- ii. Slide down to the "System" panel
- iii. Click on "About tablet"`
- iv. Press the "Build Number" item seven times

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a)-i Go to settings	ettings		م
	Device		
	✿ Home	Display	
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a)-ii Slide down to the "System" panel	System		
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a)-iii Click on "About tablet"	(i) About tablet		
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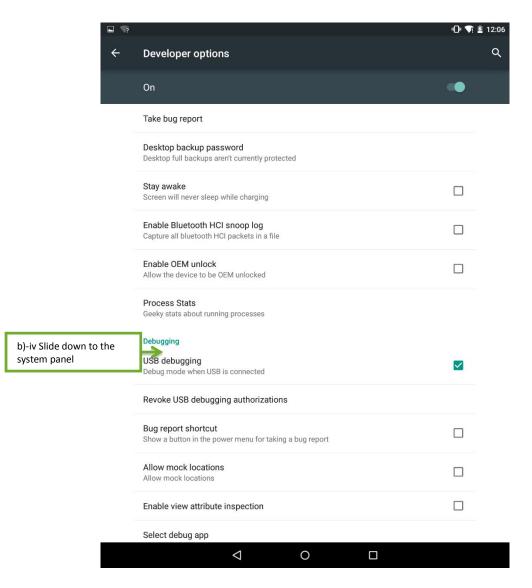
-		- i 🛈 💎 🗐 1
	About tablet	(
	System updates	
	Status Status of the battery, network, and other information	
	Legal information	
	Regulatory information	
	Send feedback about this device	
	Model number Nexus 9	
	Android version 5.0.1	
	Kernel version 3.10.40-ga3846f1 android-build@vpbs1.mtv.corp.google.com #1 Thu Nov 6 01:39:45 UTC 2014	
	Build nur a)-iv Press the "Build LRX22C Number" item 7 times	



Step 3: Configure Developer settings

- i. Go to Settings
- ii. Slide down to the "System" panel
- iii. Click on "Developer options"
- iv. Check the checkbox to select "USB debugging"

?		• ال • •	j 🖻 12:05
)-i Go to settings	Settings		۹
	Device		
	✿ Home	Display	
	Sound & notification	Storage	
	Battery	Apps	
	L Users	🛄 🖤 Тар & рау	
	Personal		
	Location	Security	
	Accounts	Language & input	
	Backup & reset		
b)-ii Slide down to the system panel	System		
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	🖶 Printing	{ } Developer option b)-iii Cli "Developer option	ck on the oper Options'
	About tablet		
	\triangleleft	0	



Step 4: Enable side loading apps

Open Settings >> Personal >> Security >> Device Administration

a) Set Unknown Sources to ON

7.1.2 Device Driver Setup

Connect your device to the computer using USB. If you are connecting the device for the first time, windows should automatically detect and install it and you will see a "Installing device...." window. This will appear only the first time you connect your device to your computer.

Installing device...

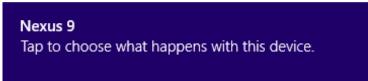


Please wait while Setup installs necessa several minutes. Windows automatically install s your device once you connect it to the computer

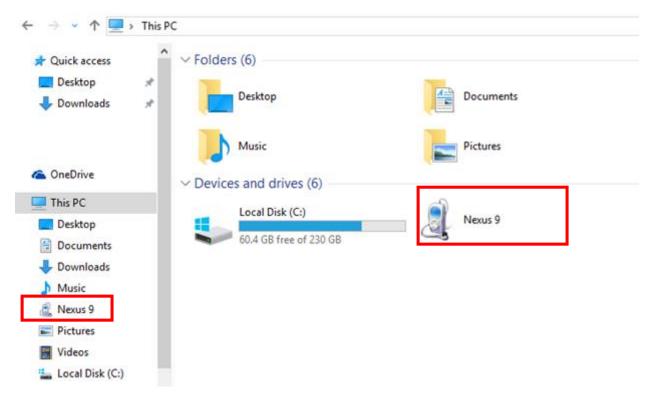
onnect ay take



After successfully installing the device, you will see a notification, such as the one below.



Go to "My Places / This PC / My Computer", and check if you can see your device name.

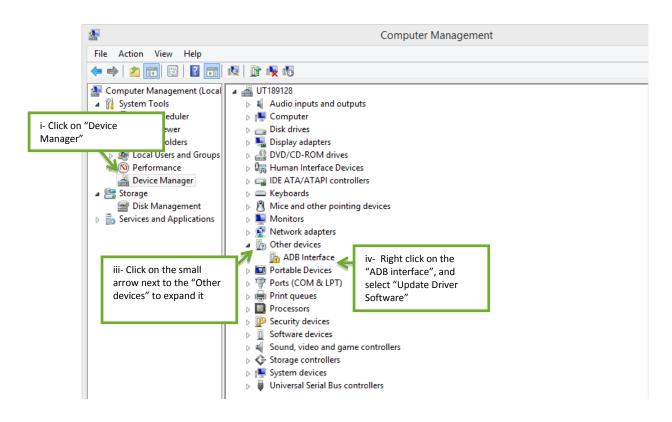


If Windows does not recognize your device, you won't see your device name. Contact your device vendor to obtain appropriate drivers.

Now, you can launch Turf and start installing the Turf for Android. For instructions, please click here.

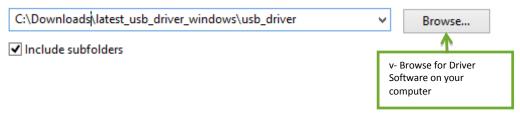
Note: If Turf does not detect your device, you need to check if you have

- 1) Activated USB debugging and permitted the installation of 3rd party applications on your device.
- 2) Installed the appropriate device drivers for ADB interface. Please follow the following steps to install drivers for ADB interface (Only for Google Nexus Devices. For others, refer to vendor sites) :
 - i. Go to "Device Manager"
 - ii. Click on the small arrow next to "Android Device" to expand it.
 - iii. If "Android Composite ADB interface" is present, drivers are correctly installed.
 - a. If you do not see this, your device may appear as "Other device". Click on the small arrow next to the "Other devices" to expand it.
 - iv. Right click on the "ADB interface", and select "Update Driver Software". Before doing this, make sure you have already downloaded the appropriate driver software. For instructions on how to download driver for Google Nexus devices, please click here.
 - v. Browse for Driver software on your computer and wait for the device to be installed and enabled
 - vi. After installation unplug the device



Browse for driver software on your computer

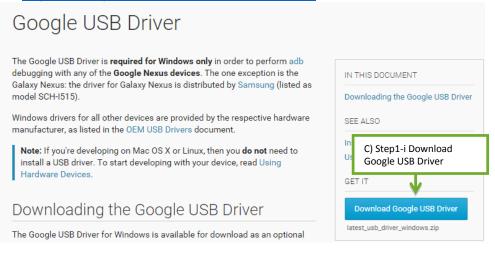
Search for driver software in this location:



7.1.3 Install USB driver in Windows

Step1: Download

i. Go to the following link to download the Google USB Driver on your desktop computer http://developer.android.com/sdk/win-usb.html.



Step2: Instructions for installing the driver

- i. Unzip the downloaded folder by extracting its components
- ii. Connect your Android device to your computer using a USB
- iii. Right click on the Computer icon and click on the "Manage" item
- iv. Click on "Device Manager" from the left panel
- v. Click on the small arrow next to the "Other devices" to expand it
- vi. Right click on the "ADB interface", and select "Update Driver Software"
- vii. Browse for Driver software on your computer and wait for the device to be installed and enabled
- viii. After installation unplug the device

7.1.4 Configuration and Installation

Follow the following steps to utilize the Turf android app. The number of steps or the suggested configuration may vary depending on the devices. The following are suggested steps for any devices with Android 4.4 or greater.

a. Turf Installation on Android Devices

Step1: Install Android in Turf

- i. Connect the device to your computer
- ii. Open Turf
- iii. Go to Settings
- iv. Select "Install android"
- v. Click on the "Install" button

Step2: Activating Turf Keyboard and Turf Launcher

- i. Open the Android device
- ii. Go to Settings
- iii. Go to "Personal" panel
- iv. Click on "Language and input"
- v. On the "Language & input" screen, click on "Current keyboard"
- vi. Click on "CHOOSE KEYBOARDS"
- vii. Turn on the "turf Keyboard" item
- viii. Click on the OK button on the "Attention" window
- ix. Get back to the "language & input" window and click on "Current Keyboard"
- x. Click on the "turf Keyboard" radio button to select it
- xi. Go back to Settings
- xii. Go to the "Device" panel
- xiii. Click on the "Home" item
- xiv. Click on "Turf launcher" radio button to select it

🕕 💎 🖻 12:05 Q Settings d) step2-ii Go to settings Device Ð Home Display A Sound & notification ¢ : Storage Ê Battery ð Apps • Users **(**1) Tap & pay d) step2-iii Go to € Personal "Personal' panel 9 Location e Security d) step2-iv Click on "Language & input" • Accounts Language & i 0 Backup & reset System (Date & time Ť Accessibility ē Printing {} Developer options () About tablet \bigtriangledown 0

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	Text-to-speech output		
	Mouse/trackpad		
	Pointer speed		
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Google Korean Input Korean	
Google Pinyin Input Chinese Pinyin	
Google voice typing Automatic	••
Google Zhuyin Input Chinese Zhuyin	
turf Keyboard	▲ ⁽⁾
	d) step2-vii Turn on "Turf Keyboard" item

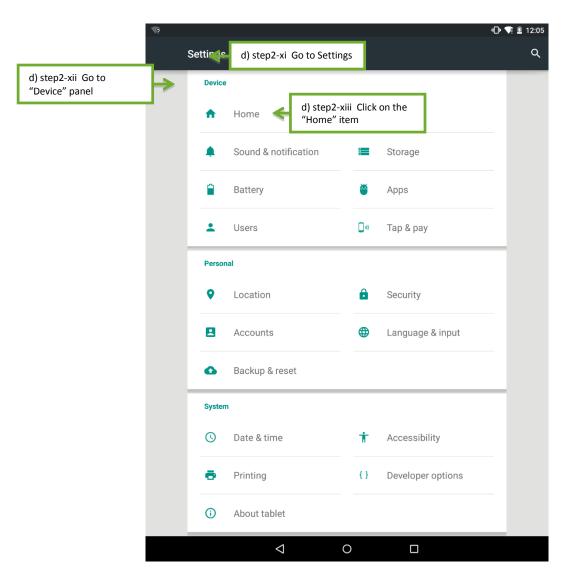
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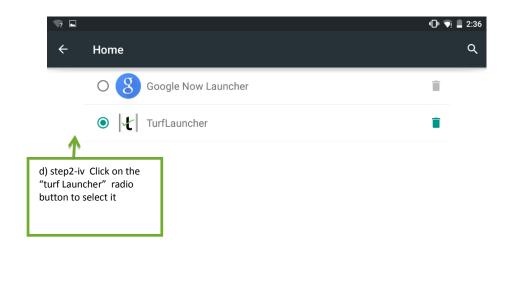
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	Google Korean Input Korean	-
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	Auto Goo Chinese Zhuyin	CANCEL OK
	turf Keyboard	d) step2-viii Click on OK button

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After successfully installing Turf on your Android device, you will be able to use Turf Android features.

