



Capstone Project 1

CMU-CS450

Project Proposal Document

Version 1.0
Date: 21/08/2022

Craft Village Pollution Monitor System

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PROJECT INFORMATION

| Project acronym | CVPMS | | |
|--|---|--|------------|
| Project Title | Craft Village Pollution Monitor System | | |
| Start Date | 22/08/2022 | End Date | 07/12/2022 |
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DOCUMENT NAME

| | | | |
|-----------------------|---------------------------|------------------|---|
| Document Title | Project Proposal Document | | |
| Author(s) | All team members | | |
| Date | 21/08/2022 | File Name | C1SE.06_CVPMS_Project-Proposal-Document_v1.0.docx |

REVISION HISTORY

| Version | Date | Comments | Author | Approval |
|----------------|-------------|------------------|------------------|---|
| 1.0 | 21/08/2022 | Create documents | All team members |  |

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1. Introduction

According to the newest statistics from JICA, in collaboration with the Ministry of Agriculture and Rural Development, there are currently 1450 craft villages distributed nationwide in 58 provinces and cities. The Red River Delta is the most crowded area with about 800 craft villages. Most of them are concentrated in all major provinces such as Ha Tay with 280 villages, Thai Binh with 187 villages, Bac Ninh with 59 villages, ...etc. The types of craft villages are very diverse from silk and leather goods to construction materials, ceramics, and porcelain. The craft villages are the place to attract the local labor force, create jobs for laborers in society, and contribute to improving the lives of people.^[1]



Figure 1. Bat Trang pottery village

However, the disadvantage/bad side of the development is that most of Vietnam's craft villages were and are now being polluted in three forms: water pollution; waste pollution, and air (emissions) pollution. According to the 2009 National Environment Report of the Ministry of Natural Resources and Environment, the survey results in 52 craft villages showed that 46% of craft villages were seriously polluted, 27% were in medium pollution, and 27% were mild pollution. Currently, the environmental

quality in most craft villages does not meet the standards, causing laborers to be exposed to health harmful risks, including 95% from dust, 85.9% from heat, and 59.6% from chemicals.^[11] One of the main reasons for this happening is the lack of overseeing the pollution from the craft village and the tools that are necessary for people of all ages to take part in protecting the environment. Based on the urgent requirements to have an effective way to monitor the pollution of the craft villages, we would like to do the topic "Building an application that allows everyone to monitoring pollution from craft villages".

1.1. Purpose

❖ Easy to use:

- Any person who knows how to use a smartphone can use the application to conduct a pollution survey easily.
- Support a wide range of ages (from 12 to 65).

❖ Quick and effective:

- Automate operations that previously had to be done manually.
- Perform tasks quickly and accurately by using AI.

❖ Accurate and complete:

- Capable of controlling, synthesizing fully accurately, and promptly reflecting the craft village's information and its pollution status.
- Ability to store data for a long time.
- Provide statistics - reports quickly and accurately.

❖ Load reduction:

- As a result of solving the above problems, people will not have to go through the cumbersome process to make a pollution survey as before. Making monitoring and collecting the pollution data from a craft village is much more effective and faster. To achieve a goal, the group will apply the knowledge from the studied subjects such as:

- ❖ Requirement Engineering: Collect, analyze current needs to form the idea. From there, find out what the user wants in that idea.
- ❖ Project Manager: Split work to calculate the schedule of the team to help the project perform on schedule.

- ❖ Information System Application: Analysis objects related to the project, data, information related to the topic.
- ❖ Software Testing: Learn an important role to ensure that when the project is completed, the product works exactly as set out without causing errors.

1.2. Scope

There are three main roles for this system:

- ❖ Personal user: The personal user will use the phone application to take picture of the pollution of the craft village and submit it to the server.
- ❖ Household user: The household user will use the phone application to submit their production information.
- ❖ Local Authority user: The local authority user will use the system to monitor the pollution status of the craft village.

The project's application is all the craft villages that are present in Vietnam.

2. Problem Definition

2.1. Project Requirement

- ❖ Due to the achievement obsession or a bureaucratic system, some systems that get the data from a certain group or government will be not accurate or already outdated. As a result, people's health will be affected if they trust these inaccurate data.
- ❖ Some systems only have records of the big cities and only support the big cities. In Vietnam, only big cities such as Hanoi, Ho Chi Minh city, or Da Nang have accurate pollution data that people can trust and use. In other places, the data would probably be inaccurate or already outdated.
- ❖ Many systems do not have a function that allows the user to make a report quickly and effectively. Even if they do, it would be still a very hard and cumbersome process that will not be very friendly for younger people or elderly people to use.
- ❖ Some systems or applications only support a certain type of pollution. Most of the reports or data focus in Vietnam on air pollution instead of other pollution such as dirt pollution, water pollution, or even light pollution. This leads to the

lack of data when the people want to know the pollution levels or what kind of pollutions exists around that craft village.

2.2. Proposed Solutions

Our team will wrap around the above problems and help everyone monitor and resolve the pollution problems from their craft village area more effectively. Some aspects that will make our system that the people will find much more effective:

- ❖ Our system will help everyone to monitor your local craft village despite where your location. This means whether you stay in a big city or a small village at the top of the mountain our system will still function.
- ❖ Our system will provide a function that lets people make an instant report to the local environment department.
- ❖ Our system will detect all kinds of pollution instead of focusing on some specific kinds. This will help to collect a variety of data that could help people to a bigger picture about their pollution levels in the area.
- ❖ Our system will have an AI that will take images from people then analyzes the image to know what kind of pollution the user is facing and the result will be automatically filled into the form which will be sent directly to the local environment department to resolve the problem. This is so easy to use that even an elementary school child can do and it also reduces a massive amount of the cumbersome and bureaucratic process that people have to go through.
- ❖ Our system is also integrated with location-based technology to detect the location of the pollution and layout the data on the map for the user to monitor.

2.3. Core Technology

2.3.1. Location-based Service

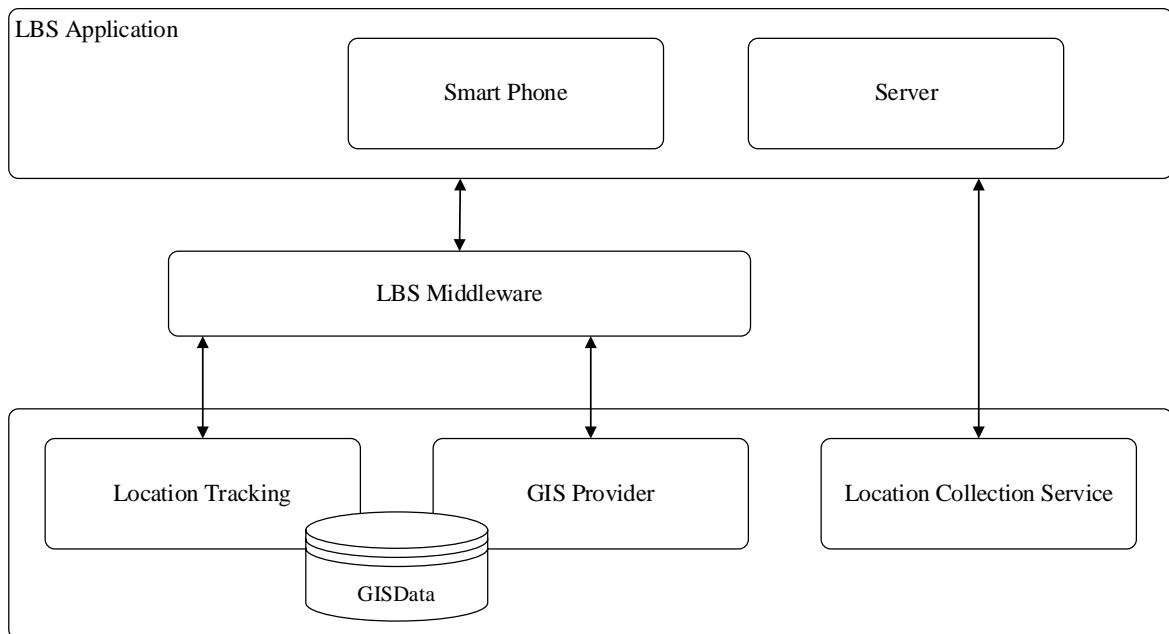


Figure 2. Architecture of the Location Based Services

A location-based service (LBS) is a general term denoting software services which use geographic data and information to provide services or information to users. LBS can be used in a variety of contexts, such as health, indoor object search, entertainment, work, personal life, etc. Commonly used examples of location-based services include navigation software, social networking services, location-based advertising, and tracking systems. LBS can also include mobile commerce when taking the form of coupons or advertising directed at customers based on their current location. LBS also includes personalized weather services and even location-based games.^[6]

Location-based services may be employed in a number of applications, including:^[6]

- recommending social events in a city
- requesting the nearest business or service, such as an ATM, restaurant or a retail store
- turn-by-turn navigation to any address
- assistive healthcare systems
- locating people on a map displayed on the mobile phone

- receiving alerts, such as notification of a sale on gas or warning of a traffic jam
- location-based mobile advertising
- asset recovery combined with active RF to find, for example, stolen assets in containers where GPS would not work
- contextualizing learning and research
- games where your location is part of the game play, for example your movements during your day make your avatar move in the game or your position unlocks content.
- real-time Q&A revolving around restaurants, services, and other venues.
- tracking a NASA lunar lander.
- sending a mobile caller's location during an emergency call using Advanced Mobile Location

For the carrier, location-based services provide added value by enabling services such as: [\[6\]](#)

- Resource tracking with dynamic distribution. Taxis, service people, rental equipment, doctors, fleet scheduling.
- Resource tracking. Objects without privacy controls, using passive sensors or RF tags, such as packages and train boxcars.
- Finding someone or something. Person by skill (doctor), business directory, navigation, weather, traffic, room schedules, stolen phone, emergency calls.
- Proximity-based notification (push or pull). Targeted advertising, buddy list, common profile matching (dating).
- Proximity-based actuation (push or pull). Payment based upon proximity (EZ pass, toll watch), automatic airport check-in.

