Engineering Design Specification

Document Number	Project Title
0.1	Glasses for the Visually Impaired

Revision History

Revision Level	Description of Revision	Person	Date
0.1	Functional and non-functional specifications for DPR2	Waleed Ahmed	July 16, 2021

Intended Application:

The design is intended to perform accurate optical character recognition and convey the results effectively through audio for the visually impaired population

Requirements Specification:

No.	Characteristic	Relation	Value	Units	Verification Method	Comments
1	The design shall extract, decode, and communicate text from an image to a visually impaired user through audio transcription				Demonstration, Test	Primary function
2	The design shall be inexpensive for users to purchase	<	200	USD	Analysis	Primary constraint
3	The design shall be able to function offline, meaning no network connection is required				Demonstration, Test	Functional Requirement
4	The iOS device needs to be in close proximity to the glasses at all times				Demonstration	Functional Constraint
5	The design shall be capable of pairing the glasses with an iOS device via Bluetooth				Demonstration, Test	Functional Requirement
6	The design's user interface (UI) and user experience (UX) shall be optimized for accessibility				Demonstration, Test, Expert Opinion	Functional Requirement
7	The device shall offload OCR processing to an iOS application				Demonstration, Test	Functional Requirement

8	The device shall be able to communicate with a locked iOS device using Bluetooth LE				Demonstration, Test	Functional Requirement
9	The iOS device shall perform OCR model inference tasks when locked	<	15	sec	Demonstration, Test	Functional Constraint
10	The iOS device shall have an Apple A11 processor or higher (iPhone X or later)				Analysis	Functional Constraint
11	The machine text OCR algorithm shall have a Word Error Rate (WER) on a custom test set	<	10	%	Test, Analysis	Functional Constraint
12	The handwritten text OCR algorithm shall have a Word Error Rate (WER) on a custom test set	<	25	%	Test, Analysis	Functional Constraint
13	The text-in-the-wild OCR algorithm shall have an F-score on a custom test set	>	60	%	Test, Analysis	Functional Constraint
14	The device shall communicate the OCR model uncertainty about its current prediction				Demonstration, Test	Non-functional Requirement
15	The device shall not have exposed any electrical components that may harm the user				Demonstration, Examination	Non-functional Constraint
16	The device shall have an operating device voltage	=	5	Volts	Test	Functional Requirement
17	The device shall have a maximum current draw from the battery	≤	250	mA	Test	Functional Requirement
18	The piezoelectric buzzer shall have a maximum current draw	≤	10	mA	Test	Functional Requirement
19	The device shall have a power source that allows it to run for a usable period of time	≥	4	hours	Analysis, Test	Non-functional Requirement
20	The device shall inform the user if any error occurs				Demonstration, Test	Non-functional Requirement
21	The design shall have a fail-safe mechanism that prevents loss of device in the case it falls from the user's face				Demonstration, Test	Non-functional Requirement