Note: After you finish working with Turf, make sure to turn off the Turf keyboard and launcher in your android device. This is to ensure that your device activities are not being logged.

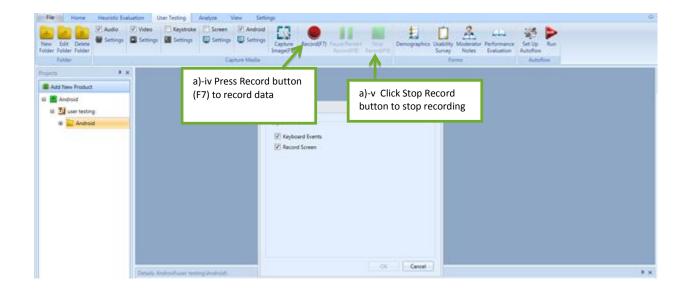
7.2 Capture events using Turf Android

a) Follow the following steps to use Turf Android features

- i. Go to User Testing tab, select the folder where you want to store your data
- ii. Check the checkbox for **Android** in the Capture Media ribbon, under the User Testing tab at the top of the screen, to select it
- iii. Click on Android Settings to select the parameters that you would like to capture

- iv. Press Record (F7) button to record data
- v. Once you are done with recording, click Stop Record (F9) button to stop the recording.

File Hereine H	a)-ii Check the chechbox in front of the Android item to select it	Antonio Antonio
tab	a)-iii Click on the Settings to select the parameters that you want to capture	
Details Autoid'une testing Auto	CK Cancel	* ×



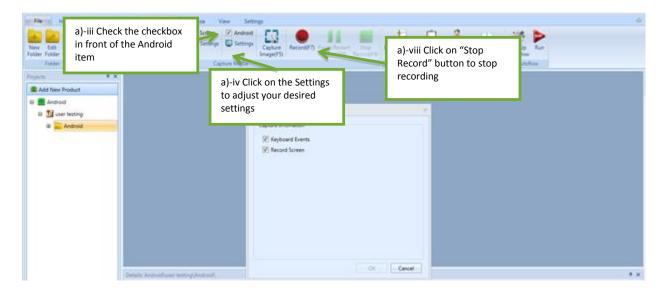
8. Using Turf Android App- Example

8.1 Using Turf Android app: Conduct a User Testing Project and analyze it

a) Perform a User testing project

- i. Open Turf on your computer
- ii. Create a User Testing Project in Turf- For instructions on how to create a user Testing file, click on the following link (https://sbmi.uth.edu/nccd/turf/training-media/)
- iii. On the "User Testing" tab, check the checkbox in front of the "Android" item
- iv. Click on the Settings to adjust the desired settings
 - a. Checking the keyboard events checkbox will allow for recording keyboard activity (only if you have already set Turf Keyboard as the active input on your android device, please refer to settings on how to setup Turf for Android)
 - b. Checking the Record screen checkbox will allow for recording all screen activity. The recordings are initially saved in the device and then moved to the computer.
- v. Click on the Record button or press F7
- vi. Example task in your android device: Launch the Chrome application on your android device
 - a. Click in the address bar and type http://drogith.com/dehr
 - b. In the search bar, enter Metformin
 - c. Pick Metformin 500mg Oral tablet
 - d. Click on the "Add to Order" button
 - e. On the pop up window (Edit Medications Details), click the "Add" button to add a problem
 - f. Select "E11.9 Non-insulin dependent Capture" from the dropdown list
 - g. Click the "Add" button
 - h. Enter a dose for medication, e.g., 500 mg
 - i. Enter 30days for the "duration"
 - j. Select oral as the rout from the drop down menu
 - k. Enter 30 in the "Dispense" field
 - I. Enter 1 for the "Take" field
 - m. Select "BID" for the "Frequency" field
 - n. Choose "Start" and "End" Date
 - o. Enter "Take after meals" for the "Pt instruction field"
 - p. Click on the "Save and Close" button
 - q. Click on the "Sign Order" button
 - r. Click on the "Confirm" button
- vii. Now, return to Turf in your computer
- viii. Click on "Stop Record" button (F9) to stop recording
- ix. Turf will upload the saved files from your android device to computer. This might take a while, do not disconnect your device.

Once completed, the recordings will be available in Turf for analysis

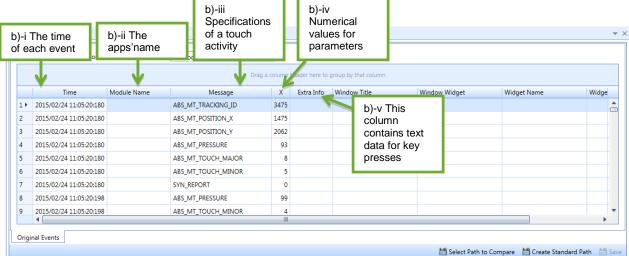


b) Using Turf android app: Analyze the recordings

Double click on the recorded files on the "Details" panel to view their content (Make sure that you have selected the desired folder). Double click on the windows event file to view the recorded key events

- i. The first column records the time of each event
- ii. The second column records the name of apps that used during the recording. If it is empty, it shows that only the main system was used.
- iii. The third column describes the specifications of a touch activity. A touch action is defined by the finger id, width of touching finger, pressure, and the x, y location on the screen. As a result, a single touch might be presented with 2-8 rows in the event file. Subsequently, a single gesture series of touch can have as many as 20-40 rows in the event file.
- iv. The fourth column provides numerical values for x, y and other parameters
- v. The fifth column contains the text data for key presses. As the number of rows that a single touch can have is more than one, the key press data can also have more than one row.

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9. User Testing Procedures

9.1 Launch and Set Up a New User Testing Project

9.1.1 Launch Turf

After loading the software on the computer, a user will launch Turf by double clicking on the Turf desktop icon. Then the user will see the File interface where she can create a new product for the heuristic evaluation.

9.1.2 Create a New Product

a) Create a new product evaluation folder

- i. Go to Home tab
- ii. Click the Add New Product
- iii. Enter the product name (e.g., Alpha)
- iv. Enter the product version (e.g., Alpha)
- v. Enter the vendor name (e.g., SharpC)
- vi. Click the Save button

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File Home Heuristic Evaluation	on User Testing	Analyze	View	Settings
Heuristic L a)-i Go to Home tab Evaluation Te New Project				
Projects 4 ×			a)-iii nam	Enter the product e
Add New Product	🚰 New Product [Details	7	×
	Product:		6	a)-iv Enter the produ
	Version:		K	version
	Vendor:	Save	Cancel	
a)-v E name	Enter the vendor	R	a)-v	i Click the Save
			but	

9.1.3 Set up a New User Testing Project Folder

After you set up a new product, choose the type of usability method (e.g., Heuristic Evaluation or User Testing) to conduct. In this case, choose User Testing.

a) Create a User Testing project folder

- i. On the projects panel, click on the User Testing icon
- ii. Fill in User Testing project information in the pop-out window
- Select the predefined use cases, e.g., check Electronic Prescribing and Clinical Information Reconciliation. You cannot add these to a project later, so choose all you think you will use now. We have included the NIST Use Case documents for the eight required functions for Meaningful Use Stage 2. Your administrator may add other reference materials for you.
- iv. Click the **Next** button

t	
File Home Heuristic Evalua	ation User Testing Analyze View Settings
E U	
Heuristic User Evaluation Testing	
a)-i Click th Testing fold	er a)-ii Fill in User Testing project
Projects 🛛 🕂 🗙	User Testing Project X
📕 Add New Product	
🗄 🛃 My first PRO	Create User Testing Project
My Product	Location: My Product\My User Testing
My Heuristic Evaluation	Project Name:* My User Testing Description:
🚡 §170.314.a(1) Compute	
Electronic Prescribing	
	Select predefined use case(s)
	5170.314.a(1) Computerized provider order entry
a)-iii Select the predefined use cases	🔲 🚡 §170.314.a(16) Electronic Medical Administration Record
	§170.314.a(2) Drug-drug, drug-allergy interaction checks §170.314.a(6) Medication list
	5170.314.a(7) Medication allergy list
	 §170.314.a(8) Clinical decision support §170.314.b(3) Electronic prescribing
	5170.314.b(4) Clinical Information Reconciliation
	a)-iv Click the Next button
	Back Next Finish Cancel

9.1.4 Associate Data Forms with Your Project

In this step you will associate the correct form with the button from which you will access it. You cannot add these to a project later, so it is best to choose any you think you will use now.

a) Associate data forms with your project

- i. Using the drop down menu, **select** the data templates you want to use
- ii. The **Advanced Settings** button allows you to customize the naming conventions for your image, video and problem files. For now, we will use the default settings

iii. Click Finish button

Se	lect Testing Templates				
	Туре	Select Template			
	Demographic Tem	Demographics	Ŧ	Preview	
	Survey Template	Isability Scale (SUS)	*	Preview	
	Moderator Note	Moderator Notes	•	Preview	
•	Performance Evalu	ormance Evaluation	•	Preview	
)-ii The Advanced Settings I aming conventions for your				
n No		image, video and proble ate options here. Fur	m fi	les	

9.2 Autoflow



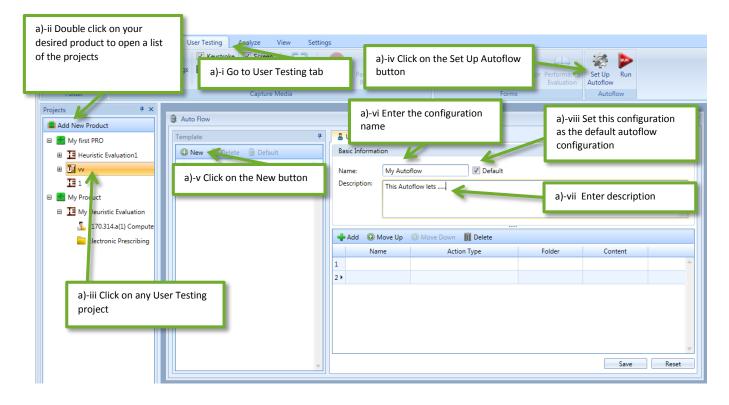
Autoflow allows the moderator to automate user testing session in a step by step fashion. The moderator can predefine actions, including, "Display PDF File", "Display RTF File", "Display Video File", "Capture image", "Fill in Demographic", "Fill in SUS", "Fill in Moderator Notes", and "Fill in Performance Notes". When you run an Autoflow session, Turf will follow the default configuration, and process its actions automatically.