2.3.2. Image Classification

In machine learning, a neuron is a mathematical function that takes an input value and outputs an output value. Many neurons connected together will form a neural network. The name "convolutional neural network" indicates that the network employs a mathematical operation called convolution.^[8]

Convolutional networks are a specialized type of neural networks that use convolution in place of general matrix multiplication in at least one of their layers or, in other words, "A convolutional neural network (CNN) is a type of artificial neural network used in image recognition and processing that is specifically designed to process pixel data." This characteristic that makes convolutional neural network so robust for computer vision. ^[8]

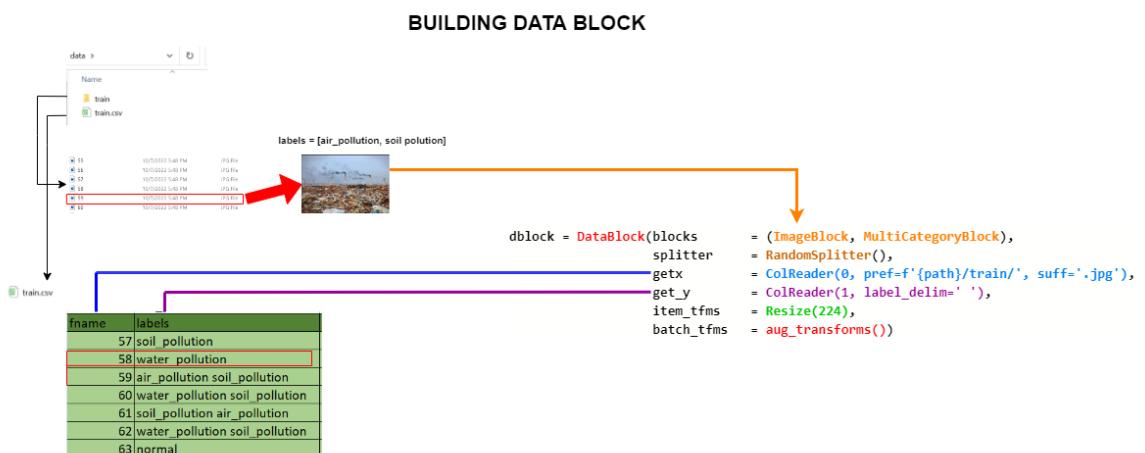


Figure 3. Building Data Block

A residual neural network (ResNet) is a convolutional neural network (CNN). Residual neural networks utilize skip connections, or shortcuts to jump over some layers. Typical ResNet models are implemented with double- or triple- layer skips that contain nonlinearities (ReLU) and batch normalization in between.^[7]

There are two main reasons to add skip connections: to avoid the problem of vanishing gradients, or to mitigate the Degradation (accuracy saturation) problem; where adding more layers to a suitably deep model leads to higher training error. ^[7]

With the problem of image classification of which type of environmental pollution, choose the direction of Image Classification to solve. It is divided into 4 classes: soil pollution, water pollution, air pollution, and no pollution. Then prepare image data for each class and train the recognition model.

```
O_Nhiem_Khong_Khi
tensor([6.5105e-07, 3.6927e-03, 9.9630e-01, 8.1420e-06])
Không ô nhiễm: 6.510521780001e-05 %
Ô nhiễm đất: 0.36926692724227905 %
Ô nhiễm không khí: 99.62985229492188 %
Ô nhiễm nước: 0.0008141990401782095 %
```



Figure 4. Detect Pollution Using Multi-Class Classification



```
1 result = {'air_pollution':float(outputs[0]), 'normal':float(outputs[1]),'soil_pollution':float(outputs[2]), 'water_pollution':float(outputs[3])}
2 result
{'air_pollution': 0.9998756647109985,
'normal': 0.013222821988165379,
'soil_pollution': 0.9442797303199768,
'water_pollution': 0.005980329588055611}
```

Figure 5. Detect Pollution Using Multi-Label Classification

The difference between Multi-Class Classification and Multi-Label Classification is that in multi-class problems, the classes are mutually exclusive. In contrast, for multi-label problems, each label represents a different classification task, but the tasks are related to each other. Here, we choose to handle the problem of Multi-Label Classification to be suitable for predicting many types of pollution in the same image.

2.4. Technical Constraints

❖ Technical to develop

- Language: Java (Spring Boot), Dart (Flutter), Python (Flask, FastAI)
- Develop tool: Visual Studio Code, SpringToolSuite4
- Version Control System: Git/GitHub

- Database Management System: Oracle SQL Developer

- ❖ **Environment**

- Operation systems: Microsoft Windows, MacOS, Android, iOS

- ❖ **Other Constraints**

- Resource: 4 people.
- Budget: Limited.
- Time: The project must be completed within 04 months.
- Area: Duy Tan University

3. Current Status of Art

3.1. Advantages

- ❖ No cumbersome and complex process: The application is very friendly for users to make a fast and effective pollution survey.
- ❖ No need to understand the complex environmental terms: The main focus of this system is for anyone who knows how to use the smartphone without a specialty in the environment area. Thus, no need to learn about complex environmental terms or you have to be an expert to use this system.
- ❖ Can detect multiple pollution types: With the application of AI, the system can discover multiple pollution types just by analyzing the submitted image by the user.
- ❖ Can automatically detect the location of pollution: Using location-based technology, there is no need for the user to specify the location where the pollution happens, everything will be automatic resolve.

3.2. Disadvantages

- ❖ Image quality: The system will be based on the image to detect the pollution types of that craft village, so if the user has a phone with a low-quality camera could cause some problems when the AI tries to detect the pollution types.
- ❖ Internet connection issues: The system will use the internet connection to communicate with the database and other services. Thus, the area with no internet connection or an unstable internet connection could cause the system to stop functioning. This will problem can be fixed in the later phase of the project.
- ❖ Data validation: Sometime people will intend to input false informations, thus, it causes the system to contain false information. This will problem can be fixed in the later phase of the project.

4. Engineering Approach

4.1. System Context Overview

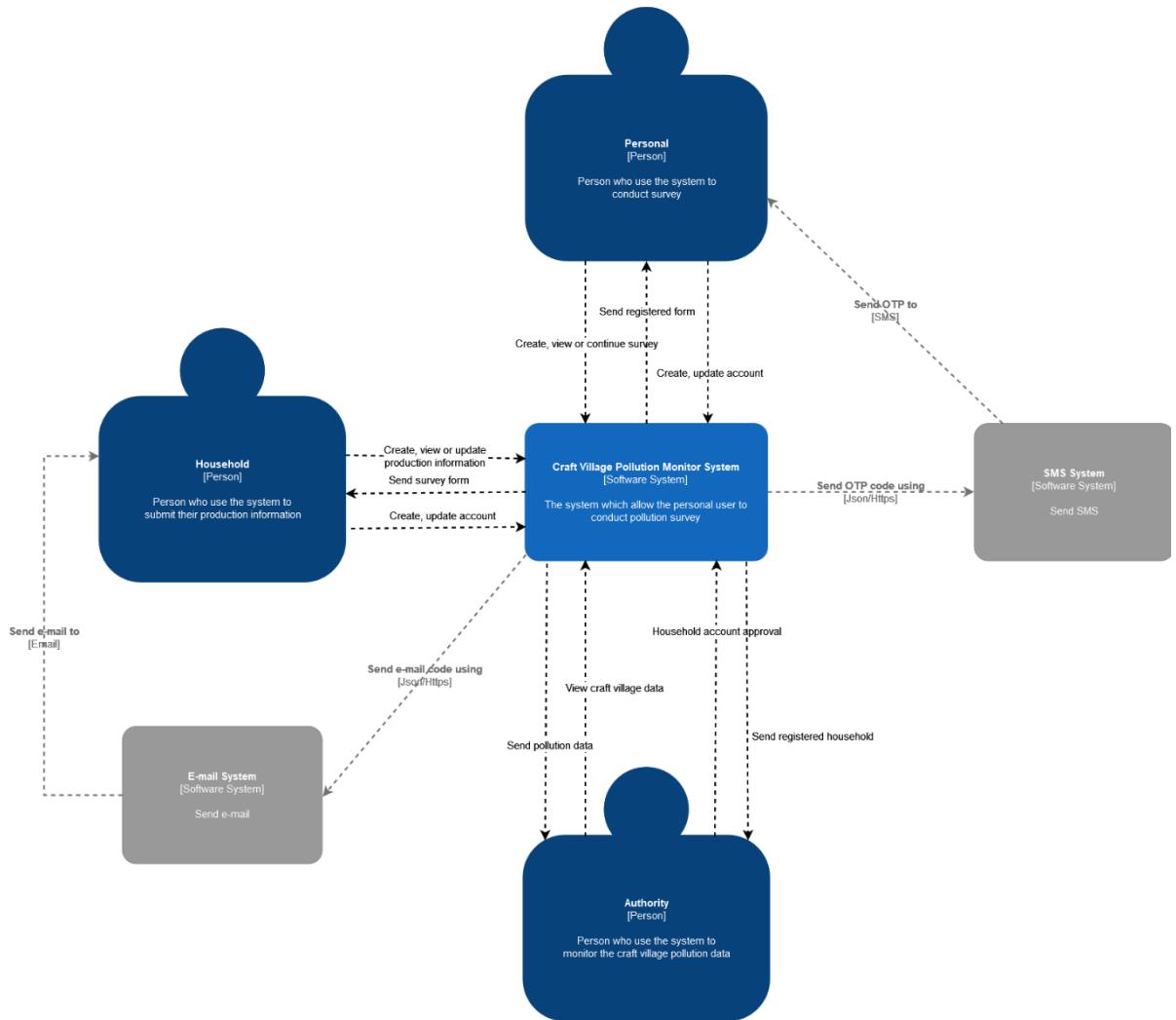


Figure 6. System Context Diagram

4.2. System Context Description

❖ As personal user, they can:

- Create, update account from system.
- Create, view the pollution survey.

❖ As a household user, they can:

- Create, update account from system.
- Create, view production information survey.

❖ As an authority user, they can:

- View craft village data.
- Give approval for household new village request.

