



Test Plan
Automates attendance system

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1 System test plan

The main idea behind the test plan consists of testing the individual parts separately on the first stage for a unit test. Then merge all modules together step by step for a final test. Therefore all modules functionality is validated through a unit test and the system functionality is verified through a final test.

1.1 RFID reader

To verify that each part of the circuit meets the specified requirements, we use electronic test equipment as voltmeters, oscilloscopes...

1. Power supply
 - The 5V DC output should be 4.8V to 5.2V
 - The 12V DC output should be 11.5 V to 12.5 V
2. clock generator
 - The output should be 125 kHz square wave with 12 V DC Vcc input
3. Power Amplifier and Antenna
 - The output should be 125 kHz sinusoid wave with 125 kHz square wave input
4. The inductance of the Resonant Antenna Design circuit should be 1.62mH

We will fine-tune the circuit until we see the highest resonant voltage form our carrier frequency.

The reader's size should not exceed 15cm x 10cm; as defined in requirement specification [R26-B].

After we assure that the circuit behaves as specified in theory, we will try to detect the tag and transfer information associated with it to the computer.

- Given the distance constraint to assure no interference from other tags, the RFID reader needs to be tested with different distances. Based on our requirement specification [R23-B], the reader should read the tag within 10 cm.
- Another tag will to be introduced at the same time. The RFID reader needs to detect only one tag at a time.
- Once the detection stage is done, the transfer stage will be tested.
A USB port will be connected to the circuit. Using a USB cable, data will be transferred to the computer. The number read should match the unique number associated with the tag.

- We also will test the read time. Based on our requirement specification [R21-A], the reader needs to read the data in less than a 0.5s. We will test the read time with putting the tag in 2cm, 4cm, 6cm, and 10cm with 5 times for each position. We will test the accuracy of the system. We will put the tag in different range, put two tags in the range and the two tags with fixed distance, or put another electronic device within the range. Around 5 to 10 different tags will be tested.

1.2 Software system and image processing

The purpose of this module is to receive the incoming information, retrieve data from the database and compare two pictures. To be efficient the image processing will be implemented and tested in parallel with the other software parts. Once every part is working, the integration phase will be done and testing will be conducted.

1. Face detection:
 - The algorithm will be tested to detect the face on pre-loaded images and an image taken with a webcam.
 - Different people will take part of the tests and different position & lighting condition will make the test cases.
 - The algorithm will handle one face per picture as discussed in our requirement specification [R41-A]
2. Face recognition
 - Face recognition is related to the previous module. Once the face is detected the system will try and identify the person.
 - A pre-loaded picture will be stored in the computer and the algorithm should be able to identify the person.
 - Different persons will take part of the test and this iteration is repeated to identify different persons.
3. The software solution – Database and information retrieval
 - A database will be created and filled by some random information for testing purpose. The first testing step after that is to make sure that the connection between the program and the database is secure and reliable.
 - Once the connection is made, a random number with the same format as the tag number will be used to access the database.
 - The second step will be to store an image in the database and to retrieve it using the same number.
4. The software solution – Add image processing



- After retrieving information, a person will try to be identified. A wrong person and the real person will take part of the test.

As soon as we assure that the system is working properly, the GUI will be taking care of. All feedback messages will be displayed to the user on the screen.

1.3 System test plan

As a final test, all parts software and hardware will be combined and extensively tested. The information received from the RFID reader will be used to access the database and the picture captured by the camera will be saved. Once reading information from both the RFID reader and the database is guaranteed to be working properly, reading from the camera will be tested. An alternation between reading the tag information and capturing a photo needs to be respected.

Multiple scenarios will be experienced to ensure that the algorithm works properly and meets the requirements.

- Student scans the RFID tag , then gets a picture from the camera
- Student scans the RFID tag and another person scans another RFID tag
- Student scans the RFID tag , then gets a picture from the camera and another person gets a picture without scanning the tag
- Student scans the RFID tag and another person gets a picture from the camera
- More than one person scan their tags at the same time

In all the above scenarios the system should detect the acceptable from the unacceptable scenario and give feedback to the user. Once everything is working properly, system improvement and optimization will be taken into consideration.