9.2.1 Set Up Autoflow

Before a user can start using Autoflow, a configuration must first be created and designated.

a) Autoflow Configuration- Part 1

- i. Go to **User Testing** tab
- ii. Double click on your desired product to open a list of the projects
- iii. Click on any User Testing project
- iv. Click on the **Set Up Autoflow** button in the autoflow ribbon under the user testing tab at the top of the screen
- v. In the left panel of the data capture configuration dialog, **click the new button**. This will open up an untitled screen on the right panel
- vi. Enter the basic information, enter the configuration name
- vii. Enter the description of the product
- viii. Set this configuration as the **default** autoflow configuration by checking the default checkbox



b) Autoflow Configuration- Part 2

- ix. Click **the add button** on the data capture configuration, to add a new action for this configuration
- x. Enter the action name, e.g., "Informed consent"
- xi. Select Display PDf file from the drop down menu under the "Action Type" column
- xii. **Click the** button with three dots under the Content column, **a dialog will pop up** for you to choose the PDF file you want to display

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xiii. **Double click on the PDF** file then you can see the name of the PDF file under the Content column

To add more actions, follow the same steps.

xiv. Click on the Save button

Please note that clicking the Reset button will revert the form to its original state.

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b)-ix Click the add button	Add Move Up Move Down Delete			
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	1 I "I normed consent" Display PDF File		AnalyticsReport	A
b)-x Enter the action name	b)-xi Select the action you would like to add, e.g., "Display PDF File"	b)-xiii Choose would like to u		*
v			Save	Reset
9.2.2 Run Autoflo	b)-xiv Click on the S button	ave		

Once the default configuration has been set, a user can start the Autoflow process. The steps will vary depending on your configuration, but the basics will be covered here. For navigation, a user can click on the **Next**, **Skip**, or **End Session** buttons. The next button will bring a user to the next step. The skip button will skip the following step and move the user to the step after. The end session button will close and save all filled information up to that point. During a screen recording session, a user or moderator can use the following keyboard shortcuts: F8 to pause the recording or F9 to stop the recording. Buttons are also available for these shortcuts at the top of the screen. Once a user has reached the last step, click the **End Session** button to finish.

Auto Flow	_ 8
Informed Consent	
<i>Test Company</i> would like to thank you for participating in this study. The purpose of this sture electronic health records system. If you decide to participate, you will be asked to perform se prototype and give your feedback. The study will last about 60 minutes. At the conclusion of compensated for your time.	several tasks using the
Agreement I understand and agree that as a voluntary participant in the present study conducted by <i>Test</i> withdraw consent or discontinue participation at any time. I understand and agree to particip conducted and videotaped by the <i>Test Company</i> .	<i>t Company</i> I am free to pate in the study
I understand and consent to the use and release of the videotape by <i>Test Company</i> . I understa and videotape is for research purposes only and that my name and image will not be used for research. I relinquish any rights to the videotape and understand the videotape may be copiec <i>Company</i> without further permission.	or any purpose other than
I understand and agree that the purpose of this study is to make software applications more u future.	useful and usable in the
I understand and agree that the data collected from this study may be shared with outside of <i>Company's</i> client. I understand and agree that data confidentiality is assured, because only d identification numbers not names – will be used in analysis and reporting of the results.	Test Company and Test de-identified data – i.e.,
I agree to immediately raise any concerns or areas of discomfort with the study administrator leave at any time.	or. I understand that I can
Please check one of the following: YES, I have read the above statement and agree to be a participant. NO, I choose not to participate in this study.	
Signature: Date:	_
End Session Current Step/Total Steps :1/2 Step Name :Informed	Consent Previous Next Skip
	e next button will take a er to the next step
The end session button will	
close and save all filled	The skip button will skip
information	the following step and
	move the user to the step

10. User Testing Analysis

Analyzing Windows Events files gives you more insight into the captured data. Clicking on Windows Events files opens up a wide screen with multiple tabs. The functions included in each tab assist you in obtaining more information regarding the captured data. The number of tabs in the latest version of Turf is 7. In the following, we will discuss each tab in more details.

a) Computed Events

This tab allows for evaluating task paths. Here, you can choose whether or not the taken path is correct using the radio buttons listed on the right top corner of the screen. Also, you will be able to choose whether the taken path has minor or major deviations. In addition, you will get more information about the Mouse and Keyboard events associated with each captured module using the drop down box at the top of the page.

ota	al Time:	0Hr 0Min 7.766Se	c Total Errors:U								ons O Major De	viations 💿 Pending D	recision
_		Duration(ms)	Module Name	Window Title	Window Widget		Widget Id	eader here to group by Message	X	Y	Extra Info	Error Coding	
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		46	CamtasiaStudi	Camtasia Studio	pane			Left mouse click	931	120			
		616						Mouse move	234	239			
		4						No Action					
		83	CamtasiaStudi	Camtasia Studio	list			Left mouse click	234	239			
		1184						Mouse move	388	1036			
		4						No Action					
		229	explorer.exe		button	Turf 3.0		Mouse hover	388	1036			
		87	explorer.exe		button	Turf 3.0		Left mouse click	388	1036			
)		2624						Mouse move	790	64			
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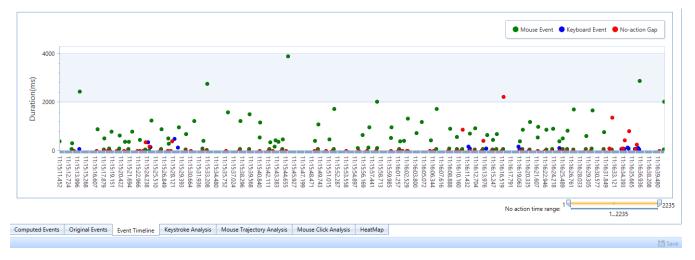
b) Original Events

On this tab, you will get more information about the mouse and keyboard events associated with each module. For example, you can see the time and data that each event was recorded.

					Drag a	a column header here to g	group by that column				
	Time	Module Name	Message	x	Extra Info	Window Title	Window Widget	Widget Name	Widget Id	Y	
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2	2015/07/30 11:54:50:342		WM_MOUSEMOVE	692						577	
3	2015/07/30 11:54:50:420		WM_MOUSEMOVE	696						419	
4	2015/07/30 11:54:50:425		WM_MOUSEMOVE	696						403	
5	2015/07/30 11:54:50:429		WM_MOUSEMOVE	696						387	
5	2015/07/30 11:54:50:436		WM_MOUSEMOVE	696						367	
7	2015/07/30 11:54:50:468		WM_MOUSEMOVE	696						307	
3	2015/07/30 11:54:50:472		WM_MOUSEMOVE	698						287	
9	2015/07/30 11:54:50:475		WM_MOUSEMOVE	700						264	
10	2015/07/30 11:54:50:486		WM_MOUSEMOVE	703						244	
11	2015/07/30 11:54:50:492		WM_MOUSEMOVE	706						226	
12	2015/07/30 11:54:50:527		WM_MOUSEMOVE	721						173	
13	2015/07/30 11:54:50:531		WM_MOUSEMOVE	728						160	
	2010/07/20 11 04 00 022		WALMOUGENOUS	776						4.00	

c) Events Timeline

The duration of each recorded mouse and keyboard event in milliseconds is displayed here. Turf indicates mouse events with green dots while keyboard event are represented by blue dots. As an example, very long mouse actions might show that user is not familiar with the system or the order of the widgets on the recorded screen is not appropriate. The red dots show that the user had no action during the specified time.

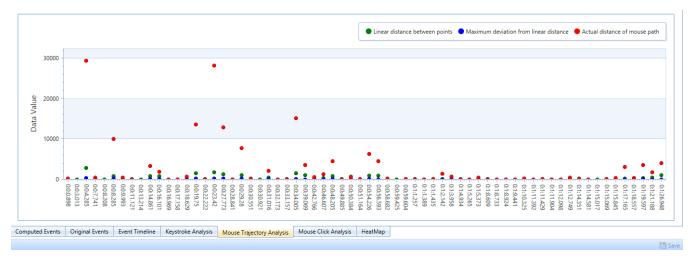


d) Keystroke Analysis

The number of typed letters and words, as well as, the number of times a user had to use the delete and backspace buttons will be displayed here.

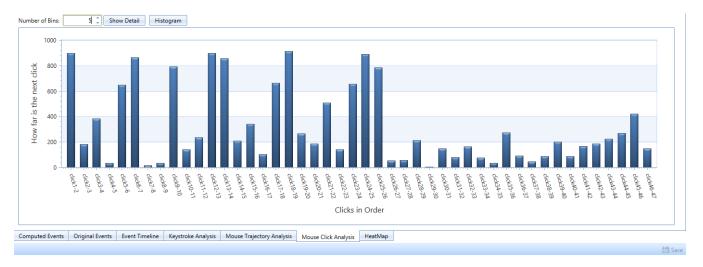
e) Mouse Trajectory Analysis

Using this tab, you will be able to assess the effect of training and/or investigate any distracting widget which will lead to deviated path.



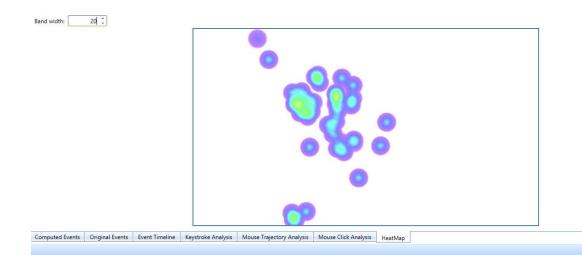
f) Mouse Click Analysis

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g) Heat Map

This tab assists moderators to identify users' concentration points. The coordination of users' mouse events along with their frequency are used to generate the heat map.



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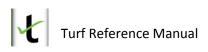
11. OneDrive-Upload/Download your projects using OneDrive

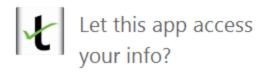
11.1 Upload to OneDrive

- a) Follow the following steps to upload your projects to OneDrive
- i. Go to the **File** Tab.
- ii. Click **OneDrive** button on the left navigation bar
- iii. Click on the login button at the bottom right of the screen
- iv. Enter your username and password to log in to your OneDrive account. If you do not have an account, you will need to create one
- v. An alert window will pop up warning that Turf will access your account info- Click on the Yes button to proceed to the next step
- vi. Go to Setting Tab
- vii. Click OneDrive Settings button
- viii. Change the value of the first field, "Automatically upload files to OneDrive" to True, if it is set to False. Setting the value to True allows you to synch your local files with the uploaded files. This means that every changes that you make to your local files will be automatically applied to their counterparts in OneDrive.
- ix. Go to the Projects panel tab- (Click on the Home tab)
- x. Right click on your desired folder. Go to "OneDrive" menu item, next, click on "Include in Sync"
- xi. If the value for "Automatically upload files to OneDrive" field is not set to True, you must click "Sync Now" from the context menu.
- xii. An icon on the right lower corner of the screen will appear indicating that the data are being uploaded
- xiii. Upon uploading a project / folder, you will notice that TurfData4.0 folder is also created in
 OneDrive.This folder will include data from Turf. The organization of sub-folders is as follows: Product
 >> Project >> Folders >> Files.

