

American International University-Bangladesh (AIUB)  
**Department of Computer Science  
Faculty of Science &Technology (FST)**

**AI-Powered CCTV System**

A software Engineering project

# 1.PRODUCT AND PROJECT DESCRIPTION

## System Features

1. **Vehicle detection**

**Functional Requirements**

User must log in to the system and go to the Vehicle detection icon.By Using our vehicle detection feature to be even more informedand spot activity as soon as possible. Bymounting his/her camera in front of his/her house, he/she can be notified immediately whenever a vehicle approaches your driveway. Even when it’s dark out, our cameras’ night vision sensors can deliver crystal clear snapshots and video alerts directly to his/her phone, informing you before a threat gets close.

*Priority Level:* High  
 *Precondition* User*:* User must be registered to the system and have a valid account.

*Cross-reference:1*

1. **Facial Recognition**

**Functional Requirements**

User must log in to the system. The software allows a user to Face detection and Person detection feature. This software detects the shape of human faces and acquires the facial features in real time. For optimal detection the target should be in front of the camera at 5 or 13 meters, depending on the model. The detection algorithm works day and night, even with many people in front of the lens and even if the target is wearing hat, beard, glasses or partial masking. When the camera detects a face, it can perform alarm actions.

*Priority Level:* High  
*Precondition:* User must be registered to the system and have a valid account.  
*Cross-reference:* 1

1. **People counting**

**Functional Requirements**

In many areas, like shops, schools and public buildings, there are increased restrictions on maximum capacities for the number of visitors, customers or employees. In order to determine the current numbers in real time, entries and exits must be monitored. This software can do reliably and effectively work for counting people.

*Priority Level:* High  
 *Precondition:* user have to purchase ticket and travel with us.  
 *Cross-reference:* 2, 3.2

1. **Send information to real time crime centers**

## It will send notification to nearby police station or real time crime centers quietly, if it detects any kind of suspicious or unusual movement. Such as “Bank Robbery”.

*Priority Level:* Medium  
*Precondition:* User must have valid account and must be logged in to the system and have to purchase ticket.  
*Cross-reference:* 1,2,3,4,5

## 1.2 System Quality Attributes

**QA 1- Availability:** The system should be available for 23 hours a day and all 7 days of the week, with an hour max downtime per day for server reset, database backup & data integrity check.

*Priority Level: High*

*Precondition: N/A*

*Cross Reference: QA 8, QA 9*

**QA 2- Efficiency:** At the desired peak load circumstances, at least 20% of the processing capacity and RAM available to the program must be idle.

*Priority Level:* Low

*Precondition:* N/A

*Cross Reference: QA 3, QA 5, QA 6, QA 7, QA 8, QA 9, QA 10, QA 11*

**QA 3- Flexibility:** A capable programmer should be able to make minor adjustment to the software and also generate additional outputs based on the information that pre-exists in the database.

*Priority Level:* High

*Precondition:* N/A

*Cross Reference: QA 2, QA 4, QA 6, QA 7, QA 8, QA 10*

**QA 4- Maintainability:** A maintenance programmer should be able to correct most non

critical errors. Any data loss should be easily recoverable in a short time due to automated

daily backups.

*Priority Level:* High

*Precondition:* N/A

*Cross Reference: QA 1, QA 2, QA 3, QA 8, QA 10*

## 1.3 Project Requirements

**Project Time:**  3 months

**Resources:**

1. **Environment:** Adaptable Environment
2. **Model:** Scrum model (Agile methodology)
3. **Model type:** Nonlinear
4. **Product type:** Personal Software

**Budget:** 50,000 BDT(Approx.)

**Personal:**

1. Coder (2-5)
2. Manager (1)
3. User (5-9 testing and feedback purpose only)
4. Client (1)

# 2.SYSTEM DESIGN SPECIFICATION:

## UI/UX Design

|  |  |
| --- | --- |
|  |  |
|  |  |

# 3.SYSTEM TEST PLAN:

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| --- | --- | --- | --- | --- |
| Project Name: AI-powered CCTV System | | | Test Designed by: Sabrina Jashim | |
| Test Case ID: FR\_2 | | | Test Designed date:05-August-2022 | |
| Test Priority (Low, Medium, High): High | | | Test Executed by: | |
| Module Name: Vehicle Detection | | | Test Execution date: | |
| Test Title: Verify registration with valid account number and detect vehicle. | | | | |
| Description: Matching with the information of database and detect vehicle number plate. | | | | |
| Precondition (If any): User must be registered to the system and have a valid account. | | | | |
| **Test Steps** | **Test Data** | **Expected Results** | **Actual Results** | **Status (Pass/Fail)** |
| 1. Go to Vehicle Detection icon. 2. Connect with the AI CCTV server. 3. Verify vehicle number plate . | Username:  Muhee202  Password: 007 | Customer should login into the application with valid account number, and detect vehicle. |  |  |
| Post Condition: Customer is validated with database and successfully login to account. The account session details are logged in the database. | | | | |