5. Tasks and Deliverables

5.1. Tasks and Scope

1. Proposal Document + Requirement Description Document
2. Project Plan Document
3. Product Backlog-User Story-Sprint Backlog Documents
4. Architecture Document
5. Database Design Document
6. Interface Design Document
7. Code Standard
8. Test Plan Document
9. Test Case Document
10. Meeting
11. Reflection

5.2. Deliverables

1. Engineering report
2. Proposal
3. Design drawings
4. Design documents
5. Completed product (building, etc.)
6. Technical interpretation
7. Design review
8. Progress report
9. Improved process efficiency
10. Better customer service
11. Faster response time
12. Product prototype
13. User manual

6. Project Management

6.1. Scrum definition

Scrum is a subset of Agile and one of the most popular process frameworks for implementing Agile. It is an iterative software development model used to manage complex software and product development. Fixed-length iterations, called sprints lasting one to two weeks long, allow the team to ship software on a regular cadence. At the end of each sprint, stakeholders and team members meet to plan next steps.^[2]

6.1.1. Scrum description

- ❖ There are three specific roles in Scrum:
- ❖ **Product Owner:** The Product Owner focuses on business and market requirements, prioritizing all the work that needs to be done. He or she builds and manages the backlog, provides guidance on which features to ship next, and interacts with the team and other stakeholders to make sure everyone understands the items in the product backlog. The Product Owner is not a project manager. Instead of managing the status and progress, his or her job is to motivate the team with a goal and vision.^[2]
- ❖ **Scrum Master:** Often considered the coach for the team, the Scrum Master helps the team do their best possible work. This means organizing meetings, dealing with roadblocks and challenges, and working with the Product Owner to ensure the product backlog is ready for the next sprint. The Scrum Master also makes sure the team follows the Scrum process. He or she doesn't have authority over the team members, but he or she does have authority over the process. For example, the Scrum Master can't tell someone what to do, but could propose a new sprint cadence.^[2]
- ❖ **Teams working at scrum:** The Scrum Team is composed of five to seven members. Everyone on the project works together, helps each other, and shares a deep sense of camaraderie. Unlike traditional development teams, there are not distinct roles like programmer, designer, or tester. Everyone completes the set of work together. The Scrum Team owns the plan for each sprint; they anticipate how much work they can complete in each iteration.^[2]

6.1.2. The artifacts

- ❖ **Product Backlog:** The Product Owner and Scrum Team meet to prioritize the items on the product backlog (the work on the product backlog comes from user stories and requirements). The product backlog is not a list of things to be completed, but rather it is a list of all the desired features for the product. The development team then pulls work from the product backlog to complete during each sprint. [2]
- ❖ **Sprint Backlog:** is a list of functions developed for Sprint; it is determined by a Sprint Planning meeting. Sprint Backlog is the functionality selected from the Product Backlog based on priority levels and the ability of the team to develop.[2]
- ❖ **Estimation:** In SCRUM, members of the Task Team will be chosen by themselves and estimate the expected development time and be responsible for this estimate. After completing the table will update Sprint Backlog. [2]

6.1.3. Process

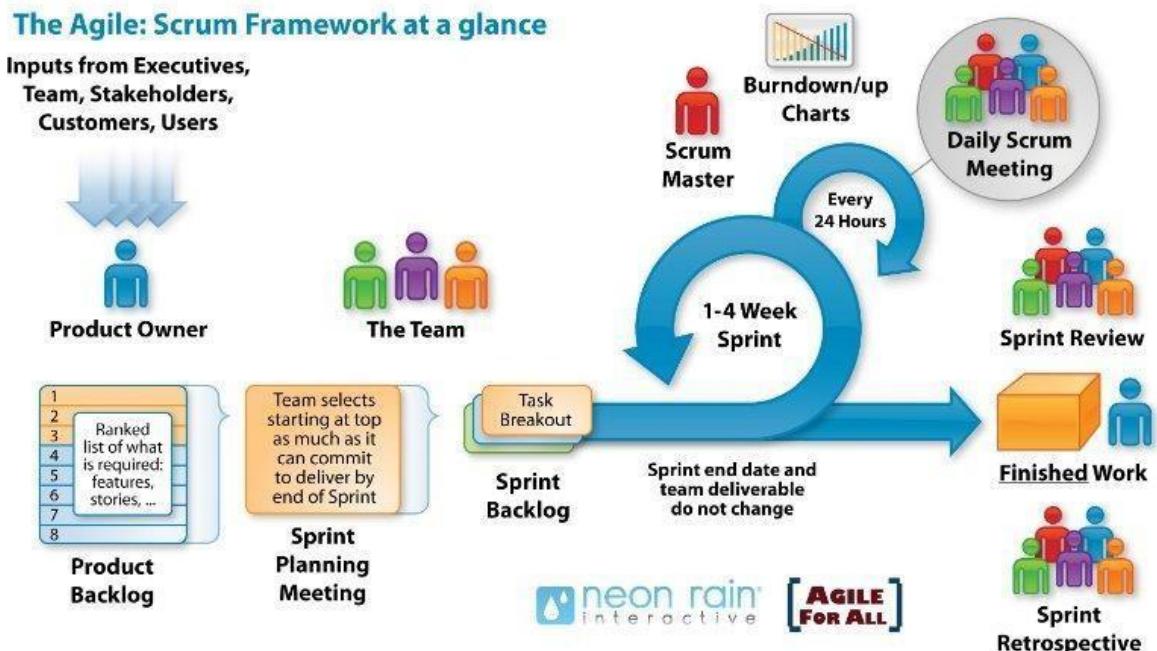


Figure 7. Scrum Framework at a glance

- ❖ **Sprint Planning meeting (planning meetings for each Sprint):** At the Planning meetings, the Team and Product Owner negotiate which items will be committed to the sprint. The team pulls the top items from the Product Backlog, commits them to the Sprint Backlog, breaks them into

smaller tasks typically, and decides whether it's the right amount of work for them to do and if they're clear about what they are going to do. They plan one sprint. [\[2\]](#)

- ❖ **Daily Scrum Meeting (also called Stand-up Meeting):** Daily Scrum Meeting is meeting the recommended daily and no more than 15 minutes and standing meeting to ensure the meeting time is not extended at the beginning of each day. [\[2\]](#)
- ❖ If members are having problems, it should work individually to address and not take long for the members. Scrum Master to ensure this meeting is to comply with regulations.
- ❖ **Sprint Review:** A meeting to:
 - Evaluate the results of the past Sprint and determine the Release function. [\[2\]](#)
 - The function continues to modify or develop. Identify and discuss issues arising plan award decisions, additional Product Backlog. [\[2\]](#)

6.2. Masterplan

Table 1. *Master Plan*

| No. | Task Name | Start | Finish | Effort |
|------------|-------------------------------|-------------------|-------------------|-----------------|
| 1 | Initial | 28/08/2022 | 29/08/2022 | 20 hrs |
| 1.1 | Gathering Requirement Meeting | | | |
| 1.2 | Analyze Requirement | | | |
| 2 | Create Document | 29/08/2022 | 31/08/2022 | 22 hrs |
| 2.1 | Create Project Plan | | | |
| 2.2 | Create User Stories | | | |
| 2.3 | Create Product Backlog | | | |
| 3 | Development | 01/09/2022 | 07/12/2022 | 1040 hrs |
| 3.1 | Sprint 1 | 01/09/2022 | 15/09/2022 | 208 hrs |
| 3.2 | Sprint 2 | 18/09/2022 | 02/10/2022 | 208 hrs |
| 3.3 | Sprint 3 | 05/10/2022 | 19/10/2022 | 208 hrs |
| 3.4 | Sprint 4 | 22/10/2022 | 05/11/2022 | 208 hrs |
| 3.5 | Sprint 5 | 08/11/2022 | 22/11/2022 | 208 hrs |
| 3.8 | Review Project | 07/12/2022 | 07/12/2022 | 6 hrs |

6.3. Cost/Budget For Project

Table 2. Total cost estimate

| No | Criteria | Price | Amount | Total (USD) |
|-------------------|----------------------------|-------|----------------|-------------|
| 1 | Working hours | \$ 2 | 1088 | \$ 2176 |
| 2 | Online server and services | \$ 50 | 2 | \$ 100 |
| 3 | Party | \$ 10 | 5 | \$ 50 |
| Total cost | | | \$ 2326 | |

Table 3. Cost detail

| Description | Amount | Unit |
|---------------------------------|--|--------|
| Number of members | 4 | Person |
| Number of working hours per day | 2 (During workday) 8 (During weekend) | Hour |
| Number of workdays / weeks | 7 | Day |
| The duration of the project | 3.5 | Month |
| Party cost per time | 10 | USD |
| The number of working days | 76 | Day |

7. Project Constraints

Table 4. *Project constraints*

| Constraint | Constraints Description | Guidelines for Acceptance |
|---|---|--|
| Economic | | Elements for consideration are design costs, production costs, maintenance costs, operating costs, and sales price |
| Environmental | Our project makes the people (more precisely the craft villages) change the way their use material or energy to be eco-friendly, and sustainable. Thus, the living environment will be improved and reduce pollution. | The impact of the design on the environment as well as the impact of the environment (e.g. temperature range, humidity, vibration, electromagnetic interference immunity, and shock) on the design should be considered. Design for recycling and design to use recycled materials should also be considered |
| Ethical | | Ethical considerations can be broad. Areas that are typically addressed include intellectual property, reverse- engineering, privacy, security, and the conflict between cost and safety |
| Public health, safety, and welfare | | Includes safety standards as well as the impact of the design on users (for example, electrical or physical hazards) |
| Social and Global | | Addresses aspects such as benefits, risks, the man- |

| | | |
|-----------------------|---|---|
| | | machine interface, the acceptance of products by the intended user or by society at large, and global and socially responsible engineering. |
| Cultural | | Which cultural characteristics could influence the approach? How do the design from different cultures differ? |
| Sustainability | Our project makes the people (more precisely the craft villages) aim to use more sustainable resources and save energy. Moreover, they could change the traditional way of manufacturing or the infrastructure into more eco-friendly ones. | Refers to the sustainability of resources, including material, energy, supplies, manufacturing techniques, personnel, operation, and the need for additional infrastructure, as well as the sustainability of the design including reliability, lifetime, durability, reusability, maintainability. |

8. Conclusion

The pollution of the craft village is at an alarming rate, affecting the environment and people's lives. One of the main reasons for this happening is the lack of overseeing or the tools that help people to take part in the problem. Thus, with the urge to protect the environment and improve people's lives, our team would like to build a system that helps everyone to monitor the pollution from craft village quickly and effectively.