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ConeDrive			a)-ii Click on the									
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							Poutlook.com	-	a)-iv Enter your username and			
						Password	•••••		password			
						Sign in						
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							a Microsoft accoun	? Sign up now				
						Priv	vacy & Cookies Tem ©2015 Microsof					
										a)-iii Click on the Login button		
		<u></u>								,	↓	
						 					Login	Logout





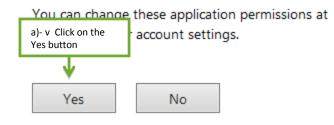
Turf 4.0 needs your permission to:

Access your name, gender, display picture, contacts, and friends

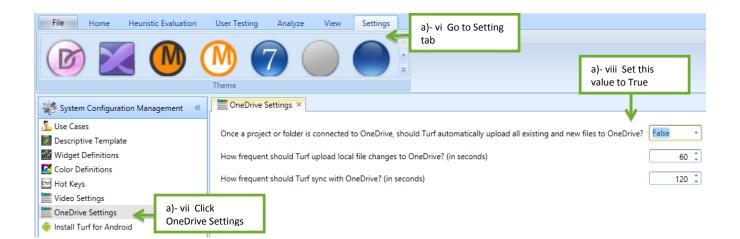
Access and edit your OneDrive

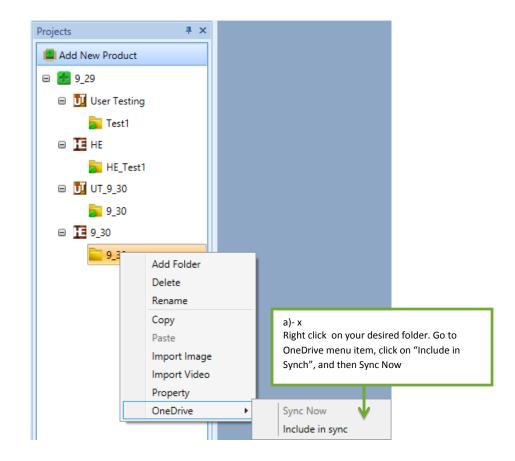
Access your info anytime

View photos and documents on OneDrive



Privacy & Cookies | Terms of Use © 2015 Microsoft





Details: New pro\User Testing\Record_step	s\							4	×
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Win_1		Window Events	3/26/2015 11:07:08 AM	msalimi	283 B				
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ne:01:19:29									6

b) If you do not want to synchronize your local data files with OneDrive:

- i. Right click on your desired folder.
- ii. Go to "OneDrive" menu item, click on "Exclude from Sync".

- iii. "Exclude from Sync" will simply stop syncing the files with their counterparts in OneDrive
- iv. This will not remove the already uploaded data in OneDrive.
- v. You can manually delete the Product / Project / File from OneDrive from any OneDrive app

11.2 Sharing Turf data on OneDrive with other team members

Do you want to import the Turf files that your team members have worked on into your Turf application? It is simple, as long as they have shared these data with you on OneDrive.

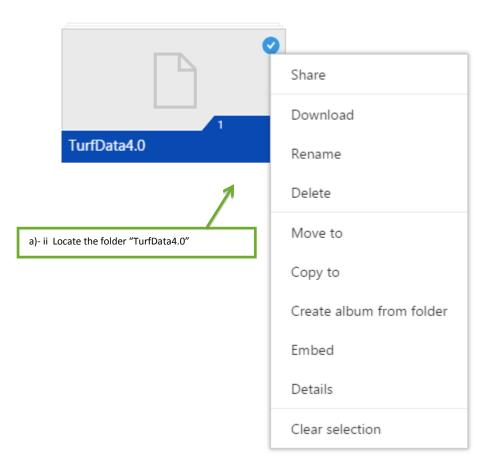
a) Sharing your Turf data with others:

To share data with others, you need to access to your OneDrive folder:

- i. Use your browser or any OneDrive applications to go to your OneDrive account where you will be able to share your files with others
- ii. Locate the folder "TurfData4.0".
- iii. Select the folder and edit its share options.
- iv. Share the folder with Edit previleges.
- v. The shared user will get an email notification.

Accepting shared data from others

If someone has shared their Turf data with you, you will receive an email notification about the share. Follow the instructions in the email to accept the share. You need not add the shared folder to your OneDrive. Simply accepting the share will be naough. You should be able to access the folder under Shared Files section in OneDrive.



Share		Invite people to "TurfData4.0"
Invite people	I	Enter contacts to send an email with a link to this item.
Get a link	1	To
Shared with		x@ <u>xxxx</u> .com
Shared with		Add a quick note
		Recipients can edit
		Recipients need to sign in with a Microsoft account
a)- iv Share the folder with edit previle	ges	
		Share Close

11.3 Importing Turf data from OneDrive

Are your User Testing or Heuristic Evaluation files damaged? Or do you want to download the folders that your teammates have shared with you on OneDrive into Turf?

In general, the file (s) /folder (s) that are uploaded to OneDrive can be imported into a Turf project, or product. They come from two different sources: (1) The ones that you have already uploaded to OneDrive, or (2) the ones that your colleagues have shared with you on OneDrive.

To import a project from OneDrive to a Turf product:

Right click on a product >> Go to OneDrive >> Select import a project from the OneDrive menu item.

Similarly, to import a folder to a Turf project:

Right click on a project >> Go to OneDrive >> Select import a folder from the OneDrive menu item.

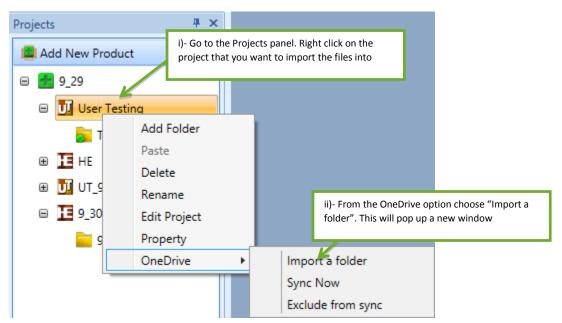
The files/folders that you have uploaded to OneDrive will be displayed in "My Files" tab, whereas, the files that your teammates have shared with you will be displayed on "Shared Files" tab.

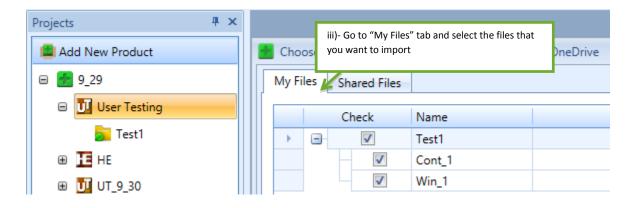
When importing a Project or Folder to "My Files" tab, you will only see the folders and files that are synced with that particular project and folder. This means that you will not be able to import folders or files from a different project or product using OneDrive function. However, if you use "Shared Files" tab, you will be able to import any projects / folders / files to your local projects or folders.

The following steps demonstrate how you can import your uploaded data files to a project folder:

- i. Go to the Projects panel. Right click on the project that you want to import the files into.
- ii. From the OneDrive menu item, choose "Import a folder". This will pop up a new window.
- iii. The new window contains two tabs, "My Files", and "Shared File". Go to "My Files" tab and select the files that you want to import

iv. Click OK button





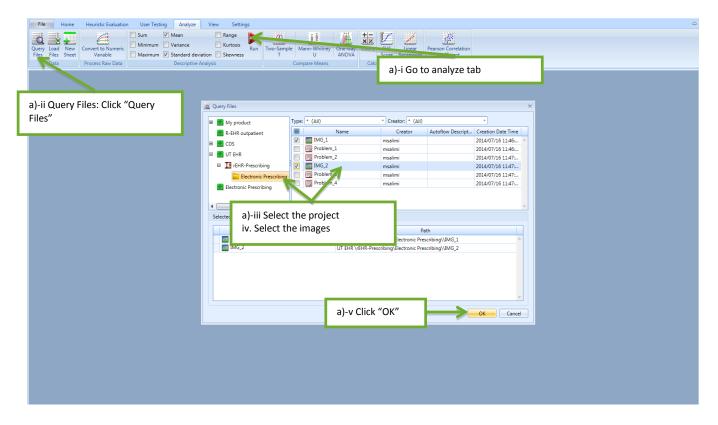
12. Analytic Procedures

12.1 How to Process Raw Data

Most of the statistical techniques can be used only with numeric data. During data collection, numeric data may be stored as other data types, such as a string. The **Convert to Numeric Variable** function can be used to convert the data from other types to numerical type.

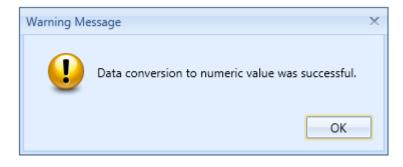
a) Query Files:

- i. Go to Analyze tab
- ii. Click Query Files
- iii. Select a product, e.g. Demo EHR -> Select a project, e.g. Heuristic Evaluation 1 -> Select a folder, e.g.: Electronic prescribing ->
- iv. Select the images where usability problems have been identified in previous steps
- v. Click OK



- b) Select the numeric data. To select multiple rows, hold down Ctrl button while clicking on each row
- c) Click the Convert to Numeric Variable button

File Home Heuristic Evaluation User Testing Analyze View Settings Query Load New Convert to Numeric Sum Mean Range Runding Query Load New Convert to Numeric Minimum Variable Runding Rund	Two-Sample Mann-Whitney One-way Court Sut Sut Linear Compare Means	۵ ?					
Image 1x Image Name C) Click the "Convert to Numeric Num Variable" button.							
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1 139 8 5) Sciect inc	Inside 3 Jutton Inside 4 Jutton						



12.2 How to Do Descriptive Analysis

The descriptive analysis within Turf include calculating the sum, mean, variance, standard deviation, range, minimum and maximum data, kurtosis and skewness. You choose the analytic method(s) that you want to apply, and then generate analysis results. These descriptive analysis results may help to assess the overall usability level of a product and identify the major usability problems. The Descriptive Analysis can be done with data collected from Heuristics Evaluation as well as User Testing.

Calculate the mean, range, minimum and maximum of severity scores:

For the severity scores assigned to problems, we are interested in the mean of severity scores, also the range, minimum and maximum scores. The following instructions are based on the data collected from Heuristic evaluation. However, it can also be done on the data collected from User Testing.

