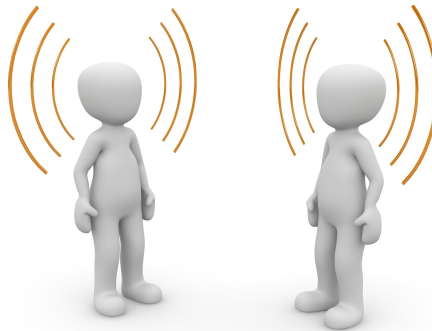# Test Plan

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Version 2.0

Status

Reviewed	Martin Dahl	2022-10-13
Approved	Danyo Danev	2022-10-31

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DOCUMENT HISTORY

Version	Date	Changes made	Sign	Reviewer
2.0	2022-12-04	Removed tests that were deemed as irrelevant to the product.	Sebastian Andersson	Martin Dahl
1.0	2022-10-13	Fixed the tests based on comments.	Sebastian Andersson	Martin Dahl
0.1	2022-10-11	First draft	Sebastian Andersson	Martin Dahl

1   INTRODUCTION

The product is a system using software-defined radio to count the number of people entering and exiting a room, thus keeping track of the number of people in the room.

This document serves as a plan for when and how the different modules will be tested to ensure that a desirable performance and stability is kept throughout the project. The test plan will be based on requirement specification, see [1], and will only touch upon the ones having a priority of 1. The other are seen as "extra" tasks and will be provided a test plan if the need is present. This will guarantee that the minimum of this project is achieved with great quality and securing that the end product lives up to the expectations when delivered.

2   TEST OUTLINE

Here is an outline of how the test will be structured and how action should be taken if a test is not meeting its desirable outcome.

2.1   Test structure

The individual test will be structured according to table 1. The first column shows the test number, this will be used to identify and refer to a particular test. In the next column is the test description, here an explanation of what should be tested is given. The column after that is the location of the test, this is to specify the environment that the test should be performed. If the location does not matter, this field will be empty. Finally, the last column shows the week this test should be performed and finished. These tables will be used in every module to list their tests.

Test number	Test description	Test location	Week to perform the test

Table 1: Definition of a test cell

The tests will be divided into different modules, making it easy to see what should be tested for each module. The test for a particular module will be listed in week order, so in the order that they should be performed for that module. The "other" section is for tests that do not fit into a particular module, for instance, tests that need to be performed on multiple modules simultaneously.

2.2   Performing a test

A test should be performed by one or more group members. If only one person is performing a test, there needs to be at least one other member that reviews the result and checks that the test was done reasonably. In the end, it is the Test manager's responsibility that every test is performed following the test plan and the requirement specification.

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2.3   Problems with a test

A problem with the test can be that it either is delayed due to a module not being ready, the desired outcome of the test is not met, or the test is too unreasonable to perform. It is up to the Test manager to ensure that every problem that arises with the test is dealt with. This is to keep the structure in the test plan and ensure that the product meets the designated requirements.

If there is a delay in the test, the test plan must update to accommodate that delay. This could be moving the test preceding the delayed one to a later date (in a reasonable time frame).

If the test is not reasonable or does not give a satisfying outcome, then the test needs to be rethought and restructured. Maybe the test needs to be split into sub-tests or the test must be scrapped or completely reconstructed.

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3 HARDWARE

In this section, the test that will be performed on the hardware modules will be presented. They are shown below.

Number	Description	Location	Week
1	Test that the Pluto SDR devices switch on without issues.	Labbet	40
2	Test that the signal can be sent by the transmitter and received by the receiver	Labbet	41
3	Test that the received signal makes sense based on the transmitted signal	Labbet	41
4	Test setup of transmitter and receiver, so it is possible to see a difference between an in- or out-passage.	Skrubben	41
5	Test that the signal is correct so the CSI is possible to extract.		44
6	Test so that the extraction method used are able to extract the CSI from the received signal.		44
7	Test that the hardware can produce data that is understandable (right format) by the software module.		45

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4 SOFTWARE

In this section, the test that will be performed on the software modules will be presented. They are shown below.

Number	Description	Location	Week
8	~~Test that the software module can store the gathered data from the hardware module.~~	~~Skrubben~~	~~45~~
	Comment: Removed because the change in the requirement specification results in this test being irrelevant.		
9	Test that the software module is able to load the stored data.		45
10	Test that the setup for the framework for machine learning algorithms is stable and dynamic (easy to change models).		45
11	Test that the filtering of the signal (pre-processing the data) gives a cleaner signal		46
12	Test that the model (arbitrary machine learning algorithm) has the ability to distinguish between an in- and out-passage through a doorway.		47
13	Test that the performance of the model can be evaluated.		47
14	Test that a running mode (detecting directions in doorways live) for the software module is working properly.		48
15	Test that a calibration mode for the unit is working properly.		48
16	Test that the functionality to switch between the different modes (running & calibration) is working without interfering with each other.		48

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5   USER INTERFACE

In this section, the test that will be performed on the user interface will be presented. They are shown below.

Number	Description	Location	Week
17	Test that the user interface is running, and a user can navigate through it.		41
18	~~Test that a skeleton of every desired functionality is implemented in the interface.~~		~~44~~
	Comment: There was no practical application in implementing this meaning that the test was redundant.		
19	Test that the interface has the functionality to start gathering data.		44
20	Test that the interface offers the functionality for the user to label data during the gathering.		44
21	~~Test that there is an option to change which model should be trained or evaluated.~~		~~45~~
	Comment: Removed because the change in the requirement specification results in this test being irrelevant.		
22	~~Test that the interface has the functionality to change the dataset which is used to evaluate or train models.~~		~~45~~
	Comment: Removed because the change in the requirement specification results in this test being irrelevant.		
23	Test that the interface can display relevant metrics (like loss over epochs, score, and so on) for the model in both training and evaluation modes.		47
24	~~Test that the interface has the option to choose an automatic hyperparameter optimization.~~		~~48~~
	Comment: Removed because the change in the requirement specification results in this test being irrelevant.		

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6   OTHER

In this section, the test that will be performed that does not fit into one particular module will be presented. They are shown below.

Number	Description	Location	Week
25	Test that the user interface can communicate with the hardware module to start and stop gathering data.		44
26	Test that the communication between the hardware and software module is working via the User Interface.		45
27	Test that all the modules are communicating with each other in the desired way.		49

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REFERENCES

[1] H. Ahlinder, S. Andersson, M. Dahl, C. Gustavsson, J. Henneberg, and T. Kylesten, "Detection of an object movement direction indoors: Requirement specification, 2022."

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