

Verification and Validation Report: Mechtronics Enigeering

Team 32, Wingman, SmartVault

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1 Revision History

| Date | Version | Notes |
|----------|---------|---------------------------|
| 2023/3/7 | 1.0 | Finish the required parts |
| 2023/3/8 | 1.1 | Fix errors |

2 Purpose

This document is intended to support the systematic plan for testing the functionality of the system. It meant to show the system has met the requirements in both software and hardware aspects mentioned in requirements document. In particular, this document will describe the testing results. By the end of testing process, it can be shown that the system is working properly and available for usage.

3 Scope

The document would pay attention to the different functionalities being discussed within the VnVPlan documentation. In addition, it would undergo the testing processes as if it was a black box, which will emphasis on the inputs and outputs of the system instead of the internal process and mechanics.

4 Background

SmartVault is designed to assist the user to remember where his/her belongings are and the most recent time the user had used or placed their belongings. The proposed system is capable of tracking and following human activities to position itself best for capturing any moving objects caused by the user. The system will identify each item that is being moved and record/update their corresponding positions. The user then has the ability to interact with our system through an interface and select which item the user is looking for. Given this information, our system would identify where that specific item is and assist the user to locate their belongings in a short time. This section will not be appropriate for every project.

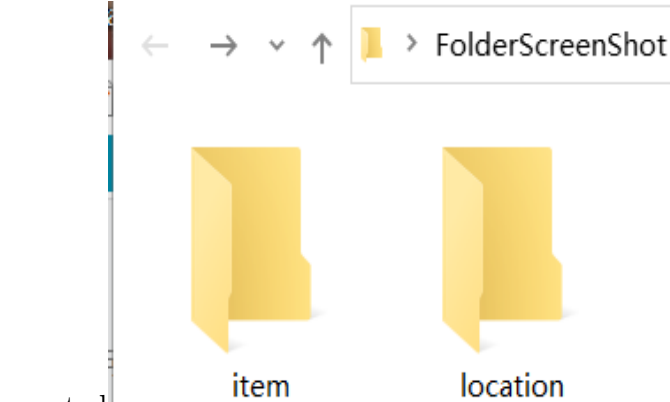
5 Functional Requirements Evaluation

5.0.1 Area of Testing1

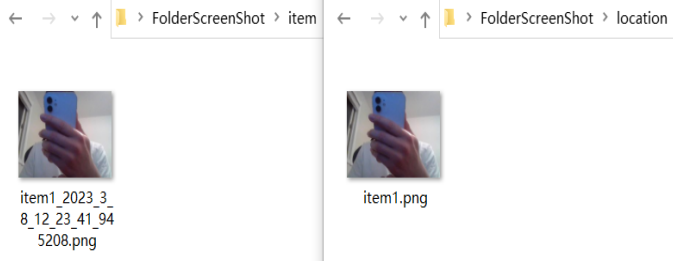
Manual Testing Testing shown:

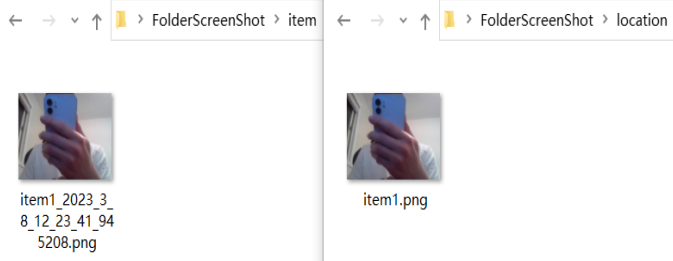
| | |
|-----------------------|--|
| Test Number | IPR1-1 |
| Requirement Reference | IPR1 |
| Requirement | The system should be able to identify human's body |
| Input | Images of the working environment and a human show up in the environment |
| Desired Output | Coordinate of the detected human body |
| Actual Output | Correct coordinate of the detected human body |
| Conclusion | The test pass as expected |

| | |
|-----------------------|---|
| Test Number | UIR4-1 |
| Requirement Reference | UIR4 |
| Requirement | The UI must be able to allow the user to view the system's status at any given point in time. |
| Input | User change the unplug the camera to insert a fault |
| Desired Output | The graphical display to the user |
| Actual Output | The camera window closed and UI stay running |
| Conclusion | The test pass |