- a) Query Files:
 - i. Go to Analyze tab
 - ii. Click Query Files
 - Select a product, e.g. Demo EHR -> Select a project, e.g. Heuristic Evaluation 1 -> Select a folder,
 e.g.: Electronic prescribing ->
 - iv. Select the images where usability problems have been identified in previous steps
 - v. Click OK

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File Home Heuristic Evaluation User Testing Analyz Query Load New Sum Mean Query Load New Sum Mean Variable Process Raw Dats Maximum Variance	Range Kurtosis eviation Skewness Run Two-Sample Mann-Whitney U ANOVA	SIS Linear Peerson Correlation	۵
a)-ii Query Files: Click "Query Files"	Query Files Wy product Ware RetHR outpatient Outpatient Declarit De	Creator (JU) Creator Autoflov Descript. Creation Date Time maalimi 2014/07/15 1146 2014/07/15 1147 maalimi 2014/07/15 1147 maalimi 2014/07/15 1147 Path Jectronic Prescribing\UMG_1 Prescribing\Electronic Prescribing\UMG_2 Ck "OK" OK Cancel	

- b) Drag the **Image Name** to the lower panel. By doing this, the Image Name will be added to the existing columns and the name of images falls under this heading.
- c) Select the column of Average Score
- d) Check the checkboxes of Minimum and Maximum
- e) Click the Run button

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d) Check the checkboxes of "Minimum" and "Maximum".	☆ ?
Query, Load New Files Convert to Numeric Vanable Sum Mean Range Kurtosis Data Process Raw Data Descriptive Analysis Two Sample Descriptive Analysis Image Run Image Convert to Numeric U Image Convert to Numeric Vanable Pearson Correlation colicitate Image Run	
e) Click "Run"	Analysis Re
Num Left b) Drag "Image Name" to the lower panel	port Board
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1 139 86 146 155 Inside 3 utton 2 314 125 406 314 Inside 4 utton	
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Data Process namona Descriptive analytics Compare means Compare means Compare means Compare means Compare means Compare means Compare means	▼ X Ana
Drag a column header here to group by that column	ilysis Rep
Name Minimum Maximum Mean Standard Devition	aport Boi
Average Score 1 4 2.75 1.26	Board

Here, Turf displays the descriptive analysis results based on your selections.

12.3 How to Compare Means

12.3.1 Two-Sample T test

Two-Sample T test helps to determine whether the means of two different data sets differ. For example, a group of physicians was asked to do E-prescribing using EHR1, another group of physicians was asked to do the same task using EHR2. Now, we are interested in comparing the mean task time for E-prescribing based on the data collected from both groups. **Note:** The Two-Sample T test only focuses on two different sets of data, and requires that the distribution of data be normal. If you need to compare means among multiple data sets, other hypothesis tests, such as One-way ANOVA should be used.

b) Query task time

- i. Go to Analyze tab
- ii. Click Query Files button
- Select a product, e.g. Demo EHR -> Select a project, e.g. User Testing 1 -> Select a folder, e.g.:
 Electronic prescribing ->
- iv. Select windows event files, e.g.: Win_1 to Win_10.
- v. Select Task time
- vi. Click OK

File Home Heuristic Evaluatio Query Load New Files Files Sheet Data Process Raw Data	Sum V Mean Range	Sample Man-Whitney One-way Court SUS	Linear Pearson Correlation		☆?
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a)-ii Click "Query Files"	a)-iv Sel	ect window events files	ton * (All) Creator Autoflow Descript.	×	ard
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	🖲 🛃 UT EHR	Win_1 msal	mi	2014/07/16 12:29:	
	🛃 Electronic Prescribing	e Win_2 msal		2014/07/16 12:29:	
	😑 🚼 Demo EHR	Win_3 msal		2014/07/16 12:30:	
	User Testing 1	Win_4 msal		2014/07/16 12:30:	
	Electronic presc			2014/07/16 12:31:	
		Win_7 msal		2014/07/16 12:47: 👻	
	Sore it d Files	ame Demo EHR\User Testino 1	Path Electronic prescribing\\Win_1		
a)-iii Select	Product.		Electronic prescribing\\Win_2		
project, an	Win_3		Electronic prescribing\\Win_3	=	
project, an	d tolder		Electronic prescribing\\Win_4		
	Win_5		Electronic prescribing\\Win_5 Electronic prescribing\\Win_6		
	Win_7		Electronic prescribing\\Win_7		
	a)-v Select Task time	eps Number of errors Task Path Evaluation		OK Cancel	

c) Add categorical columns

- i) Right click on **Task time** and click **Insert Column**. The "column data table" window pops up, where you can set values for the following properties: "Column Name, Data Type, Selected Column Left, and Selected Column Right.
- ii) Enter **Column Name**, e.g.: **Product Name.** The data type is preselected on "String". String indicates the data type of the value entered in Column Name. String data type represents text rather than numbers. Also, it consists a set of characters that can contain spaces and numbers.
- iii) Choose where you want the column to be inserted, before or after the current column.
- iv) Click OK
- v) Enter EHR 1 for the first five rows of Product Name Column to indicate it's Product 1, enter EHR 2 for the last five rows of Product Name Column to indicate it's Product 2

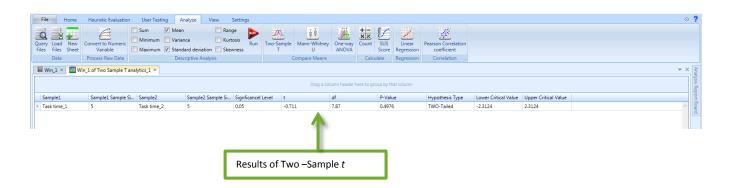
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Files Files Sheet Va	to Numeric	Mean	Range Kurtosis Skewness	Two-Sample T T Compare Means
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Column Data	×			
Column Name: Product N	Vame	b)-ii Enter Co	olumn Name	
Data Type: String	•			
Selected Column Left (🔵 Selected Column Right	b)-iii Ch	noose where you wan	t the column to be inserted
	OK Cancei	b)-iv Click	ок	

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Name		Product Name	Task time				
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Win_2		EHR1		4		or the first fi	
Win_3		EHR1		2		lame Columr	
Win_4		EHR1		2	EHR 2 for th f Product N	ne second five Jame	2
Win_5		EHR1		3		-	
Win_6		EHR2		44.243			
Win_7		EHR2		52.495			
Win_8		EHR2		65.515			
Win_9		ELARZ		41.85			
Win_10		EHR2		30.844			

c) Calculate

- i) Select **Product Name** and **Task time** Column (select Product Name/Task time, hold down Shift /Ctrl button and select another column)
- ii) Click Two-Sample T button
- iii) Add Product Name as Group Variable
- iv) Choose EHR 1 for Group 1, choose EHR 2 for Group 2
- v) Add Task time to the Test Variable(s) list. By doing this step, you indicate that Task time is the criteria on which different products are to be compared with each other.
- vi) If two different groups of users involved in User Testing evaluation, you need to choose "Unpaired", otherwise "Paired" should be selected
- vii) Select None
- viii) Click **OK**

in_1 in_2	Product Name Task time C) EHR1 EHR1 EHR1 5.04	-ii Click Two-Sample T		e to group by that column	c)-iii Add Product Name as Group Variable	
in_4 in_5 in_6 in_7 in_8 in_9	EHR1 13.45 EHR1 6.95 EHR2 5.19	9 46 6 9 6 6 8 3	Variable(s)	Grouping Variable Product Name Group 1: EHR1 Group 2: EHR2 Test Variable(c) Task time	c)- iv Choose EHR 1 for Group 1, choose EHR 2 for Group 2 c)- v Add Task time to the Test	
	ect Product Name and me Column	┛┛┛		>>> Unpaired None OK Cancel	Variable(s) list c) -vi Select Unpaired and None	



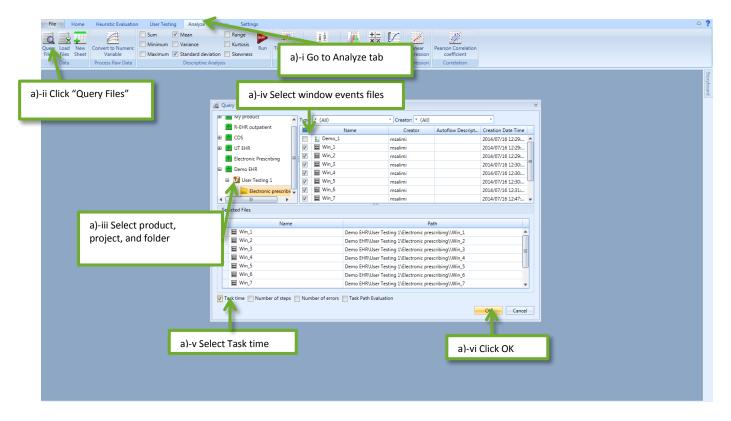
12.3.2 Mann-Whitney U test

Sometimes data is not normally distributed or the samples sizes are so small that one cannot tell whether they are part of a normal distribution or not. In these cases you need to use the non-parametric Mann-Whitney U test.

a) Query task time

- i) Go to Analyze tab
- ii) Click Query Files button.
- Select a product, e.g. Demo EHR -> Select a project, e.g. User Testing 1 -> Select a folder, e.g.:
 Electronic prescribing ->

- iv) Select windows event files, e.g.: Win_1 to Win_10.
- v) Select Task time
- vi) Click **OK**



b) Add categorical columns

- i) Right click on Task time and click Insert Column
- ii) Enter **Column Name**, e.g.: **Product Name**. The data type is preselected on "String". String indicates the data type of the value entered in Column Name. The String data type includes alphabetic characters rather than numbers. Also, it allows characters that can contain spaces and numbers.
- iii) Choose where you want the column to be inserted, before or after the current column
- iv) Click OK
- v) Enter EHR 1 for the first five rows of Product Name Column to indicate it's Product 1, enter EHR 2 for the last five rows of Product Name Column to indicate it's Product 2

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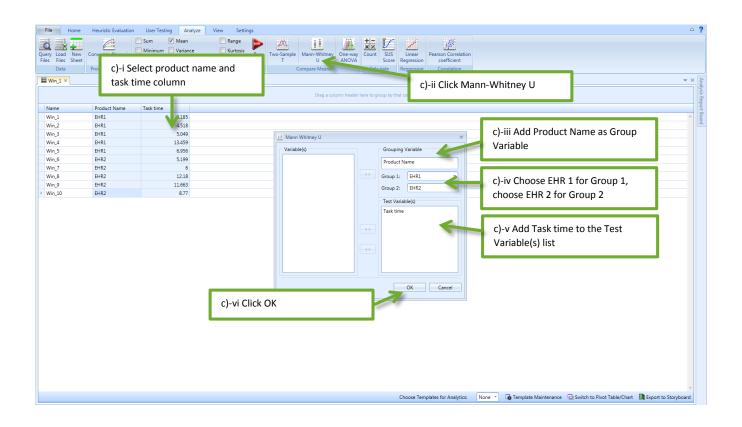
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	File		Home	Heuristic Evaluati	on	User Testi	ng Ana	lyze	View	Setting	s		
	Query Files	Load Files	New Sheet	Convert to Numeri Variable		Sum Minimum Maximum	MeanVariancStandar		tion	Range Kurtosis Skewness	Run	Two-Sample T	Mann-Whitney U
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	🖽 Wi	in_1 ×											
													Drag a col
	Nar	me		Task time	AL								
	Wir	L1			â₽	Sort Asce	-						
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	Wir				6 🖶	Hide Grou	ıp Panel						
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	Wir	-		ight click on Task time nn header and click		Best Fit (a	ll columns)						
	Wir	_	Inser	t Column	2	Filter Edit							
	wir	n_10											
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						Insert Col	umn						