*Table Number: Test Case for Vehicle Detection*

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Project Name: AI-powered CCTV System | | | Test Designed by: Sabrina Jashim | |
| Test Case ID: FR\_3 | | | Test Designed date:05-August-2022 | |
| Test Priority (Low, Medium, High): High | | | Test Executed by: | |
| Module Name: Facial Recognition | | | Test Execution date: | |
| Test Title: Verify registration with valid account number and detect face. | | | | |
| Description: Matching with the information of database and detect person with their image. | | | | |
| Precondition (If any): User must have valid account and must be logged in to the system. | | | | |
| **Test Steps** | **Test Data** | **Expected Results** | **Actual Results** | **Status (Pass/Fail)** |
| 1. Go to Facial Recognition icon. 2. Connect with CCTV server 3. Check image from database and verify. | Username: Muhee202  Password: 007 | Customer should login into the application with valid account number, and recognize face after collecting information from database. |  |  |
| Post Condition: Verify face structure with valid storage data. | | | | |

*Table Number: Test Case for Facial Recognition*

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Project Name: AI-powered CCTV System | | | Test Designed by: Sabrina Jashim | |
| Test Case ID: FR\_5 | | | Test Designed date:05-August-2022 | |
| Test Priority (Low, Medium, High): High | | | Test Executed by: | |
| Module Name: People Counting | | | Test Execution date: | |
| Test Title: Register to the system and must have a verified account and count people. | | | | |
| Description: Track and manage people entering/exiting specific property and how many people enter specific areas of property. | | | | |
| Precondition (If any): User must have valid account and must be logged in to the system. | | | | |
| **Test Steps** | **Test Data** | **Expected Results** | **Actual Results** | **Status (Pass/Fail)** |
| 1. Go to People Counting icon.  2. Connect with the AI CCTV.  3. User might input the total number of people.  4. Get information the actual number of people and match those people from database. | Username:  Muhee202  Password: 007 | Total number of entering/exiting people. |  |  |
| Post Condition: User is validated with database and successfully login to account. The account session details are logged in the database. | | | | |

*Table Number: Test Case for People Counting*

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Project Name: AI-powered CCTV System | | | Test Designed by: Sabrina Jashim | |
| Test Case ID: FR\_6 | | | Test Designed date:05-August-2022 | |
| Test Priority (Low, Medium, High): Medium | | | Test Executed by: | |
| Module Name: Send information to real time crime centers | | | Test Execution date: | |
| Test Title: verify information and send to real time crime centers. | | | | |
| Description: Send notification to nearby police station or real time crime centers quietly, if it detects any kind of suspicious or unusual movement. | | | | |
| Precondition (If any): User must have valid account and must be logged in to the system. | | | | |
| **Test Steps** | **Test Data** | **Expected Results** | **Actual Results** | **Status (Pass/Fail)** |
| 1)Receive immediate  alerts when an ‘event’ occurs.  2)Police will be available to help the victims.  3) Criminal face will be detected. | Username:  Muhee202  Password: 007 | Receive alert and will able to help the victims. |  |  |
| Post Condition: The account session details are logged in the database. | | | | |

*Table Number: Test Case for Send information to real time crime centers*

# 4.PROJECT MANAGEMENT PLAN:

## Project Scheduling

|  |  |  |
| --- | --- | --- |
| **Project Activities/Tasks** | **Duration** | **Pre-requisite** |
| 1. Preliminary Project/Thesis Plan | 1 weeks |  |
| 1. Requirements Specification | 4 weeks |  |
| 1. Analysis [Object model, User interface] | 5 weeks |  |
| 1. Source Code | 5 weeks |  |
| 1. Test Plan | 3 weeks |  |
| 1. Final Product / Demo | 2 weeks |  |

*Table 05: Work Breakdown Structure (WBS) of AI powered CCTV system*

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Task | Week | | | | | | | | | | | |
| Person | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
| A: Sharear |  |  |  |  |  |  |  |  |  |  |  |  |
| B: Sharear |  |  |  |  |  |  |  |  |  |  |  |  |
| C: Sharear |  |  |  |  |  |  |  |  |  |  |  |  |
| D: Muhi |  |  |  |  |  |  |  |  |  |  |  |  |
| E: Muhi |  |  |  |  |  |  |  |  |  |  |  |  |
| F: Muhi |  |  |  |  |  |  |  |  |  |  |  |  |
| G:Mostafizur |  |  |  |  |  |  |  |  |  |  |  |  |
| H: Mostafizur |  |  |  |  |  |  |  |  |  |  |  |  |
| I: Afroja |  |  |  |  |  |  |  |  |  |  |  |  |
| J: Afroja |  |  |  |  |  |  |  |  |  |  |  |  |

A. Overall Design



B. Specify Module 01

C. Specify Module 02

D. Specify Module 03

E. Code Module 01

F. Code Module 02

G. Code Module 03

H. Code Module 04

I. Integration testing

J.System Testing

*Figure 4.1: Activity Planning of AI powered CCTV system*

## Risk Analysis

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| --- | --- | --- | --- | --- |
| S/N | **Risk Description** | **Probability** | **Impact** | **Mitigation Plan** |
| 1 | Unrealistic time estimation | 40% | Project will be delayed 2 months | Take multiple estimation |
| 2 | Developing wrong interface type | 20% | Hard to correct the design | User Involvement |
| 3 | Late Changes to requirement | 30% | The cost will be increased 33% of original cost | Change control |
| 4 | Real time performance problem | 50% | Performance of the software is low and showing unnecessary outputs | Simulation, Prototyping |