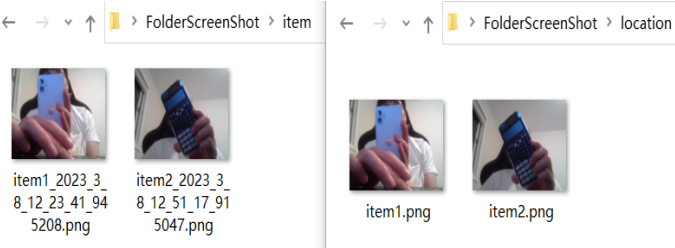
| | |
|-----------------------|--|
| Test Number | IPR4-1 |
| Requirement Reference | IPR4 |
| Requirement | To create 3 folders sequentially |
| Input | createFolder() being called |
| Desired Output | 3 folders (FolderScreenShot, item, location) created |
| Actual Output | <p>3 folders (FolderScreenShot, item, location)</p>  <p>created</p> |
| Conclusion | Pass |

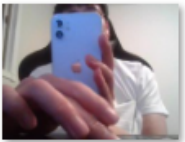



| | |
|-----------------------|---|
| Test Number | IPR4-2 |
| Requirement Reference | IPR4 |
| Requirement | Do nothing if they have already existed |
| Input | createFolder() being called |
| Desired Output | No change |
| Actual Output | No change |
| Conclusion | Pass |

| | |
|-----------------------|---|
| Test Number | IPR5-1 |
| Requirement Reference | IPR5 |
| Requirement | To store the initial frame |
| Input | (1, 'i') |
| Desired Output | Adding item1_{date and time}.png, item1.png |
| Actual Output | Added as:  |
| Conclusion | Pass |

| | |
|-----------------------|---|
| Test Number | IPR5-2 |
| Requirement Reference | IPR5 |
| Requirement | To check whether the frame is stored in the correct path |
| Input | (1, 'i') |
| Desired Output | item{num}_{date and time}.png is stored in 'item', item{num}.png is stored in 'location' |
| Actual Output | item1_2023_3_8_12_23_41_945208.png is within 'item', item1.png is inside 'location'  |
| Conclusion | Pass |

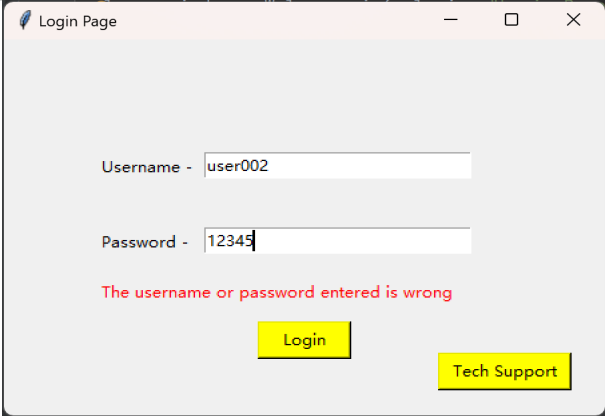
Automatic Testing Testing shown:

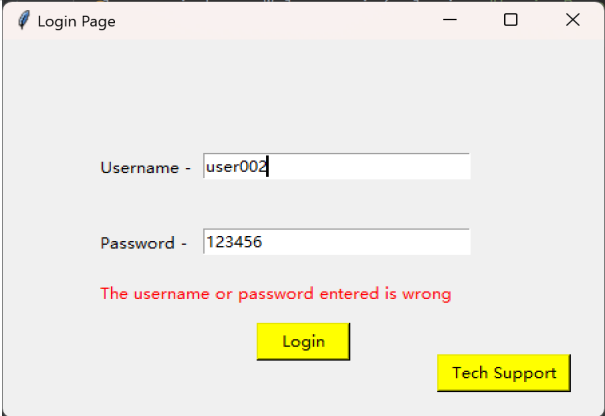
| | |
|-----------------------|---|
| Test Number | IPR6-1 |
| Requirement Reference | IPR5, IPR6 |
| Requirement | To check whether the frame for the second item is captured |
| Input | (2, 'i') |
| Desired Output | Adding item2_{date and time}.png, item2.png |
| Actual Output | <p>Added as:</p>  |
| Conclusion | pass |