👹 Column Data	—	
Column Name:	Product Name	b)-ii Enter Column Name
Data Type:	String 🔹	
Selected Column	nn Left 🛛 Selected Column Right	b)-iii Choose where you want the column to be inserted
	OK Cancel	b)-iv Click OK

Ł			
File Hom	e Heuristic Evaluation	User Testing Ar	nalyze View Settings
Query Load Net Files Files She Data			
Win_1 ×			
Name	Product Name	Task time	
Win_1 Win_2	EHR1 EHR1	29.25 40.266	b)-v Enter EHR 1 for the first five rows of Product Name Column
Win_3 Win_4	EHR1 EHR1	23.213 24.728	Enter EHR 2 for the second five rows of Product Name
Win_5 Win_6	EHR1 EHR2	30.821 44.243	
Win_7 Win_8	EHR2 EHR2	52.495 65.515	
Win_9 Win_10	EHR2 EHR2	41.85 30.844	

c) Calculate

- i) Select Product Name and Task time Column
- ii) Click Mann-Whitney U button
- iii) Add Product Name as Group Variable
- iv) Choose EHR 1 for Group 1, choose EHR 2 for Group 2
- v) Add Task time to the Test Variable(s) list
- vi) Click OK



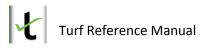
File Home	Heuristic Evaluation	User Testing Ar	nalyze View S	Settings							
Query Load New Files Files Sheet	Convert to Numeric	Sum 🗹 Mean Minimum 🚺 Variar Maximum 🗹 Stand	nce 📃 Kurte	osis Run Two	-Sample Mann-Whitney	One-way ANOVA	SUS Score Regression	Pearson Correlation			
Data	Process Raw Data	Desc	riptive Analysis		Compare Means	Cal	culate Reg Res	ults of Mann-W	/hitney U		
🖿 Win_1 × 📑 Win	_1 of MannUTest analy	tics_1 ×							·		
	Drag a column header here to group by that column										
Data1	Data1 Sample Size	Median of Data1	Data2	Data2 Sample Size	e Median of Data2	Mann-Whitney U	Significance level	P-Value	Hypothesis Type		
Task time_1	5	5.09	Task time_2	5	3.91	9	0.05	0.55	TWO-Tailed		

12.3.3 One-way ANOVA test

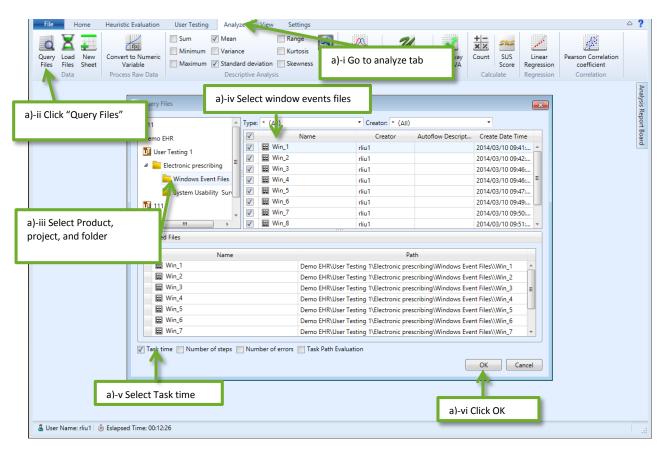
The one-way ANOVA test is used to compare more than two groups of data. This test shows whether there are any significant differences between the means of three or more groups. For example, a group physicians were asked to do E-prescribing using EHR1, another group of physicians was asked to do the same task using EHR2, and finally the third group was asked to do the same task using EHR3. Now, we are interested to compare the means of task time for E-prescribing based on the data collected from each EHR.

a) Query task time

- i) Go to Analyze tab
- ii) Click Query Files button.
- Select a product, e.g. Demo EHR -> Select a project, e.g. User Testing 1 -> Select a folder, e.g.:
 Electronic prescribing ->



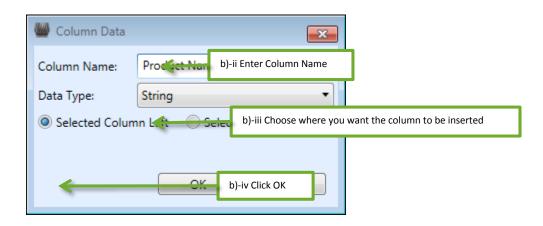
- iv) Select windows event files, e.g.: Win_1 to Win_10.
- v) Select Task time
- vi) Click **OK**



b) Add categorical columns

- i) Right click on Task time and click Insert Column
- ii) Enter Column Name, e.g.: Product Name. The data type is preselected on "String". String indicates the data type of the value entered in Column Name. The String data type includes alphabetic characters rather than numbers. Also, it allows spaces and numbers.
- iii) Choose where you want the column to be inserted, before or after the current column.
- iv) Choose where you want the column to be inserted, before or after the current column
- v) Click OK
- vi) Enter EHR 1 for the first three rows of Product Name Column to indicate it's Product 1, enter EHR 2 from the fourth to sixth rows of Product Name Column to indicate it's Product 2, enter EHR 3 for the last four rows of Product Name Column to indicate it's Product 3

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Query Load Ne Files Files Sh		Sum V Mean Minimum Variance	Range Kurtosis	Run	Two-Sample T	Mann-Whitne
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Win_4	11					
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Min 7)-i Right click on Task time plumn header and click	Show Column Chooser				
	isert Column	🛱 Best Fit				
Win_9	11	Best Fit (all columns)				
Win_10		🕈 Filter Editor				
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Win_2 Win_3 Win_4 Win_5 Win_6 Win_7	EHRI EHR1 EHR2 EHR2 EHR2 EHR3	rows of Product Name Column Enter EHR 2 from the fourth to sixth rows of Product Name EHR 3 for the last four rows of Product Name Column 52.495

c) Choose variables

- i) Select Product Name and Task time Column
- ii) Click One-way ANOVA button
- iii) Add Product Name as Factor. This step specifies different groups of the test which based on our scenario, are EHR1, EHR2, EHR3.
- iv) Add **Task time** to the **Dependent list. According to our scenario,** it means that three different groups are compared with each other based on the task time criteria.
- v) Click **OK**

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				c) – ii Click One-wa	ay ANOVA			
File Home	e Heuristic Evaluation	User Testing Analy	ze View Settings					
lery Load Net les Files She		Sum Mean	Range Kurtosis deviation Skewness	Two-Sample T	J ANOVÁ	Count SU	ore Regression	Pearson Correlati coefficient
Data	task time column	crip	tive Analysis	Compare 1	Means	Calculate	Regression	Correlation
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Name	Product Name	Task time						
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Win_2	EHR1	4.518						
Win_3	EHR1	5.049	Variable(s)	Factor	r			
Win_4	EHR1	13.459		>> Produ	uct Name			
Win_5	EHR2	6.956			_			
Win_6	EHR2	5.199						
Win_7	EHR2	6			ndent List	· · · · ·		
Win_8	EHR3	12.18		Task t		c)-III Add P	roduct Name	as factor
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Win_10	EHR3	8.77		>>		list	k time to the	Dependent
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12.4 How to Calculate

12.4.1 Count

In addition to the analytical tests described earlier, you can count the frequencies of each documented design violation by using Count Function in Turf. The count function helps evaluators understand which are the most violations in one project.

- a) Query Files:
 - i. Go to Analyze tab
 - ii. Click Query Files
 - Select a product, e.g. Demo EHR -> Select a project, e.g. Heuristic Evaluation 1 -> Select a folder,
 e.g.: Electronic prescribing ->
 - iv. Select the problems, e.g.: select Prob_1, Prob_2.
 - v. Click OK

15		1011 510 (1				
File Home Heuristic Evaluation User Testing Analyze	New Settings					۵ ?
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						Analysis R
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	te 📷 CDS		msalimi	2014/07/16 11:46:		
	🛛 📾 UT EHR		msalimi	2014/07/16 11:47:		
	😑 🔃 rEHR-Prescribing		msalimi	2014/07/16 11:47:		
	Electronic Rescribing	📃 🔂 rublem_3	msalimi	2014/07/16 11:47:		
	Electronic Prescribing	Problem_4	msalimi	2014/07/16 11:47:		
	E Demo EHR		_			
	a)-iii Select the p	roiect		v		
	iv. Select problem	nii, anu z	F	Path		
			ribing\Electronic Pr	escribing\\Problem_1		
	Problem_2	UT EHR \rEHR	-Prescribing\Electronic Pr	escribing\\Problem_2		
				v		
			-L "(OV")			
		a)-v Clie	CK UK	OK Cancel		

b) Count:

- i. Select the column **Design Violation** (make sure the selected problems have documented Design Violation)
- ii. Click the Count button
- iii. Drag the **Variable Name** to the lower panel. The result of this step shows based on what criteria the count function was triggered. Performing this step is a simple way to organizing the data displayed on the screen.

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H.									_ 6	9 X
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Files Files Sheet	Convert to Numeric Variable		nce 📃 Kurto dard deviation 📃 Skew	sis Run	Two-Sample Mann-Whitney One-way T U	Count SUS Score	Linear Regression			
	Process Raw Data	Des	criptive Analysis		Compare Means	Calculate	Regression	Correlation		
Problem_1 ×									× ×	haly
					Drag a column header	here to group by t	that column			sis Re
Name	Problem Location	Problem Description	Design Violation	Average Score	ore					port
Problem_2 Problem_3	1	1	05 Memory 03 Match	~	b)-i Select the " column	Design V	iolatio/	1 <i>"</i>	^	Board

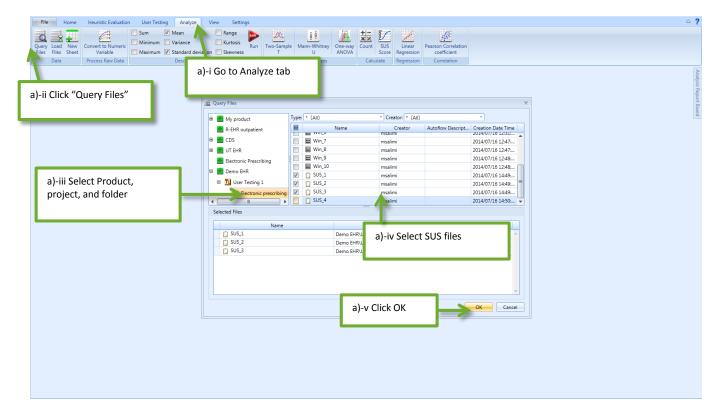
You will get the frequencies of each error type and design violation, as appropriate.

