Verification and Validation Report: SE 4G06, TRON 4TB6

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1 Revision History

Date	Version	Notes
Date 1	1.0	Notes
Date 2	1.1	Notes

2 Purpose

This VnV report's establishment is to support development of the product Synthesis Wear. The actions taken in the document are linked with testing to ensure reliability and robustness of the product for adequate detection of particular sounds.

3 Scope

The focus of this document is on the output results of Synthesis Wear when given arbitrary input. We will using black box testing on important aspects of the output and input rather then how the results are generated. These tests will be based on certain implementations we have put into place to handle unexpected inputs.

4 Background

Synthesis wear is designed with a mobile application which allows users to toggle certain sounds on and off to improve usability of the watch. This allows customization to occur right from the mobile. Synthesis wear will be able to detect key words and sound which are custom to the user, to help aid their hearing. This will help them focus on someone calling on their name, emergency situations and much more.

5 Functional Requirements Evaluation

Id	**Ref**	**Description**	**Input**	**Expected Result**	**Actual Result**	**Result**
FRT1	FR1, FR2	Testing ability to differentiate sounds	Five different sounds	Device produces five different feedbacks		Pass

FRT2	FR1	Testing in different environments	Same sound in different environments	Same feedback in all enviroments		Fail
FRT3	FR1	Testing at different ranges	Same sound at specified distances	Same feedback at specified distances		TBD
FRT4	FR1	Testing its ability to ignore ambient noise	No input	No output		
FRT5	FR2	Testing its ability to classify correctly	Different specified words	Feedback based on correct classification		
FRT6	FR2	Testing variability in speech	Same word said by four different people	Same feedback for all		
FRT7	FR2	Testing its ability to ignore high amplitude random sounds	Random not specified sounds	No haptic feedback		
FRT8	FR3	Testing newly set classifications	A newly set classification sound	The specified haptic feedback		

FRT9	FR3	Testing removed classifications	A removed classification sound	No feedback		
FRT10	FR3	Testing reboot and memory retention	Power switched on and off and test FRT5 run again	Feedback based on correct classification		
FRT11	FR4	Testing haptic feedback with the device worn	Specified sound	Haptic feedback based on the sound's classification		
FRT12	FR4	Testing variability in haptic feedbacks	Three different specified sounds	Different haptic feedbacks that convey the specified sounds		
FRT13	FR4	Testing different wearable orientations	FRT12 run on different orienations	All orientations give consistent output		
FRT14	FR4	Testing intensity of feedback wearing different clothes of varying thickness	FRT12 run on three different clothes	All clothes give consistent results		
FRT15	FR5	Testing real-time application of device	Specified sound	Correct classification within one second		

6 Nonfunctional Requirements Evaluation

6.1 Usability

6.2 Performance

6.3 etc.

7 Comparison to Existing Implementation

This section will not be appropriate for every project.

8 Unit Testing

Id	Ref	Description	Input	Expected Result	Actual Result	Result
UT1		Testing accuracy of the microphone to detect sounds	3 Different Sample Recordings	3 Distinct Sample Recordings in memory buffer that match the inputs respectively	The detected sounds matched the input sounds	Pass
UT2?		Testing bluetooth's ability to transfer digital sound recordings accurately	Digital Sound Recording	Same digital sound recording at the receiver		Fail
UT3		Testing bluetooth's ability to send signals accurately	Sample classification signal asserted on software	Feedback signal asserted on hardware		TBD

UT4		Testing classification module's ability to accurately categorize sound data	Stored samples of sound data in the memory buffer	Accurately classified Sound Data		
UT5		Testing classification module's ability to change its sound classification settings	New Classification settings	Classification settings have been changed on the app	The settings displayed on the settings page match the newly inputted classification settings	Pass
UT6		Testing feedback module's ability to transmit accurate feedback signals according to the settings	Feedback signal is asserted	Vibration detected in the bracelet that coincides with the feedback signal	Vibration motor went off appropriately with respect to the settings configured on the app	Pass
UT9		Testing bluetooth connection ability	Enable bluetooth connection	Bluetooth connection connected in under a minute	Bluetooth connection was established within 10 seconds	Pass

UT10		Testing bluetooth connection's ability when devices go in and out of range	Separate the connected devices 10 or more metres away, wait at least 5 seconds, then bring the devices closer together	Bluetooth will disconnect and reconnect when devices are back in range to each other		
UT11		Testing noise filtering module's ability to remove noise from a sample sound	Digital data with one or more sounds	Same digital sound recording but with less noise	The output still had noise but notably less compared to the original sound file	Pass

UT15		Testing app interface's ability to respond quickly to a user input	User input	User Interface response within 1ms	The app was appropriately able to respond as soon as a button was clicked or an input was submitted	Pass
UT16		Testing app interface's ability to respond the same across different systems (Android, Windows, IOS)	User Input	Same User Interface response on all the different devices	N/A (The app has not yet been implemented on different IOS systems)	N/A

9 Changes Due to Testing

10 Automated Testing

11 Trace to Requirements

12 Trace to Modules

13 Code Coverage

Taran's part.

14 Traceability Metrics

Taran's part.

Appendix — Reflection

The information in this section will be used to evaluate the team members on the graduate attribute of Lifelong Learning. Please answer the following questions:

1.

2.