

# **Software Testing Document**

## **Bangla Book Reader For The Blind**

**Group No : 04 (B)**

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# **1 INTRODUCTION**

Testing is the process of evaluating a system or its component(s) with the intent to find whether it satisfies the specified requirements or not. In simple words, testing is executing a system in order to identify any gaps, errors, or missing requirements in contrary to the actual requirements. It is also stated as the process of verifying and validating a software product. It checks whether the software product meets the business and technical requirements that guided its design and development, if it works as per the requirement and can be implemented with the same characteristics. Documentation for Software testing helps in estimating the testing effort required, test coverage, requirement tracking/tracing etc. The Software Test Plan (STP) is designed to prescribe the scope, approach, resources, and schedule of all testing activities. The plan must identify the items to be tested, the features to be tested, the types of testing to be performed, the personnel responsible for testing, the resources and schedule required to complete testing, and the risks associated with the plan.

## **1.1 Objective**

Testing is the process of analyzing a software item to detect the differences between existing and required conditions and to evaluate the features of the software item. To build a device that can read text out loud from any printed book for the blind or visually impaired by:

- i. Taking picture of the text document with a camera placed on the stand.
- ii. Extracting the text from the document.
- iii. Converting extracted text to speech.
- iv. Controlling speed, volume of the speech and navigation with user input through external buttons.

## **1.2 Scope**

The overall purpose of testing is to ensure the application meets all of its technical, functional and business requirements. The purpose of this document is to describe the overall test plan and strategy for testing the application. The approach described in this document provides the framework for all testing related to this application.

## **2. TEST ITEMS**

We will mainly focus to ensure the following items to be tested.

- Requirements specification
- Design specification
- Availability
- Response time
- Security
- Model accuracy
- Usability

## **3. FEATURES TO BE TESTED**

The features to be tested are listed below:

### **3.1 Server System**

**Criteria Assessment:** Security, Response time

**Testing Type:** Unit testing.

### **3.2 Android Application**

**Criteria Assessment:** Usability

**Testing Type:** Unit Testing.

### **3.3 Server Image Receive and Processing from Android<sup>[OBJ]</sup>:**

**Criteria Assessment:** Performance, Response time

**Testing Type:** Integration Testing.

### **3.4 Server Send Audio File to Android<sup>[OBJ]</sup>:**

**Criteria Assessment:** Performance, Response time

**Testing Type:** Integration Testing.

### **3.5 Whole System test:**

**Criteria Assessment:** Performance, Response time, Model Accuracy, Usability

**Testing Type:** System Testing.

## 4 SOFTWARE TESTING

### Development Testing:

Tested we have done during the development phase are discussed below:

#### 4.1 Unit Testing:

Unit Testing is a level of software testing where individual units/ components of a software are tested. The purpose is to validate that each unit of the software performs as designed. We have done unit testing on the following features:

1. Server System
2. Android Application

#### 4.2 Integration Testing:

Integration Testing is a level of software testing where individual units are combined and tested as a group. The purpose of this level of testing is to expose faults in the interaction between integrated units. We have done integration testing in the following features of our software.

1. Server send audio file to android
2. Server image receive and processing from Android

#### 4.3 System Testing:

System testing is a level of testing that validates the complete and fully integrated software product. The purpose of a system test is to evaluate the end-to-end system specifications.

## 5 HARDWARE TESTING

Our primary objective is to ensure convenient usage of the system by the blind people. Keeping that in mind we designed and integrated different hardware tools with the software. Our focus was to ensure user convenience in following aspects.

1. **Bluetooth Connection:** We passed the hardware button's controlling signal to the phone through Bluetooth. We put an automatic notification on the app so that user connects with the Bluetooth before using the app. Also, we programmed the Bluetooth to have a passcode for security.
2. **Buttons:** We have assigned 4 buttons for controlling and navigating the app. 1 for returning to the home screen, 1 for opening the camera, 1 for uploading the picture, 1 for downloading the converted Bangla speech. The 4 buttons work flawlessly. Each button sends different commands to the app without any loss in the signal.
3. **Power:** Currently we are using our laptops power for powering the application. We are connecting the Arduino with the laptop with a chord. Then we are powering the breadboard with 5v with a current .6 amp. This is enough to run the Bluetooth and the buttons.