ł	;					
	File Home	Heuristic Evaluation	n User Testin	g Analyze	e View Settir	ngs
	uery Load New Files Files Sheet	Convert to Numeric Variable	Minimum	 ✓ Mean ✓ Variance ✓ Standard d 	Range Kurtosis eviation Skewness	Run
	Data	Process Raw Data		Descriptiv	e Analysis	
	Froblem_1 ×	Problem_1 of Count	analytics_1 ×			
		b)-iii Drag tl Name to th	he Variable e lower panel			
	Variable Name	Class Name	Count			
	Error Type	1D Data availabilit	y	2		
	Design Violation	12-Pleasurable an	d	2		

12.4.2 SUS Score

The System Usability Survey (SUS) can be used to quickly test the usability of a product. After collecting the surveys with 10 items from all participants (for more information, please refer to the section 4 of the current document), you can convert the raw scores of each survey into an overall SUS score which ranges from 1 to 100. Then you can use the descriptive analytics in Turf to calculate the average SUS score.

- a) Query SUS
 - i) Go to Analyze tab
 - ii) Click Query Files button
 - Select a product, e.g. Demo EHR -> Select a project, e.g. User Testing 1 -> Select a folder, e.g.:
 Electronic prescribing ->
 - iv) Select SUS files, e.g. SUS_1, SUS_2, and SUS_3.
 - v) Click **OK**



b) Calculate overall SUS score

- i) Select all the rows (Click on the small arrow next to any of the rows, hold down Ctrl/Shift button, and select other rows).
- ii) Click SUS Score button

		[b)-ii Click	SUS Score	button			
File Home Heuristic Evaluation User Testing	Analyze View Settings			1				ې ۵
Query Load New Convert to Numeric Star Shot Variable		Two-Sample T	One-way Count	SUS Linear F	Pearson Correlation coefficient			
	Descriptive Analysis	Compare Means	Calcula	te Regression	Correlation			
b)–i Select SUS scores								- × ₽
		Drag a colu	mn header here to group	p by that column				alysis Reg
Name 1. I hink that I wou 2. I found the syst	te 3. I thought the sys 4. I think that	I wou 5. I found the vario 6	. I thought there	7. I would imagine	8. I found the syste	9. I felt very confid	10. I needed to lear	port
SUS_1 4	4 4	4 5	4	4	4	4	4	Boa
SUS_2 1	3 2	4 3	4	3	4	3	4	E I
SUS_3 2	3 3	3 3	4	4	4	4	4	

c) Calculate average SUS score

- i) Select SUS Score column
- ii) Select Mean by checking the checkbox of mean
- iii) Click Run button

-	File Home	Heuristic Evaluatio	n User Testing Analyze View Settings							۵	?
Q	iles Files Sheet	Convert to Numeric Variable	Sum V Mean Range Minimum Variance Kurtosis Maximum Standy Laviation Skewness	Two-Sample Mann T	U ANOVA		SUS Score	Linear Regression	Pearson Correlation coefficient		
	Data	Process Raw Data	Descriptive Analysis	Compare	Means	Calcu	late	Regression	Correlation		
L	🖆 SUS_1 × 🛛 🗾 SU	IS_1 of SUS Score ana	llytics_1 ×							▼ X	Ana
				c)-ii	Select me	an		Imn			lysis Rep
	File Name	SUS Score		_							ort
Þ	SUS_1	52.5								A	Boar
	SUS_2	325	c) –i Select SUS score	-111 C	ick Run						1
	SUS_3	45	· ·								
11		_									

File Home	Heuristic Evaluation	User Testing Analyze View	Settings						۵
iery Load New Colles Files Sheet	Convert to Numeric Variable		Kurtosis Run Two-	Sample Mann-Whitney	One-way ANOVA	nt SUS	Linear Regression	Pearson Correlation coefficient	
Data	Process Raw Data	Descriptive Analysis		Compare Means	C	alculate	Regression	Correlation	
🛾 SUS_1 × 🛛 🗹 SUS_	_1 of SUS Score analy	tics_1 × SUS_1 of SUS Score analytics	_1 of Descriptive analytic	s_1 ×					▼ X
				Drag a ci	lumn header here to	o group by t	hat column		
Name	Mean	_							
SUS Score	43.33	A A	verage SUS s	score					A

12.5 How to Do Regression

In statistics, **regression analysis** is a statistical process for estimating the relationships among variables. It includes many techniques for analyzing variables. Here we discuss the most commonly used techniques: "Linear Regression", and "Pearson Correlation Coefficient".

12.5.1 Linear Regression

A linear regression is a statistical model that attempts to show the relationship between two variables with a linear equation. It simply describes how a variable varies based on the change of the other variable. For example, you might be interested to know how the task time of E-prescribing would change based on the decrease or increase in the number of steps taken for E-prescribing.

a) Query task time

i) Go to Analyze tab

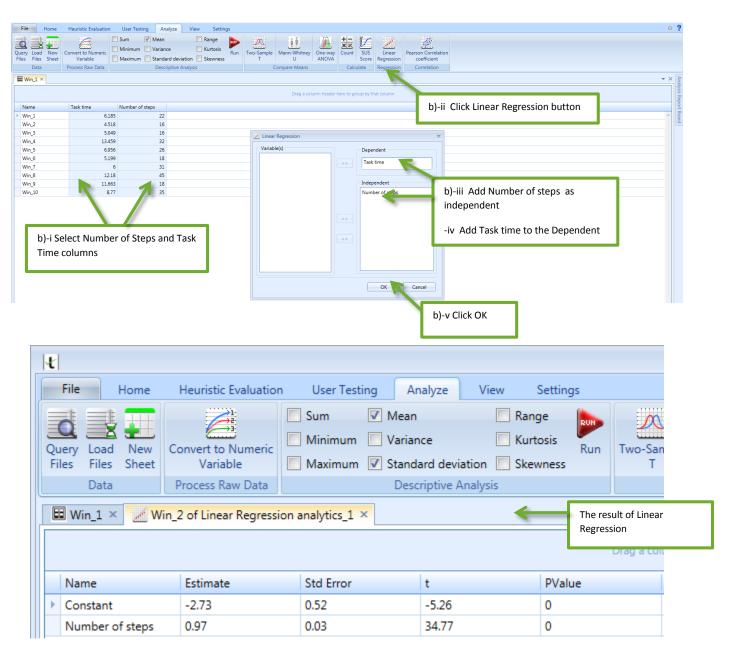
- ii) Click Query Files button
- iii) Select a product, e.g. Demo EHR -> Select a project, e.g. User Testing 1 -> Select a folder, e.g.:
 Electronic prescribing ->
- iv) Select windows event files, e.g.: Win_1 to Win_10.
- v) Choose your desired variables to see the relationship between them. Here, we select **Task time, and Number of steps.**
- vi) Click OK

	User Testing Analyze Sum V Mean Minimum Variance Maximum Standard deviati Descriptive And		-i Go to analyze	tab	Pearson Correlation coefficient Correlation	A ?
a)-ii Click "Query Files"	-	Ary product R-EHR outpatient CS CS CIS Electronic Prescribing Demo EHR ① User Testing 1	Name Win,3 Win,4 Win,5 Win,6 Win,7 Win,8 Win,8 Win,9 Win,10	files or - (All Creator msalimi msalimi msalimi msalimi msalimi msalimi msalimi msalimi msalimi msalimi	Autoflow Descript Creation Date Time 2014/07/15 12:30 2014/07/15 12:30 2014/07/15 12:31 2014/07/15 12:31 2014/07/15 12:47 2014/07/16 12:48 2014/07/16 12:48	×
a)-iii Select Product, project, and folder		Vin_1 Win_2 Win_3 Win_4 Win_5 Win_6 Win_7 Vask time Number of steps	Demo EHR Demo EHR Demo EHR Demo EHR Demo EHR Demo EHR Number of errors Task Path	User Testing 1/Electronic pr User Testing 1/Electronic pr Evaluation	escribing\\Win_2 escribing\\Win_3 escribing\\Win_4 escribing\\Win_5 escribing\\Win_6	

b) Choose variables

- i) Select **Number of steps** and **Task time** Columns (click on any of these columns, hold down Ctrl/Shift button, click on another column)
- ii) Click Linear Regression button
- iii) Add Number of Steps as Independent
- iv) Add Task time to the Dependent
- v) Click **OK**

Turf Reference Manual



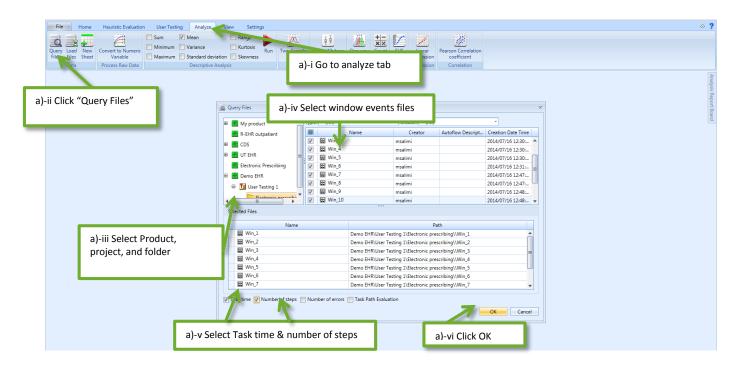
12.6 How to Do Correlation

12.6.1 Pearson Correlation Coefficient

Correlation is a technique for investigating the relationship between two quantitative variables. Pearson's correlation coefficient is a **measure of the strength of the association** between the two variables. It describes how two variables vary together. For example, you might be interested to know whether there is any relation between the number of errors and the number of steps taken for E-prescribing.

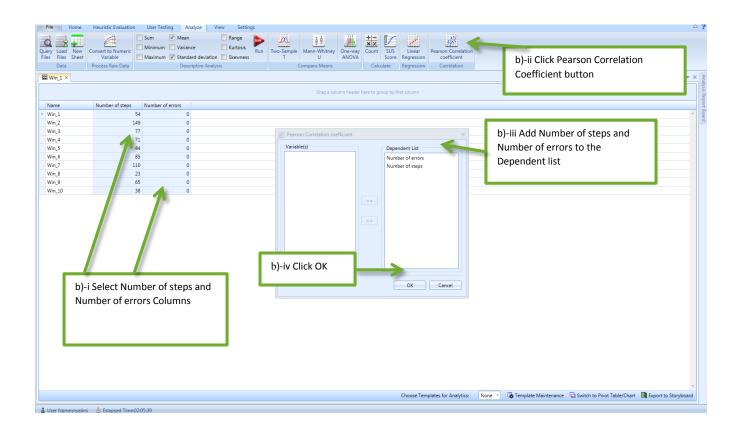
a) Query task time

- i) Go to Analyze tab
- ii) Click Query Files button
- iii) Select a product, e.g. Demo EHR -> Select a project, e.g. User Testing 1 -> Select a folder, e.g.:
 Electronic prescribing ->
- iv) Select windows event files, e.g.: Win_1 to Win_10.
- v) Select Task time & Number of steps
- vi) Click OK



b) Choose variables

- i) Select **Number of steps** and **Number of errors** Columns (click on any of these columns, hold down Ctrl/Shift button, click on another column)
- ii) Click Pearson Correlation Coefficient button
- iii) Add Number of steps and Number of errors to the Dependent list
- iv) Click OK



File	Home	Heuristic Evaluation	User Testin	g Analyze	View Se	ttings					
	oad New	Convert to Numeric Variable	Sum Minimum Maximum		Range	is Run	Two-Sample T	Mann-Whitney U	One-way ANOVA		SUS Score Regression
[Data	Process Raw Data		Descriptive	Analysis		(Compare Means		Calcula	te Regression
🖽 Win	Win_1 × Win_1 of RTF analytics_1 ×										
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• =	Depedent:										
	Product Nam	e Task time	-0.33	-	0.99	8		-35	0.95		TWO-TAILED
	The result of Pearson Correlation Coefficient										

13. Pivot table

Pivot tables summarize data in an intuitive and quick way. After you have selected the parameters that you want to analyze, click on "Switch to Pivot table/Chart" at the bottom of the screen.