Our approach:

- ❖ We will build a phone application using Flutter that allows the user to make a pollution survey very quickly by taking a picture of pollution.
- ❖ The application will automatically attach the GPS location to the picture.
- ❖ The picture then will be sent to an AI that will analyze the picture to detect the pollution types.
- ❖ The result will automatically fill into the form for the user to check and submit.
- ❖ The local authority can use the system to monitor the data and know the pollution status of the craft village.

The project will be finished after the course of 4 months with a limited budget of 3000 USD.

9. References

1. Nguyen Thi Loi, “[Environmental pollution in Vietnam's craft villages](#)”, National Economics University;
2. Kate Eby, “[What's the Difference? Agile vs Scrum vs Waterfall vs Kanban](#)”, February 15, 2017;
3. Office of Water Prediction (U.S.), “[General Software Standards](#)”
4. IEEE SA, “[Standard 12208-2017](#)”
5. NASA, “[LaRC Software Engineering \(SWE\) Process Improvement Initiative \(SPII\)](#)”
6. Wikipedia, “[Location-based service](#)”
7. Kaiming He, Xiangyu Zhang, Shaoqing Ren, Jian Sun, “[Deep Residual Learning for Image Recognition](#)”
8. Wikipedia, “[Convolutional neural network](#)”

10. Attachment

1. C1SE.06_CVPMS_ReqDescription-Document_v1.0.docx

DESCRIPTION OF PRODUCT REQUIREMENTS

Group: C1SE.06

Project: CVPMS

Date: 21/08/2022

I. Short description of product ideas (less than 7 statements)

With the aim to help everyone monitor and resolve the pollution problems from their craft village area more effectively. Some aspects that will make our system that the people will find much more effective:

- ❖ Our system will help everyone to monitor their local craft village despite where the location. This means whether the user stay in a big city or a small village at the top of the mountain our system will still function.
- ❖ Our system will provide a function that lets people make an instant survey to the system.
- ❖ Our system will detect all kinds of pollution instead of focusing on some specific kinds. This will help to collect a variety of data that could help people to a bigger picture about their pollution levels in the area.
- ❖ Our system will have an AI that will take images from people then analyse the image to know what kind of pollution the user is facing and the result will be automatically filled into the form which will be sent directly to the local environment department to resolve the problem. This is so easy to use that even an elementary school child can do and it also reduces a massive amount of the cumbersome and bureaucratic process that people have to go through.
- ❖ Our system is also integrated with location-based technology to detect the location of the pollution and layout the data on the map for the user to monitor.

II. Requirements

| | |
|---|---|
| High-level Functional Requirements | <ol style="list-style-type: none">1. Detect pollution types using input photo (AI detection)2. Auto detect user location3. Auto fill the form with detected information4. Map pollution craft villages to the map5. Add new unknown craft village |
| Quality Attributes Requirements (Example related to issues: Ease Use, Easy to Like, Easy to Learn, Easy to Understand, Easy to Buy / Yes, ...) | <ol style="list-style-type: none">1. Tasks handle no more than 10 seconds.2. Account can be protected with authentication and encryption with high security3. User can use easily app without taking much time4. The processing features are logical and easy to understand5. Extending a new feature is easy and doesn't redesign the architecture |
| Operation Requirements (Related to issues: Speed, Accuracy, Performance, Stability, Load Resistance, Scalability, Safety, ...) | <ol style="list-style-type: none">1. Process quick tasks for no more than 10 seconds per task2. Handling traffic to applications that are more than 500 concurrently accessed.3. Ensure the number of transactions is processed correctly at the rate of 99.9%4. Completely load the application in no more than 10 seconds |
| Environment & Operation Requirements (Related to issues: physical impacts on the environment, interact with relevant or existing systems, conditions for product commercialization, ...) | <ol style="list-style-type: none">1. Web browsers: IE, Fire Fox, Google Chrome with latest version.2. Mobile: Android 10 and more, IOS 13 and more3. Operating systems: Microsoft Windows 10, Ubuntu 18.04 with SSD 120GB, RAM 2G, minimum 50Mbps4. External Services: Google Cloud, Map API |

| | |
|--|--|
| Requirements for Maintenance & Support | 1. Direct customer support consulting via email or phone number of our organization. |
| | |
| | |
| | |
| | |
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| | |
|---|---|
| Security/ Safety Requirements (Related to issues: conditions of use / access to products, personal freedom, inspection, ...) | 1. Must login to use registered account |
| | 2. 3-layer password encryption |
| | 3. Clear authorization for each type of user and restrict access. |
| | |
| | |
| | |

| | |
|----------------------|--|
| Culture Requirements | 1. Vietnamese and English language support |
| | 2. Culture according to international standards |
| | 3. Does not contain harmful content, content level, toxic cultural content is specified in the law of Vietnam and international. |
| | |

| | |
|---|---|
| Evaluate the complexity of engineering problems | 1. Involving wide-ranging or conflicting technical issues |
| | 2. Having no obvious solution |
| | 3. Addressing problems not encompassed by current standards and codes |
| | X 4. Involving diverse groups of stakeholders |
| | X 5. Including many component parts or sub-problems |
| | 6. Involving multiple disciplines |
| | 7. Having significant consequences in a range of contexts |

| | | |
|-----------------------|---|--|
| Standard requirements | X | 1. Code standard. (GNU, Oracle standard for Java, ...) |
| | X | 2. Design standard. (Design patterns, object-oriented analysis and design, ...) |
| | X | 3. IEEE (1058, 1540, 830, 1016, 829, 1012, 1008) |
| | X | 4. ISO/IEC/IEEE 12207:2017 (TCVN 10539:2014); ISO/IEC 25051:2006(TCVN 10540:2014); |
| | | 5. Other standards. (Related to specific topics) |



Capstone Project 1

CMU-CS450

Project Plan Document

Version 1.1
Date: 22/10/2022

Craft Village Pollution Monitor System

Submitted by
Ca, Van Cong Le
Huy, Bui Duc
Phuc, Hua Hoang
Trung, Nguyen Thanh

Approved by
Ph.D. Nguyen Thanh Binh

Proposal Review Panel Representative:

Name Signature Date

Capstone Project 1 - Mentor:



Name Signature Date

PROJECT INFORMATION

| Project acronym | CVPMS | | |
|--|---|--|------------|
| Project Title | Craft Village Pollution Monitor System | | |
| Start Date | 22/08/2022 | End Date | 07/12/2022 |
| Lead Institution | International School, Duy Tan University | | |
| Project Mentor | Ph.D. Thanh Binh, Nguyen | | |
| Scrum master / Project Leader & contact details | Ca, Van Cong Le <i>Email:</i> cascabusiness@gmail.com <i>Tel:</i> 0352707895 | | |
| Partner Organization | | | |
| Project Web URL | https://github.com/Casca113s2/craft-village-pollution-monitor-system | | |
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DOCUMENT NAME

| | | | |
|-----------------------|-----------------------|------------------|---|
| Document Title | Project Plan Document | | |
| Author(s) | All team members | | |
| Date | 20/10/2022 | File Name | C1SE.06_CVPMS_Project-Plan-Document_v1.1.docx |

REVISION HISTORY

| Version | Date | Comments | Author | Approval |
|----------------|-------------|---------------------|------------------|---|
| 1.0 | 21/08/2022 | Create documents | All team members |  |
| 1.1 | 20/10/2022 | Update after review | All team members |  |

Approve Document: Sign in to approve the document

| | | | |
|---------------------|------------------------|------|---|
| Mentor | Binh, Nguyen Thanh | Date | 20/10/2022 |
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| | | Sign |  |
| Scrum Member | Huy, Bui Duc | Date | 20/10/2022 |
| | | Sign |  |
| Scrum Member | Phuc, Hua Hoang | Date | 20/10/2022 |
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| Scrum Member | Trung, Nguyen Thanh | Date | 20/10/2022 |
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1. Project Overview

1.1. Project Description

Table 1. Project Description

| Project code | CVPMS | Contract type | Internal Project |
|------------------|--|----------------------------------|---|
| Customer | Duy Tan University | End-User | Private Person Household Local authority Admin |
| Project Type | Internal | Project Manager/ Scrum master | Van Cong Le Ca |
| Project Category | Development and Maintaince | Business domain | Environment |
| Application type | Mobile application, Web application | | |

1.2. Scope and Purpose

1.2.1. Scope

The system runs on mobile platforms and website platform, the windows operating system includes:

- Deploy on an Android/iOS device.
- Deploy on a PC or Laptop.
- During: 107 days.

1.2.2. Purpose

The project name is “Craft Village Pollution Monitor System”. With the goal of building a software system to help automate the process of collecting and managing the pollution data from craft villages in Vietnam, in order to overcome the limitations and weaknesses of the current exist systems. The system is designed so that everyone from a wide range of ages can help to collect the pollution data from craft villages and other stake holders can use the system to monitor and manage the collected data. The process of collecting data will be more quick, efficient and required no deep

understanding of environment science from the end user (private user to be more precisely). The project is developed in the form of a mobile application for collecting pollution data and a web application for data management, the work is handled automatically, saving effort and time for the users. Automate information storage and processing, and provide accurate and timely information at the request of the users. Synthesize, report statistics, get better results.