| | |
|-----------------------|---|
| Test Number | IPR6-2 |
| Requirement Reference | IPR4, IPR6 |
| Requirement | To check whether the location frame for the first item is updated, meanwhile the second item won't get affected |
| Input | (1, 'u') |
| Desired Output | item1- <code>{date and time}.png</code> should remain, item1.png shall be updated |
| Actual Output | <p>Only item1.png get updated Comparison shown:</p> <div> <div> <div>← → ▾ ↑</div> <div>FolderScreenShot > location</div> </div> <div> <div>  <div>item1.png</div> </div> <div>  <div>item2.png</div> </div> </div> <hr/> <div> <div> <div>← → ▾ ↑</div> <div>FolderScreenShot > location</div> </div> <div> <div>  <div>item1.png</div> </div> <div>  <div>item2.png</div> </div> </div> </div> </div> |
| Conclusion | Pass |

5.0.2 UI Interface Menu

Manual Testing Testing shown:

| | |
|-----------------------|---|
| Test Number | UIR1-1 |
| Requirement Reference | UIR1 |
| Requirement | The UI should notify the user when the user has a wrong password input |
| Input | The wrong input of the password |
| Desired Output | There should be a text notification shown on the window |
| Actual Output |  |
| Conclusion | The test is successful |

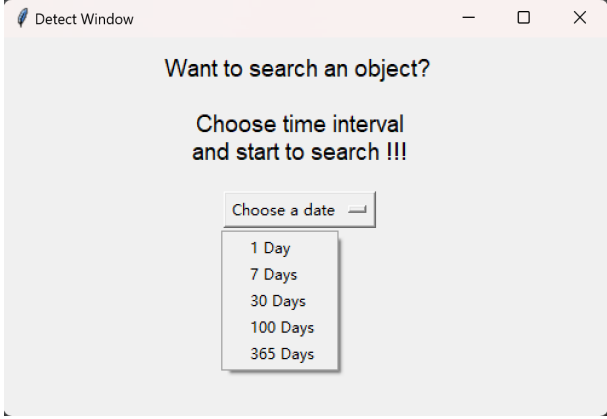
| | |
|-----------------------|---|
| Test Number | UIR1-2 |
| Requirement Reference | UIR1 |
| Requirement | The UI should notify the user when the user has a wrong username input |
| Input | The wrong input of the username |
| Desired Output | There should be a text notification shown on the window |
| Actual Output |  |
| Conclusion | The test is successful |

| | |
|-----------------------|--|
| Test Number | UIR2-1 |
| Requirement Reference | UIR2 |
| Requirement | The UI should be able to let the user to switch the pictures shown in the window |
| Input | The next button is clicked |
| Desired Output | A different picture is shown |
| Actual Output | A different picture is shown in the window |
| Conclusion | The test is successful |

| | |
|-----------------------|--|
| Test Number | UIR2-2 |
| Requirement Reference | UIR2 |
| Requirement | The UI should be able to let the user to switch the pictures shown in the window |
| Input | The previous button is clicked |
| Desired Output | A different picture is shown |
| Actual Output | A different picture is shown in the window |
| Conclusion | The test is successful |

| | |
|-----------------------|---|
| Test Number | UIR3-1 |
| Requirement Reference | UIR3 |
| Requirement | The UI should be able to provide information about the location of the item |
| Input | The user select the item picture |
| Desired Output | The location of the picture is shown in a new window |
| Actual Output | |
| Conclusion | The test is successful |

| | |
|-----------------------|---|
| Test Number | UIR3-2 |
| Requirement Reference | UIR3 |
| Requirement | The UI should be able to provide information about the location of the item |
| Input | The user select the item picture |
| Desired Output | The UI should notify the user that the item has been taken out of the room |
| Actual Output | |
| Conclusion | The test is successful |

| | |
|-----------------------|--|
| Test Number | UIR4-1 |
| Requirement Reference | UIR4 |
| Requirement | The UI should be able to let the user to choose the information input |
| Input | The user select the choose box |
| Desired Output | The UI provides choices to the user |
| Actual Output |  |
| Conclusion | The test is successful |