: =: 															
1 📑 1		Sum 🔽 Mean			A	άŪ		* <u>-</u> /	Z	<u>#</u>	1	12			
y Load New		Minimum 📃 Variar			Two-Sample I	Mann-Whitney	One-way Co	ount SUS	Linear	Pearson Correlatio	n Training C	omparing			
Files Sheet			lard deviation 📗 Skewr	ness	T	U	ANOVÁ		Regression	coefficient	Effects	Products			
Data	Process Raw Data	Desc	criptive Analysis		Co	mpare Means		Calculate	Regression	Correlation	Success Ra	e Audgsis			
Win_1 ×															
						Drag a col	lumn header here	e to group by th	at column						
ame	Task time	Number of steps	Task Path Evaluation												
n_1	25		Minor Deviations												-
n_1	16	62	Minor Deviations												
n_1	11		Minor Deviations												
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in_1 in_1	9		Minor Deviations												
<u>(</u>)	4	10	Minor Deviations												
										lates for Analytics:	None -	Terrar II.	G Switch to Pivot	- The curve of t	

The following screen appears:

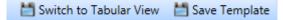
₩Win_1 × W	in_1 ×			
Data Headers				
Drop Row Field	Grand Total			
Drop Now Heid	Number of steps	Task time	Name	
Grand Total	218	89	0	0

If you prefer, you can adjust the columns' widths, so you can see the descriptions. On this screen you will see the aggregated results for each of the field names that you have selected.

Clicking on "Data Headers" will show you the field names. You can drag the field names into the column, or row to design the layout of your pivot table and back to the Data Headers to remove it. You will do this process until you get the desired report. Drag and drop field names on "Drop Row Fields Here" help you summarize results based on that particular field. You can also drop your field names to the "Drop Filter Fields Here" if you do not want to include them in your report.

Win_1 × Wi	in_1* ×		
Data Headers			
	Grand Total		
Name 🔍	Number of steps	Task time	
Win_1	218		89

If you click on "Save Template", you will be able to save the layout of your pivot table as a template and then apply it to other data files.

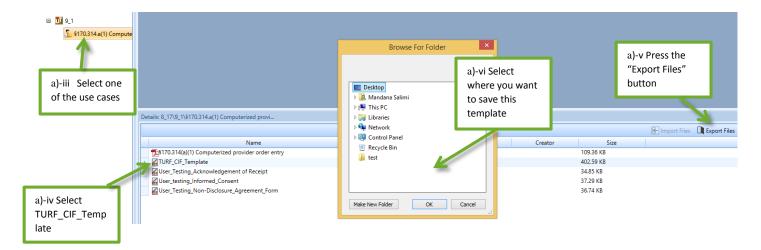


14. Common Industry Format (CIF)

The Common Industry Format (CIF) is a standard format for reporting the results of summative usability testing. In the following we will show how to export the results of Demo files, Win event files, Performance files, and SUS files into the Turf Storyboard (the number of components to be included in the CIF reports varies based on your goal), and how to use the accumulated results in the Storyboard in the CIF template. Before following the steps listed below, make sure you already have created the required files.

a) The following steps demonstrate how to use the CIF template

- i. Go to Home, or User testing, or Heuristic Evaluation tab
- ii. Under the Projects panel, select a Heuristic Evaluation or User Testing project
- iii. Select one of the use cases
- iv. Under the details panel on the bottom of the right panel, select the TURF_CIF_Template. Fill in the document, as needed.
- v. Press the "Export Files" button
- vi. Select where you want to save this template



To gather the results of the files that will be included in the CIF template follow the following steps:

First, we will select the results of the Win files. But before proceeding, make sure you have already defined the number of errors in each windows event file.

b) Follow the following steps to define the potential errors of the windows event files

- i. Go to Home, or User testing, or Heuristic Evaluation tab
- ii. Select the appropriate folder where you have saved your windows files
- iii. Under the Details panel, click on the Win files that you want their results to be included in the CIF report
- iv. Once they are opened on the top panel, go to the Error Coding column. For each documented mouse event, define the type of error if applicable.
- v. Press the Save button

c) Select the results of the Win files for using in the CIF report

- i. Go to Analyze tab
- ii. Press the Query Files button
- iii. Select your desired Product, and then Project
- iv. Select the windows event files that you want to include in the report
- v. Select "Number of steps" and "Number of errors"
- vi. Press the OK button
- vii. Select the entire table by dragging the mouse over it
- viii. Click on "Export to Storyboard" button

d) Select the results of the Performance files:

- i. Go to Analyze tab
- ii. Press the Query Files button
- iii. Select your desired Product, and then Project
- iv. Select the PFM files that you want to include in the report

- v. Press the OK button
- vi. Select the entire table by dragging the mouse over it
- vii. Click on "Export to Storyboard" button

e) Select the results of the SUS files:

- i. Go to Analyze tab
- ii. Press the Query Files button
- iii. Select your desired Product, and then Project
- iv. Select the SUS files that you want to include in the report
- v. Press the OK button
- vi. Select the entire table by dragging the mouse over it
- vii. Click on the SUS Score button (this calculates the individual SUS score for each participant)
- viii. Select the SUS Score column
- ix. On the "Descriptive Analysis" ribbon, select Mean, Max, and standard deviation
- x. Click on the Run button (now you have SUS Score for all of the individuals that have completed your survey)
- xi. Select the entire table by dragging the mouse over it
- xii. Click on "Export to Storyboard" button

f) Exporting the file from the Storyboard

Now that you have the results of all components copied to the Storyboard,

- i. Go to the Storyboard
- ii. Click on the Export Document button
- iii. Select the RTF file as the export format
- iv. Press the OK button
- v. Select the location where you want to save it
- vi. Press Save button

g) Importing the exported data to the CIF template

- i. Open the file containing the data copied to the Storyboard
- ii. Select all data by pressing Ctrl+A keys
- iii. Use Ctrl+C keys to copy data
- iv. Open the CIF template
- v. Scroll to the bottom of the document where the Appendix is
- vi. Under this heading, paste your data
- vii. Save your file

15. Settings Procedures

15.1 How to Do System Configuration

15.1.1 Use Cases

The **Use Cases** button opens a mini tab that allows the user to create, modify or upload a new use case. **New Use Case** opens a window popup where users can enter the name and the description for a new use case they create. **New Folder** opens a window popup where users can name a folder and description to keep new, old and updated cases organized. **Modify** allows users to rename a folder/ use case. **Delete** permanently deletes the selected folder/use case. Clicking **Load** allows the user to find an XML file from the computer to upload to Turf. Clicking on **Upload** opens a popup window where users can upload a PDF/RTF file by selecting the path and creating a brief description. Clicking **Export** allows the user to save a use case file in XML format to a folder chosen by the user.

15.1.2 Descriptive Template

The **Descriptive Template** button opens a mini tab that allows the user to create, modify or upload a new template. These templates can be used as Evaluation Templates for a Heuristic Evaluation Project. **New** opens a new template mini tab where the user can create a template from scratch, selecting the name, dimensions, description, etc. **Load** opens a window where the user can upload an XML format of a new template from the computer. **Export** allows the user to save the template in XML format to a folder chosen by the user. **Delete** permanently removes the template selected. Clicking on any of the 5 default templates opens the template in another mini tab to allow template editing.

15.1.3 Widget Definitions

Widget Definitions opens a mini tab where users can assign different icons, such as, Button, **TextBox, List Box, Check Box** or **ComboBox** to problems found in the images captured from different resources, such as, a HTML page, an Android device, an IOS device, or a windows screenshots.

15.1.4 Color Definitions

Color Definitions opens a mini tab that allows the user to set the unique color for **Windows events color** and **Mark property color** from a dropdown list of a **Color Category**. Users can **Add Field** or edit an existing field by customizing the **Name**, **Color** used, **Description** of the field and **Active** checkbox.

15.1.5 Hot Key

Hot keys can be customized for each of the 6 tabs. Hot keys can easily be modified by clicking on the ActionName of the hotkey, then clicking on the Modify Hotkey Value, and choosing a unique hotkey value in a Set Hotkey popup. The user can customize the Hotkey keystrokes if the hot keys are Active.

15.1.6 Video Settings

The **Video** settings allow users to specify the maximum number of video tabs that can be opened at the same time.

15.1.7 OneDrive Settings

OneDrive settings allow you to customize the way that you want Turf interact with your OneDrive account.

15.1.8 Install Turf for Android Settings

Install Turf for Android settings allow you to install Turf on your android smartphone or tablet device.

16. Troubleshooting

16.1 Recover Interrupted Files

A one-of-a-kind characteristic that Turf has is its ability to restore interrupted media files. If there is any interruption in recording media files, launching turf will open a pop up window prompting you to save the corrupted file. Clicking on the OK button will restore the corrupted files and you will not lose any data.

ecord Audio ,Webcam ,keystork ,Screen file(s) at 2014-08-20 0	1		
Name af31123a-d6fc-4132-becf-59e5673bab78Audio.mp3	Type	Path C:\Users\mzhu\Documents\TurfE ····	
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2c0f53ac-0868-4af2-97de-361bc2d42d43	WindowsEvents	C:\Users\mzhu\Documents\Turf[
125cd95c-bb8d-40f3-afb5-080a43873aafDeskTop.wmv	DeskTop	C:\Users\mzhu\Documents\Turf[
		OK	anc

17. Recommendations

17.1 Labeling Files

Turf assigns a label to each file based on the system default settings. It is recommended to rename the files in a way that makes sense for you. For example, if you have different notes in a folder, it is recommended to organize them in a systematic way. Labeling each note with its corresponding media file might be a good idea.

18. Update Instructions

Please follow the instructions below to update the earlier versions of Turf to the latest one (4.0):

- i. Uninstall the current version: control panel >> programs >> uninstall a program >> select Turf >> uninstall
- ii. If you have data from Turf old versions (Truf 3.0.1 and higher) and you want to access them in new version:
 - a. Make a backup of current TurfData located in C:\Users\<user name>\Documents\TurfData3.0
 - b. Rename the folder from TurfData3.0 to TurfData4.0
 - c. The files can be accessed in Turf4.0, however, the Heat Map function will not work on the keystroke events recorded in earlier versions.
- iii. Install the new version: For the instructions on how to install Turf, please click here.
- iv. Launch new version Turf 4.0
- v. Your activation key used for Turf 3.0.1 will not work and will need new activation licence.