1.3. Assumptions and Constraints

Table 2. Assumptions and Constraints

| No | Description | Note |
|--------------------|---|--|
| Assumptions | | |
| 1 | The mobile application can be run on both Android and iOS | Scope |
| 2 | The website can be run on Chrome, CocCoc, Edge | Scope |
| 3 | Customer reviewers will get seven days to approve a milestone document. If no comments are received within this time period, it will be considered as approved. | External Interfaces |
| Constraints | | |
| 1 | All module must be completed and delivered to customer before 10 – December – 2022 because customer has to demo to its end user after 12 – December | Schedule |
| 2 | The project shall conform to security requirements specified by the customer in the NDA | Security |
| 3 | Network is available | Environment |
| 4 | Flutter, Spring Boot, Bootstrap, Dart, Java, HTML/CSS, JavaScript, Python, SQL | Programming languages and supporting libraries |
| 5 | Multi-Lable classification in machine learning, Location based services | Technology |

1.4. Project Objectives

1.4.1. Standard Objectives

Table 3. Standard Objectives

| Metrics | Unit | Committed | Note |
|---|-------------|--|------|
| Start Date | Date | 22/08/2022 | |
| End Date | Date | 07/12/2021 | |
| Duration | Date | 107 days | |
| Team Size | Person | 4 peoples | |
| Billable Effort | Person-day | 2\$ * 2 * 4 * 50 (For workday) 2\$ * 8 * 4 * 20 (For weekend) (Working hours = Number of working hours per day * Number of members * Number of days. Cost = Working hours * The cost per member per hour = Working hours * 2) | |
| Number of work hours per day for one engineer | Person-hour | 2 (For workday) 8 (For weekend) | |

1.4.2. Specific Objectives

- ❖ No defect
- ❖ Done on time, completion of project early by December 10th
- ❖ Apply new technology to the project
- ❖ The system is easy to use and user friendly
- ❖ Complete the functions of the system

1.5. Critical Dependencies

Table 4. *Critical Dependencies*

| No | Dependency | Expected delivery date | Note |
|----|----------------------------------|------------------------|------|
| 1 | Craft Village Mobile Application | 19/10/2022 | |
| 2 | Detection Pollution AI | 19/10/2022 | |

1.6. Project Risk

Table 5. *Project Risk*

| Risk | Description | Probability | Impact | Mitigation Strategy |
|-------------------------------|---|-------------|--------|---|
| Incorrect requirements | Developing the product which does not accord with the requirements | 3 | 5 | Discuss and communicate frequently with Stakeholders |
| Estimate working time | Actual working time is not enough to finish a task compared to the estimated previous time | 2 | 4 | Review old tasks and evaluations to estimate for the new task. Replan for each sprint. |
| People | Team member who is ill, has health problems, or busy | 4 | 3 | Notify the scrum master (or ask a colleague to help you) Complete the assigned tasks when possible |
| Lack of technical experiences | Detect harmful content in the video is a difficult technique that all members need to research and develop. | 4 | 4 | Spend a lot of time for learning and training |
| Team Communication | Team members can conflict with each other while discussing something | 4 | 2 | Conduct a meeting to share knowledge, experience and learning methods |

| | | | | |
|-------------------|--|---|---|---|
| | related to the project | | | |
| External problems | It has power problems, laptop, personal computer, network system | 3 | 3 | Find another workplace (library, coffee shop, ...) Notify the scrum master to assign appropriate tasks |
| Market | Other products are deployed at the same time and compete with the project team's product | 2 | 3 | Develop newer features and organize promotional activities |

2. Project Development Approach

2.1. Technical Process

2.1.1. Reasons for selecting

To keep up with today's increasingly changing technology trends, we want a truly flexible and easy project development model to adapt to that change. Our project will develop more new features in the future. We will continuously update and apply new technologies that increase the attractiveness and intelligence of the application.

Currently, our team is a small team with little experience in project development. Therefore, we cannot avoid problems that arise in the software development stages and requirements can be changed to be more suitable. For the traditional model that requires managerial skills and high accuracy, it will not suit our team. Applying Agile Scrum model will help us to solve these problems, bring a lot of experience and best performance for project development.

2.1.2. Agile Methodology

Agile software development refers to a group of software development methodologies based on iterative development, where requirements and solutions evolve through collaboration between self-organizing cross-functional teams.

Agile software development is more than frameworks such as Scrum, Extreme Programming, or Feature-Driven Development (FDD).

Agile software development is more than practices such as pair programming, test-driven development, stand-ups, planning sessions, and sprints.

Agile software development is an umbrella term for a set of frameworks and practices based on the values and principles expressed in the Manifesto for Agile Software Development and the 12 Principles behind it. When you approach software development in a particular manner, it's generally good to live by these values and principles and use them to help figure out the right things to do given your particular context.

2.1.3. Scrum Process

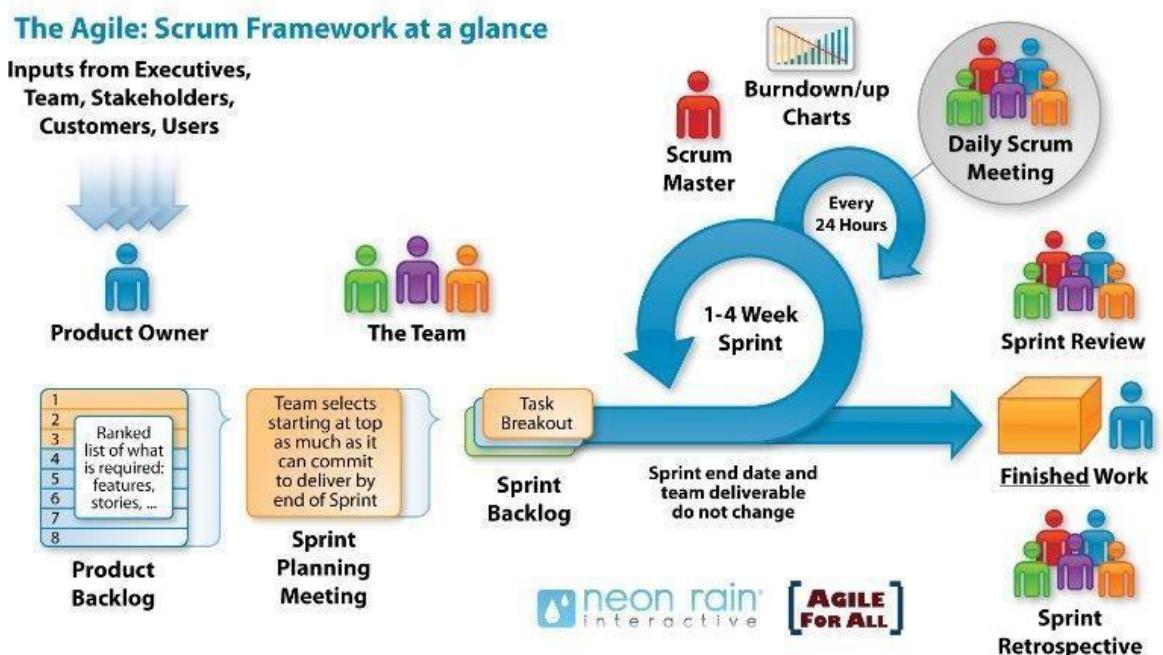


Figure 1. Principle and Different Stages

- Scrum is an iterative and incremental agile software development framework for managing software projects and product or application development.
- Scrum focuses on project management institutions where it is difficult to plan ahead.
- Mechanisms of empirical process control, where feedback loops that constitute the core management technique are used as opposed to traditional command-and-control management.
- Its approach to planning and managing projects is by bringing decision-making authority to the level of operation properties and certainties.

- Scrum has three roles: product owner, scrum master and the development team members.

❖ Benefit of the methodology:

- Project can respond easily to change.
- Problems are identified early.
- Customer gets most beneficial work first.
- Work done will better meet the customer's needs.
- Improved productivity.
- Ability to maintain a predictable schedule for delivery.

2.2. Quality Management

2.2.1. Estimates of Defects to be detected

Table 6. Pre-release review defects

| Process | Planned found by review | Actual found by review |
|--------------------|-------------------------|------------------------|
| Requirement | 10 | 7 |
| Design | 20 | 22 |
| Coding | 50 | 42 |
| Other | 10 | 3 |
| Total | 90 | 74 |

2.2.2. Quality Control

Table 7. Quality Control

| Review Item | Type of Review | Reviewer | When | | |
|---|-----------------------------------|--------------------------------------|-------------------------------------|------------------------|------------------------|
| Project Plan Project schedule CM Plan | Group review One-person review | Mentor Team members | End of the Initiation stage | | |
| Business analysis and requirements specification document, Use Case Catalog | Group review | All members | End of 90% of requirements | | |
| Design document, object model | Group review | All members | End of 90% design | | |
| Stage plans | One-person review | Mentor | Beginning of each stage | | |
| Complex/first specs incl. diagrams | time test | generated cases, program interactive | Group review | Mentor Team members | End of detailed design |
| Code | Group review | All members | After coding for first few programs | | |

2.2.3. Measurements Program

Table 8. Measurements Program

| Data to be collected | Purpose | Responsible | When |
|-------------------------------|--|------------------|---------------------------------|
| Size: No. of KLOC// FP | Early estimate project cost | PM/SM | At the end of the stages |
| Effort: No. person-day | Calculate project effort for scheduling | Team members | Daily |
| Quality: No. defects detected | Early evaluate product quality and the feasibility of the project | Reviewer, Tester | Right after the review/test |
| Schedule | Divide work and allocate resources properly, ensure the project is completed on time and on budget | PM/SM | Weekly and at the end of stages |

2.3. Unit Testing Strategy

Completion criteria: Completion criteria are stated to for two purposes:

- Identify acceptance criteria for product quality.
- Identify when the testing is successfully executed

A clear statement of completion criteria should include the following items:

- Function, behavior, or condition being measured
- Method of measurement

Criteria or degree of conformance to measurement Special considerations:

This section should identify any influences or dependencies, which may impact or influence the test effort described in the test strategy. Influences might include:

Human resources (such as availability or need for non-test resources to support/participate in test) Constraints, (such as equipment limitations or availability,

or the need/lack of special equipment) Special requirements, such as test scheduling or access to systems

Testing may be stopped when

- It becomes unproductive
- It requires a certain coverage
- It requires a certain number of errors to be found
- Schedule time runs out

2.4. Manual Testing Strategy

Manual testing is a software testing process in which test cases are executed manually without using any automated tool. All test cases executed by the tester manually according to the end user's perspective. It ensures whether the application is working, as mentioned in the requirement document or not. Test cases are planned and implemented to complete almost 100 percent of the software application. Test case reports are also generated manually.

