Weapon Zeroing System and Warriors' Range Efficiency Analysis for Bangladesh Army

Software Testing Documentation
Document

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October 21, 2019

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Chapter 1

Introduction

A software test plan is a documentation describing software testing scope and activities. It is the basis for formally testing any software/product in a project. A test plan also contain details of who will perform a given task. Wikipedia definition: A test plan is a document detailing the objectives, target market, internal beta team, and processes for a specific beta test for a software or hardware product.

1.1 Objectives

The purpose of test plan document is to provide details on how testing process will be conducted for a given project. It contains the testing objectives and tasks where the scope of testing is identified at high level. A test plan serves as a road map to the testing process that has all the necessary details related to the process. It serves a means of communication between the team members and stakeholders and keeps a record of what was tested in a particular release, along with any comments or conversation notes.

1.2 Testing Strategy

A test strategy is an outline that describes the testing approach of the software development cycle. It is created to inform project managers, testers, and developers about some key issues of the testing process. The following strategy will be followed:

- Methodical Testing Strategy: Here test teams follow a predefined quality standard (like ISO25000), checklists or simply a set of test conditions. Standard checklists can exists for specific types of testing (like security), application domains. For instance, in case of this project software testing, a checklist describing important functions, their attributes, etc. is defined and those will be tested sequentially.

1.3 Scope

Testing will be performed at several points in the life cycle as the product is constructed. Testing is a very 'dependent' activity. As a result, test planning is a continuing activity performed throughout the system development life cycle. Test plans must be developed for each level of product testing.

Chapter 2

Test Items

The following test items will be focused here in the testing process:

- Requirement Specification
- Design Specification
- Features (availability, response time)

Chapter 3

Features to be tested

The software section of the project contains two section: mobile application and the web application.

3.1 Mobile Application Features for Testing

The mobile application section contains the following elements which are to be brought under testing procedure:

- Feature#1
  - Name of Feature: Image Crop feature.
  - Input: Take image from gallery or capture using mobile camera.
  - Output: Crop the target part from image and send for processing.
  - Testing Type: Unit Testing.
  - Criteria Assessment: It is to be checked whether the app can crop the target part of the image trimming all other unnecessary items from the captured image properly.
- Feature#2
  - Name of Feature: Image processing feature.
  - Input: Image of target.
  - Output: Determine the bullet impression from target.
  - Testing Type: Unit Testing.
  - Criteria Assessment: The image process section of app is the most vital part of the project which is the first thing which is to be cross checked properly and repeatedly. It is to be checked whether the impression calculated from the image processing is approximately equal to the real time calculation done manually.
- Feature#3
  - Name of Feature: Individual firer account data handling.
  - Input: Log-in using user name and password.
  - Output: Get access to user account and display all the information relevant to the firer.
  - Testing Type: Integration Testing.
  - Criteria Assessment: Individual firer must be able to access their own account and their relevant information from the server database. Besides his firing performance will be shown based on which firer can judge himself.

3.2 Web Application Features for Testing

The web application section has the following items which are to be tested:

- Feature#1
  - Name of Feature: Machine learning feature of the web application.
  - Input: Previous data sheet of firer.
  - Output: Machine based on the previous data of firing of the firer can answer whether the weapon of the firer is to be zeroed or not.
  - Testing Type: Integration Testing.
  - Criteria Assessment: Machine learning of the data from bullet impression data sheet. The machine learning is applied here to determine whether zeroing is required for the weapon based on previously recorded impress data. However this is to be tested manually whether the confidence achieved from machine learning result matches with the real time.

Chapter 4

Software Testing

4.1 Development Testing

Unit testing is done while development of the project. The components used in the software section are tested individually to check the validity.

4.2 Release Testing

Testing conducted in which software elements, hardware elements, or both are combined and tested until the entire system has been integrated. The purpose of integration testing is to ensure that design objectives are met and ensures that the software, as a complete entity, complies with operational requirements. Integration testing is also called System Testing.

Chapter 5

Hardware Testing

The system developed is to zero the weapon. The machine was taken to firing range of Mirpur Cantt. A soldier fired for 5 rounds and later on based on the correction the weapon was zeroed. A video is attached to demonstrate the hardware testing part.

Chapter 6

Pass/Fail Criteria

The machine is to zero the weapon which is shown in the video attached in appendix section where it its shown in real time that a weapon has been zeroed with the developed machine which high accuracy. It indicates the working validity of the machine. Again, at the same time both the company commander and the soldiers were able to watch their firing results logging from either mobile application or web based application which also indicates the validity of the application.

Chapter 7

Testing Scheduling

While development and release of the product the machine along with the software was tested. The machine will be used regularly at the firing range. As a result, any fluctuations in the accuracy result will call the developers to check and rectify the system.

Chapter 8

Environmental Requirements

8.1 Hardware

The hardware can be used anywhere at any firing range. However it needs to be kepts safe from rain and water which there is electrical circuits associated with hardware.

8.2 Software

The firer will be able to use the web based management system using the IP provided by the system admin. Since it is system designed for Army, the system will be available through the IP provided and also within the network connectivity inside the Firing Range. The mobile application can be installed easily in an android phone without any hassle. However, the mobile where the app is running needs to be connected to the IP provided by the system user within the firing range network connectivity so the app reaches out the central database.

8.3 Tools

The tools used here are sensitive and accurate which requirements special care.

8.4 Risks and Assumptions

The machine for zeroing has motors and actuators along with other circuits. As a result, the user needs to be very careful while handling all these things. The weapon need to be inserted properly so that it does not do any harm to the structure and circuit. Besides, it must be protected from environmental hazards like rain, wind, snow etc. No human interruption should be done in zeroing process. The system being made for Army must be kept under proper security steps and measures. The application should not be allowed to be used by public users.

Appendices

The following documents are attached hereby:

1. Project Plan
2. Base File
3. Project Proposal
4. System Architecture
5. Work Flow Diagram
6. A video to demonstrate the hardware activities live in the firing range.