## 6. PASS / FAIL CRITERIA

### Android Application:

1. **Bluetooth connection:** If the Bluetooth connection is not set after opening the app, the whole thing will not work. So, our primary focus is to ensure the connection.
2. **Button's function:** The four buttons need to send "take photo", "home", "upload", "read" commands to the app respectively. Anything else will not work.
3. **Stand's position and orientation:** The book stand needs to be positioned and placed in a proper way so the camera gets the full view of the page. Otherwise it might take a portion of the page.
4. **Uploading the photo:** The photo needs to be uploaded to the server.

| Participant No | Total attempts to success | Completion time |
|----------------|---------------------------|-----------------|
| 1              | 7                         | 3 mins 39 secs  |
| 2              | 6                         | 4 mins 3 secs   |
| 3              | 5                         | 4 mins 4 secs   |
| 4              | 7                         | 3 mins 38 secs  |
| Average        | $6 \pm 1$                 | 3 mins 51 secs  |

**Table: 1**

## 7. TESTING SCHEDULE :

Test was done according to the following schedule :

|                            |                                                         |                 |
|----------------------------|---------------------------------------------------------|-----------------|
| <b>Unit Testing</b>        |                                                         | <b>9 days</b>   |
| 1                          | Review buttons function                                 | .2 day          |
| 2                          | Review bluetooth's functionality                        | 1 day           |
| 3                          | Test control signaling to the app                       | 5 days          |
| 4                          | Identify problems with commands sent to app             | 1 day           |
| 5                          | Re-test control signaling                               | .2 day          |
| 6                          | Integrate buttons with the app                          | .6 day          |
| 7                          | Re-test button's functionality with signaling           | 1 day           |
|                            |                                                         |                 |
| <b>Integration testing</b> |                                                         | <b>3.2 days</b> |
| 8                          | Integrate all the buttons with the app                  | .2 day          |
| 9                          | Test the stand and book holder with the app and buttons | 1 day           |
| 10                         | Test module integration                                 | 1 day           |
| 11                         | Modify the book holder design                           | .5 day          |
| 12                         | Optimize the camera stand's position                    | .5 day          |
| 13                         | Integration testing complete                            | 1 day           |
|                            |                                                         |                 |
| <b>System testing</b>      |                                                         | <b>1 day</b>    |
| 14                         | Complete system testing                                 | 1 day           |

Fig : Testing Schedule

## **8. ENVIRONMENTAL REQUIREMENTS**

### **8.1 Hardware:**

The following items were required in hardware part of our book reader:

1. Arduino Mega
2. Button
3. Bluetooth Module
4. Book stand

### **8.2 Software:**

The following items were required in software part of our book reader:

1. Mobile Phone
2. Android studio
3. Arduino
4. Tensorflow
5. Flask
6. Ngrok
7. Total Audio Converter
8. Microsoft project

### **8.3 Tools:**

Tools we have used are:

1. Balsamiq

#### 8.4 Risks :

There are some potential risks of using this system in real life. The risks are shown in tabular form

| Risk Description                                 | Mitigation Plan (what to do to avoid the risk occurring)                                                                                              | Contingency Plan (what to do if the risk occurs)                                                                      | Impact (what the impact will be to the project if the risk occurs)                                                                    |
|--------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------|
| Device falls on leg                              | Since the prototype device is heavy better no to carry it around. It should be in a fixed place.                                                      | If the device falls it might fall on leg and it could seriously injure someone. First aid toolbox should be kept near | If the device falls the book stand may break or the buttons or maybe the circuit in which case it won't be functional                 |
| Circuit connection damage                        | It can occur due to careless usage or from the fall of device. So delicate and careful usage is recommended                                           | If the circuit damage occurs it maybe taken to a technician. Since the circuit is very simple it can be easily fixed. | If the circuit is damaged none or some system features may not work and it would give the user unsatisfactory experience              |
| Button/phone breaks due to hard pressing or fall | Buttons should be pressed carefully and check every time if the phone is safely placed on the phone holder. Otherwise if it falls it would be damaged | In these cases buttons maybe replaced and phone display7 would need to be fixed which would be expensive              | If the button breaks all system features won't work and if the phone display breaks it maybe non-functional. So the system won't work |

Fig: Risk Overview