Manual Testing is one of the most fundamental testing processes as it can find both visible and hidden defects of the software. The difference between expected output and output, given by the software, is defined as a defect. The developer fixed the defects and handed it to the tester for retesting.

Manual testing is mandatory for every newly developed software before automated testing. This testing requires great efforts and time, but it gives the surety of bug-free software. Manual Testing requires knowledge of manual testing techniques but not of any automated testing tool.

Manual testing is essential because one of the software testing fundamentals is "100% automation is not possible". The advantages of Manual Testing:

- It does not require programming knowledge while using the Black box method.
- It is used to test dynamically changing GUI designs.
- Tester interacts with software as a real user so that they are able to discover usability and user interface issues.
- It ensures that the software is a hundred percent bug-free.
- It is cost-effective.
- Easy to learn for new testers.

3. Estimation

3.1. Size

Table 9. *Software Scale Drivers*

| Software Scale Drivers | |
|--------------------------------|----------------|
| Precedentedness | <i>Nominal</i> |
| Development Flexibility | <i>High</i> |
| Architecture / Risk Resolution | <i>Nominal</i> |
| Team Cohesion | <i>High</i> |
| Process Maturity | <i>Nominal</i> |

Table 10. Software Cost Drivers

| Software Cost Drivers | | | |
|--|----------------|---------------------------------|----------------|
| Product | | Personnel | |
| Required Software Reliability | <i>High</i> | Analyst Capability | <i>Nominal</i> |
| Data Base Size | <i>Nominal</i> | Programmer Capability | <i>High</i> |
| Product Complexity | <i>High</i> | Personnel Continuity | <i>Nominal</i> |
| Developed for Reusability | <i>High</i> | Application Experience | <i>Nominal</i> |
| Documentation Match to Lifecycle Needs | <i>Nominal</i> | Platform Experience | <i>Low</i> |
| | | Language and Toolset Experience | <i>High</i> |
| Project | | Platform | |
| Use of Software Tools | <i>Nominal</i> | Time Constraint | <i>High</i> |
| Development | <i>Nominal</i> | Storage Constraint | <i>Nominal</i> |
| Required Development Schedule | <i>Nominal</i> | Platform Volatility | <i>Nominal</i> |

Software Development (Elaboration and Construction)

Effort = 11.6 Person-months

Schedule = 2.9 Months

Cost = \$2316

Total Equivalent Size = 2500 SLOC

Effort Adjustment Factor (EAF) = 1.47

Acquisition Phase Distribution

Table 11. Acquisition Phase Distribution

| Phase | Effort (Person-months) | Schedule (Months) | Average Staff | Cost (Dollars) |
|--------------|------------------------|-------------------|---------------|----------------|
| Inception | 0.7 | 1.0 | 0.7 | \$139 |
| Elaboration | 2.8 | 3.0 | 0.9 | \$556 |
| Construction | 8.8 | 4.9 | 1.8 | \$1760 |
| Transition | 1.4 | 1.0 | 1.4 | \$278 |

Software Effort Distribution for RUP/MBASE (Person-Months)

Table 12. Software Effort Distribution for RUP/MBASE

| Phase/Activity | Inception | Elaboration | Construction | Transition |
|----------------|-----------|-------------|--------------|------------|
| Management | 0.1 | 0.3 | 0.9 | 0.2 |
| Environment/CM | 0.1 | 0.2 | 0.4 | 0.1 |
| Requirements | 0.3 | 0.5 | 0.7 | 0.1 |
| Design | 0.1 | 1.0 | 1.4 | 0.1 |
| Implementation | 0.1 | 0.4 | 3.0 | 0.3 |
| Assessment | 0.1 | 0.3 | 2.1 | 0.3 |
| Deployment | 0.0 | 0.1 | 0.3 | 0.4 |

3.2. Estimated Effort

Table 13. *The estimated effort*

| Activity/ Process | Total Budget Effort Usage (pd) | Total % Budget Effort Usage (%) | <Sprint 1> | | <Sprint 2> | | <Sprint 3> | | <Sprint 4> | | <Sprint 5> | |
|-----------------------------------|--|---|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|
| | | | No. | % |
| Requirement | 36 | 13.5 | 15 | 23.8 | 4 | 7.4 | 3 | 6.1 | 10 | 17.9 | 4 | 8.9 |
| Design | 59 | 22.1 | 11 | 17.5 | 22 | 40.7 | 7 | 14.4 | 12 | 21.5 | 7 | 15.6 |
| Coding | 88 | 33 | 18 | 28.6 | 15 | 27.8 | 20 | 40.8 | 18 | 32.2 | 17 | 37.8 |
| Unit Testing | 11 | 4.1 | 2 | 3.2 | 2 | 3.7 | 3 | 6.1 | 2 | 3.6 | 2 | 4.4 |
| Testing | 22 | 8.2 | 4 | 6.3 | 4 | 7.4 | 5 | 10.3 | 4 | 7.2 | 5 | 11.1 |
| Support for Acceptance Test | 7 | 2.6 | 0 | 0 | 2 | 3.7 | 1 | 2 | 2 | 3.6 | 2 | 4.4 |
| Project Planning | 9 | 3.4 | 4 | 6.3 | 1 | 1.9 | 1 | 2 | 2 | 3.6 | 1 | 2.2 |
| Project monitoring | 14 | 5.2 | 3 | 4.8 | 2 | 3.7 | 3 | 6.1 | 3 | 5.2 | 3 | 6.7 |
| Quality Assurance | 14 | 5.2 | 2 | 3.2 | 2 | 3.7 | 3 | 6.1 | 3 | 5.2 | 4 | 8.9 |
| Training | 7 | 2.7 | 4 | 6.3 | 0 | 0 | 3 | 6.1 | 0 | 0 | 0 | 0 |
| Total | 267 | 100 | 63 | 100 | 54 | 100 | 49 | 100 | 56 | 100 | 45 | 100 |

3.3. Schedule

3.3.1. Work Breakdown Structure

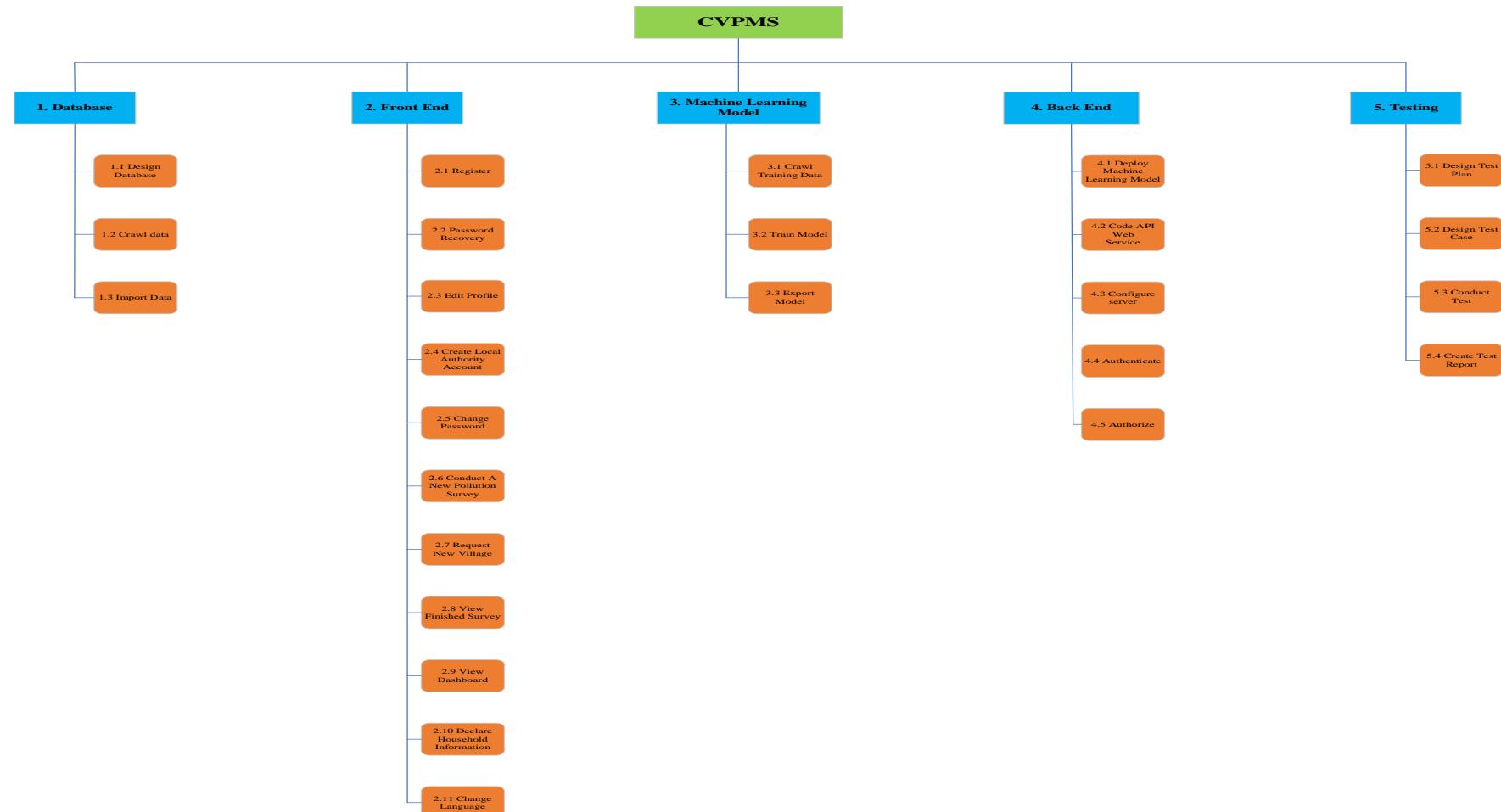


Figure 2. Work Breakdown Structure

3.3.2. Detailed Schedule

Table 14. Detailed Schedule

| No. | Task Name | Start | Finish | Effort |
|------------|--|-------------------|-------------------|-----------------|
| 1 | Initial | 28/08/2022 | 29/08/2022 | 32 hrs |
| 1.1 | Gathering Requirement Meeting | | | |
| 1.2 | Analyze Requirement | | | |
| 2 | Create Document | 29/08/2022 | 31/08/2022 | 16 hrs |
| 2.1 | Create Project Plan | | | |
| 2.2 | Create User Stories | | | |
| 2.3 | Create Product Backlog | | | |
| 3 | Development | 01/09/2022 | 22/11/2022 | 1042 hrs |
| 3.1 | Sprint 1 | 01/09/2022 | 15/09/2022 | 208 hrs |
| 3.1.1 | Sprint 1 Planning Meeting | | | |
| 3.1.2 | Create Sprint Backlog | | | |
| 3.1.3 | Create Test Plan document | | | |
| 3.1.4 | Design Database | | | |
| 3.1.5 | Create Database (AD_COUNTRY, AD_PROVINCE, AD_DISTRICT, VILLAGE) and Mapping entities | | | |
| 3.1.6 | Crawl Data For Database | | | |
| 3.1.7 | Import Data Into Database | | | |
| 3.1.8 | Research Method To Build AI | | | |
| 3.1.9 | Crawl Data For AI | | | |