6 Nonfunctional Requirements Evaluation

6.1 Usability and Humanity Requirements

| | |
|-----------------------|---|
| Test Number | APR1-1 |
| Requirement Reference | APR1 |
| Requirement | The User is able to launch the program without help |
| Input | The servy paper |
| Desired Output | An average of high rating shown on the paper |
| Actual Output | |
| Conclusion | The test is successful |

| | |
|-----------------------|---|
| Test Number | EUR1-1 |
| Requirement Reference | EUR1 |
| Requirement | The User is able to use the hardware without help |
| Input | The servy paper |
| Desired Output | An average of high rating shown on the paper |
| Actual Output | |
| Conclusion | The test is successful |

| | |
|-----------------------|--|
| Test Number | EUR2-1 |
| Requirement Reference | EUR2 |
| Requirement | The User is able to find the desired item without help |
| Input | The servy paper |
| Desired Output | An average of high rating shown on the paper |
| Actual Output | |
| Conclusion | The test is successful |

| | |
|-----------------------|---|
| Test Number | LER1-1 |
| Requirement Reference | LER1 |
| Requirement | The User is able to install the software without help |
| Input | The servy paper |
| Desired Output | An average of high rating shown on the paper |
| Actual Output | |
| Conclusion | The test is successful |

| | |
|-----------------------|--|
| Test Number | LER2-1 |
| Requirement Reference | LER2 |
| Requirement | The program can take pictures after the user has been leave the room |
| Input | The user leave the room |
| Desired Output | Pictures are taken |
| Actual Output | |
| Conclusion | The test is successful |

| | |
|-----------------------|--|
| Test Number | UPR1-1 |
| Requirement Reference | UPR1 |
| Requirement | The user is able to see each picture clearly |
| Input | The servy paper |
| Desired Output | An average of high rating shown on the paper |
| Actual Output | |
| Conclusion | The test is successful |

7 Changes Due to Testing

8 Traceability Matrices

8.1 Traceability for Functional Requirements

| Table 1: Traceability for Area of Testing 1 | | |
|---|-------------|-------------|
| Test Method | Requirement | Test Number |
| Manual | IPR4 | IPR4-1 |
| Manual | IPR4 | IPR4-2 |
| Manual | IPR5 | IPR5-1 |
| Manual | IPR5 | IPR5-2 |
| Automatic | IPR5, IPR6 | IPR6-1 |
| Automatic | IPR4, IPR6 | IPR6-2 |

| Table 2: Traceability for UI Interface Menu | | |
|---|-------------|-------------|
| Test Method | Requirement | Test Number |
| Manual | UIR1 | UIR1-1 |
| Manual | UIR1 | UIR1-2 |
| Manual | UIR2 | UIR2-1 |
| Manual | UIR2 | UIR2-2 |
| Manual | UIR3 | UIR3-1 |
| Manual | UIR3 | UIR3-2 |
| Manual | UIR4 | UIR4-1 |

8.2 Traceability for Nonfunctional Requirements

| Table 3: Traceability for Usability and Humanity Requirements | | |
|---|-------------|-------------|
| Test Method | Requirement | Test Number |
| Manual | APR1 | APR1-1 |
| Manual | EUR1 | EUR1-1 |
| Manual | EUR2 | EUR2-1 |
| Manual | LER1 | LER1-1 |
| Manual | LER2 | LER2-1 |
| Manual | UPR1 | UPR1-1 |
| Manual | UIR4 | UIR4-1 |

Appendix — Reflection

The information in this section will be used to evaluate the team members on the graduate attribute of Lifelong Learning. Please answer the following questions:

- 1.
- 2.