| | | | | |
|---------------|--|--|--|---------------|
| 3.1.10 | Design user interface | | | 64 hrs |
| 3.1.10.1 | Design UX/UI Register Page For Mobile Application | | | |
| 3.1.10.2 | Design Web layout | | | |
| 3.1.10.3 | Design UX/UI Login Page For Mobile Application | | | |
| 3.1.10.4 | Design UX/UI Home Page For Mobile Application | | | |
| 3.1.11 | Coding | | | 96 hrs |
| 3.1.11.1 | Code UX/UI Register Page For Mobile Application | | | |
| 3.1.11.2 | Code Register Function For Mobile Application | | | |
| 3.1.11.3 | Code UX/UI Login Page For Mobile Application | | | |
| 3.1.11.4 | Code UX/UI Home Page For Mobile Application | | | |
| 3.1.11.5 | Code Login Function For Mobile Application | | | |
| 3.1.11.6 | Code Logout Function For Mobile Application | | | |
| 3.1.11.7 | Code Address API | | | |
| 3.1.11.8 | Code Village API | | | |
| 3.1.12 | Testing & Fix bug | | | 40 hrs |
| 3.1.12.1 | Design Test Case for Sprint 1 | | | |
| 3.1.12.2 | Conduct test sprint 1 | | | |
| 3.1.12.3 | Fix bug | | | |

| | | | | |
|---------------|--|-------------------|-------------------|----------------|
| 3.1.13 | Release Sprint 1 | | | |
| 3.1.13.1 | Sprint 1 Review Meeting | | | |
| 3.1.13.2 | Sprint 1 Retrospective | | | |
| 3.2 | Sprint 2 | 18/09/2022 | 02/10/2022 | 208 hrs |
| 3.2.1 | Sprint 2 Planning Meeting | | | |
| 3.2.2 | Create Sprint 2 Backlog | | | |
| 3.2.3 | Create Database (UR_USER, UR_ROLE, USER_ROLE, UR_SESSION) and Mapping entities | | | |
| 3.2.4 | Process Training Data | | | |
| 3.2.5 | Train Model | | | |
| 3.2.6 | Deploy machine learning Model | | | |
| 3.2.7 | Design user interface | | | 64 hrs |
| 3.2.7.1 | Design UX/UI Forget Password Page For Mobile Application | | | |
| 3.2.7.2 | Design UX/UI Change Password Page For Mobile Application | | | |
| 3.2.7.3 | Design UX/UI Register Page For Web Application | | | |
| 3.2.7.4 | Design Web layout (household, local authority, admin) | | | |
| 3.2.7.5 | Design UX/UI Login Page For Web Application | | | |

| | | | | |
|--------------|--|--|--|---------------|
| 3.2.7.6 | Design UX/UI Edit Profile Page For Mobile Application | | | |
| 3.2.7.7 | Design UX/UI Change Password For Web Application | | | |
| 3.2.7.8 | Design UX/UI Forget Password For Web Application | | | |
| 3.2.7.9 | Design UX/UI Add New Local Authority For Web Application(Admin page) | | | |
| 3.2.8 | Coding | | | 96 hrs |
| 3.2.8.1 | Code UX/UI Forget Password Page For Mobile Application | | | |
| 3.2.8.2 | Code Forget Password Function For Mobile Application | | | |
| 3.2.8.3 | Code Forget Password Function API | | | |
| 3.2.8.4 | Code UX/UI Change Password Page For Mobile Application | | | |
| 3.2.8.5 | Code Change Password Function For Mobile Application | | | |
| 3.2.8.6 | Code Change Password Function API | | | |
| 3.2.8.7 | Code UX/UI Register Page For Web Application | | | |

| | | | | |
|----------|---|--|--|--|
| 3.2.8.8 | Code Register Function For Web Application | | | |
| 3.2.8.9 | Code Authorize Function (Personal User, Household, Local Authority, Admin) | | | |
| 3.2.8.10 | Code UX/UI Login Page For Web Application | | | |
| 3.2.8.11 | Code Login Function For Web Application | | | |
| 3.2.8.12 | Code Logout Function For Web Application | | | |
| 3.2.8.13 | Code UX/UI Edit Profile Page For Mobile Application | | | |
| 3.2.8.14 | Code Edit Profile Function For Mobile Application | | | |
| 3.2.8.15 | Code Update Profile API | | | |
| 3.2.8.16 | Code Change Language For Mobile Application | | | |
| 3.2.8.17 | Code & Design UX/UI Change Password For Web Application | | | |
| 3.2.8.18 | Code & Design UX/UI Forget Password For Web Application | | | |
| 3.2.8.19 | Code & Design UX/UI Add New Local Authority For Web Application(Admin page) | | | |
| 3.2.8.20 | Code Login/Logout API | | | |

| | | | | |
|---------------|---|-------------------|-------------------|----------------|
| 3.2.8.21 | Code Mail Service | | | |
| 3.2.9 | Testing & Fix Bug | | | 40 hrs |
| 3.2.9.1 | Design Test Case for machine learning Model | | | |
| 3.2.9.2 | Conduct test machine learning Model | | | |
| 3.2.9.3 | Design test case for Sprint 2 | | | |
| 3.2.9.4 | Conduct test Sprint 2 | | | |
| 3.2.9.5 | Fix Bug | | | |
| 3.2.10 | Release Sprint 2 | | | |
| 3.2.10.1 | Sprint 2 Review Meeting | | | |
| 3.2.10.2 | Sprint 2 Retrospective | | | |
| 3.3 | Sprint 3 | 05/10/2022 | 19/10/2022 | 208 hrs |
| 3.3.1 | Sprint 3 Planning Meeting | | | |
| 3.3.2 | Create Sprint 3 Backlog | | | |
| 3.3.3 | Create table User_Survey and Mapping entity | | | |
| 3.3.4 | Write Pollution Detection API | | | |
| 3.3.5 | Write Detection Pollution Function | | | |
| 3.3.6 | Design user interface | | | 64 hrs |
| 3.3.6.1 | Design UX/UI Survey Page For Mobile Application (Personal User) | | | |

| | | | | |
|--------------|---|--|--|---------------|
| 3.3.6.2 | Design UX/UI Declare Page For Web Application (Household) | | | |
| 3.3.6.3 | Design UX/UI Household Page | | | |
| 3.3.7 | Coding | | | 96 hrs |
| 3.3.7.1 | Code UX/UI Survey Page For Mobile Application (Personal User) | | | |
| 3.3.7.2 | Code Take Photo Function | | | |
| 3.3.7.3 | Code Location Base Function | | | |
| 3.3.7.4 | Code Automatic Fill Data Function | | | |
| 3.3.7.5 | Code Encryption Image Function | | | |
| 3.3.7.6 | Code Submit Survey Function | | | |
| 3.3.7.7 | Code Location detection API | | | |
| 3.3.7.8 | Code Survey API | | | |
| 3.3.7.9 | Code UX/UI Declare Page For Web Application (Household) | | | |
| 3.3.7.10 | Code Household API | | | |
| 3.3.7.11 | Code UX/UI Household Page | | | |
| 3.3.7.12 | Code Admin API | | | |
| 3.3.8 | Testing & Fix Bug | | | 40 hrs |
| 3.3.8.1 | Design Test Case for Sprint 3 | | | |
| 3.3.8.2 | Conduct test Sprint 3 | | | |

| | | | | |
|--------------|---|-------------------|-------------------|----------------|
| 3.3.8.3 | Test And Retrain AI Model | | | |
| 3.3.8.4 | Fix Bug | | | |
| 3.3.9 | Release Sprint 3 | | | |
| 3.3.9.1 | Sprint 3 Review Meeting | | | |
| 3.3.9.2 | Sprint 3 Retrospective | | | |
| 3.4 | Sprint 4 | 22/10/2022 | 05/11/2022 | 208 hrs |
| 3.4.1 | Sprint 4 Planning Meeting | | | |
| 3.4.2 | Create Sprint 4 Backlog | | | |
| 3.4.3 | Research Multi-Lable Classification Machine Learning | | | |
| 3.4.5 | Crawl Training Data | | | |
| 3.4.6 | Crawl Craft Village Data (VILLAGE) | | | |
| 3.4.7 | Design user interface | | | 64 hrs |
| 3.4.7.1 | Design UX/UI Accept/Decline New Village Page For Web Application | | | |
| 3.4.7.2 | Design UX/UI Dashboard Page For Web Application | | | |
| 3.4.7.3 | Redesign UX/UI View Finished Surveys Page For Mobile Application | | | |
| 3.4.7.4 | Redesign UX/UI Survey Page With Add New Village For Mobile Application (Personal User) | | | |

| | | | | |
|--------------|--|--|--|---------------|
| 3.4.7.5 | ReDesign UX/UI Register Page For Mobile Application | | | |
| 3.4.8 | Coding | | | 96 hrs |
| 3.4.8.1 | Code UX/UI Accept/Decline New Village Page For Web Application | | | |
| 3.4.8.2 | Code Function Accept/Decline New Village For Web Application | | | |
| 3.4.8.3 | Code Dashboard API | | | |
| 3.4.8.4 | Code UX/UI Dashboard Page For Web Application | | | |
| 3.4.8.5 | Update UX/UI View Finished Surveys Page For Mobile Application | | | |
| 3.4.8.6 | Update Function View Finished Surveys For Mobile Application | | | |
| 3.4.8.7 | Update View Finished Surveys API | | | |
| 3.4.8.8 | Update UX/UI Survey Page With Add New Village For Mobile Application (Personal User) | | | |
| 3.4.8.9 | Update Submit Survey With New Village Function | | | |
| 3.4.8.10 | Update Change Language For Mobile Application | | | |

| | | | | |
|---------------|---|-------------------|-------------------|----------------|
| 3.4.8.11 | Update Register Function Using Mail For Mobile Application | | | |
| 3.4.8.12 | Update Register API Response Format | | | |
| 3.4.9 | Testing & Fix Bug | | | 40 hrs |
| 3.4.9.1 | Design Test Case for Sprint 4 | | | |
| 3.4.9.2 | Conduct test Sprint 4 | | | |
| 3.4.9.3 | Fix Bug | | | |
| 3.4.10 | Release Sprint 4 | | | |
| 3.4.10.1 | Sprint 4 Review Meeting | | | |
| 3.4.10.2 | Sprint 4 Retrospective | | | |
| 3.5 | Sprint 5 | 08/11/2022 | 22/11/2022 | 208 hrs |
| 3.5.1 | Sprint 5 Planning Meeting | | | |
| 3.5.2 | Create Sprint 5 Backlog | | | |
| 3.5.3 | Process Training Data | | | |
| 3.5.4 | Train New Model | | | |
| 3.5.5 | Write Pollution Detection API | | | |
| 3.5.6 | Write Detection Pollution Function | | | |
| 3.5.7 | Crawl Craft Village Data (VILLAGE) | | | |
| 3.5.8 | Design user interface | | | 64 hrs |
| 3.5.8.1 | Redesign UX/UI Home Page For Mobile Application | | | |

| | | | | |
|---------------|---|--|--|---------------|
| 3.5.8.2 | Redesign UX/UI Household Page For Web Application | | | |
| 3.5.8.3 | Redesign UX/UI Survey Page For Mobile Application (Personal User) | | | |
| 3.5.9 | Coding | | | 96 hrs |
| 3.5.9.1 | Add Scroll Up Button For All Page | | | |
| 3.5.9.2 | Code Submit Survey With New Village Function | | | |
| 3.5.9.3 | Update UX/UI Home Page For Mobile Application | | | |
| 3.5.9.4 | Update Location Base Function | | | |
| 3.5.9.5 | Update Location Base API | | | |
| 3.5.9.6 | Update UX/UI Household Page For Web Application | | | |
| 3.5.9.7 | Update Submit Survey API | | | |
| 3.5.9.8 | Update UX/UI Survey Page For Mobile Application (Personal User) | | | |
| 3.5.9.9 | Update Change Language For Mobile Application | | | |
| 3.5.10 | Testing & Fix bug | | | 40 hrs |
| 3.5.10.1 | Design Test Case for machine learning Model | | | |
| 3.5.10.2 | Conduct test machine learning Model | | | |

| | | | | |
|---------------|-------------------------------|-------------------|-------------------|--------------|
| 3.5.10.3 | Design test case for Sprint 5 | | | |
| 3.5.10.4 | Conduct test Sprint 5 | | | |
| 3.5.10.5 | Fix Bug | | | |
| 3.5.11 | Release Sprint 5 | | | |
| 3.5.11.1 | Sprint 5 Review Meeting | | | |
| 3.5.11.2 | Sprint 5 Retrospective | | | |
| 3.6 | Review Project | 07/12/2022 | 07/12/2022 | 2 hrs |

3.3.3. Project Schedule

Table 15. Project Schedule

| No. | Activity | Start date | Responsible | Note |
|--------------------------|----------------------------|------------|-----------------------|------|
| Defect Prevention | | | | |
| | Sprint 1 | 01/09/2022 | Team members | |
| | Sprint 2 | 18/09/2022 | Team members | |
| | Sprint 3 | 05/10/2022 | Team members | |
| | Sprint 4 | 22/10/2022 | Team members | |
| | Sprint 5 | 08/11/2022 | Team members | |
| Quality Control | | | | |
| | Review: Work Product 1 | 15/09/2022 | Mentor - Team members | |
| | Review: Work Product 2 | 02/10/2022 | Mentor - Team members | |
| | Review: Work Product 3 | 19/10/2022 | Mentor - Team members | |
| | Review: Work Product 4 | 05/11/2022 | Mentor - Team members | |
| | Review: Work Product 5 | 22/11/2022 | Mentor - Team members | |
| Project Tracking | | | | |
| | Project initiation meeting | 28/08/2022 | Team members | |
| | Sprint 1 Planning Meeting | 01/09/2022 | Team members | |
| | Sprint 1 Review Meeting | 15/09/2022 | Team members | |
| | Sprint Planning Meeting | 18/09/2022 | Team members | |
| | Sprint 2 Review Meeting | 02/10/2022 | Team members | |

| | | | | |
|-----------|------------------------------------|------------|--------------------------|--|
| | Sprint 3 Planning Meeting | 05/10/2022 | Team members | |
| | Sprint 3 Review Meeting | 19/10/2022 | Team members | |
| | Sprint 4 Planning Meeting | 22/11/2022 | Team members | |
| | Sprint 4 Review Meeting | 05/11/2022 | Team members | |
| | Sprint 5 Planning Meeting | 08/11/2022 | Team members | |
| | Sprint 5 Review Meeting | 22/11/2022 | Team members | |
| QA | | | | |
| | Final Inspection: Deliverable 1 | 15/09/2022 | Mentor - Team members | |
| | Final Inspection: Deliverable 2 | 02/10/2022 | Mentor - Team members | |
| | Final Inspection: Deliverable 3 | 19/10/2022 | Mentor - Team members | |
| | Final Inspection: Deliverable 4 | 05/11/2022 | Mentor - Team members | |
| | Final Inspection: Deliverable 4 | 22/11/2022 | Mentor - Team members | |
| | Baseline audit: Startup | 07/12/2022 | Mentor - Team members | |
| | Baseline audit: Wrap-up | 07/12/2022 | Mentor - Team members | |

3.4. Resource

Specified as in the section Project Team

3.5. Infrastructure

Table 16. Infrastructure

| Work/Product | Purpose | Expected Availability by |
|--------------------------------|-------------------------------|--------------------------|
| Development Environment | | |
| Flutter | Development framework | Construction stage |
| Spring Boot | Development framework | Construction stage |
| Oracle SQL | Database | Construction stage |
| Python | Development language | Construction stage |
| HTML/CSS/JavaScript | Development language for Web | Construction stage |
| Material UI | Supporting library for UI Web | Construction stage |
| Katalon | Testing | Construction stage |
| Hardware & Software | | |
| 1GB space on server | | Initiation stage |
| Browser | | Construction stage |
| Emulator | | Construction stage |
| Other Tools | | |
| Github | Source version control | Initiation stage |
| Trello | Task management tool | Initiation stage |

3.6. Training Plan

Table 17. Training Plan

| Training Area | Participants | When, Duration | Waiver Criteria |
|-------------------|-----------------------|----------------|--------------------|
| Technical | | | |
| Flutter | Van Cong Le Ca | 7 days | If already trained |
| Spring Boot | Hua Hoang Phuc | 3 days | If already trained |
| Material UI | Nguyen Thanh Trung | 5 days | If already trained |
| Python | Bui Duc Huy | 7 days | If already trained |
| Process | | | |
| Task management | Van Cong Le Ca | 8 hrs | If already trained |
| Human management | Van Cong Le Ca | 8 hrs | If already trained |
| Defect prevention | Van Cong Le Ca | 1 day | Mandatory |

3.7. Budget for Project

Table 18. Total Cost Estimate

| No | Criteria | Price | Amount | Total (USD) |
|-------------------|----------------------------|-------|--------|----------------|
| 1 | Working hours | \$ 2 | 1088 | \$ 2176 |
| 2 | Online server and services | \$ 50 | 2 | \$ 100 |
| 3 | Party | \$ 10 | 5 | \$ 50 |
| Total cost | | | | \$ 2326 |

Table 19. Cost Description

| Description | Amount | Unit |
|--|--------|--------|
| Number of members | 4 | Person |
| Number of working hours per weekdays | 2 | Hour |
| Number of working hours per two weekends | 8 | Hour |
| Number of working days per week | 7 | Day |
| The duration of the project | 4 | Month |
| The cost per member per week | 52 | USD |
| Party cost per time | 150 | USD |
| The number of working days | 117 | Day |

** *Explain:* Amount of working hours = 4 members * (2 hours * 75 Days + 8 hours * 32 days)

Table 20. Estimate Budget

| Item | Total Budget | % Budget | Budget in Period | | | | | | Note |
|-------------------|--------------|-------------|------------------|------------|------------|------------|------------|------------|------|
| | | | Sprint 1 | Sprint 2 | Sprint 3 | Sprint 3 | Sprint 4 | Sprint 5 | |
| Purchases (COTS) | 3248 | 80% | 650 | 650 | 650 | 650 | 650 | 648 | |
| Team Building | 300 | 8% | 150 | 0 | 0 | 0 | 0 | 150 | |
| Tools | 500 | 12% | 100 | 100 | 100 | 100 | 100 | 100 | |
| Travel Costs | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| Training | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| Review Activities | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| Total | 4048 | 100% | 900 | 750 | 750 | 750 | 750 | 898 | |

4. Project Organization

4.1. Organization Structure

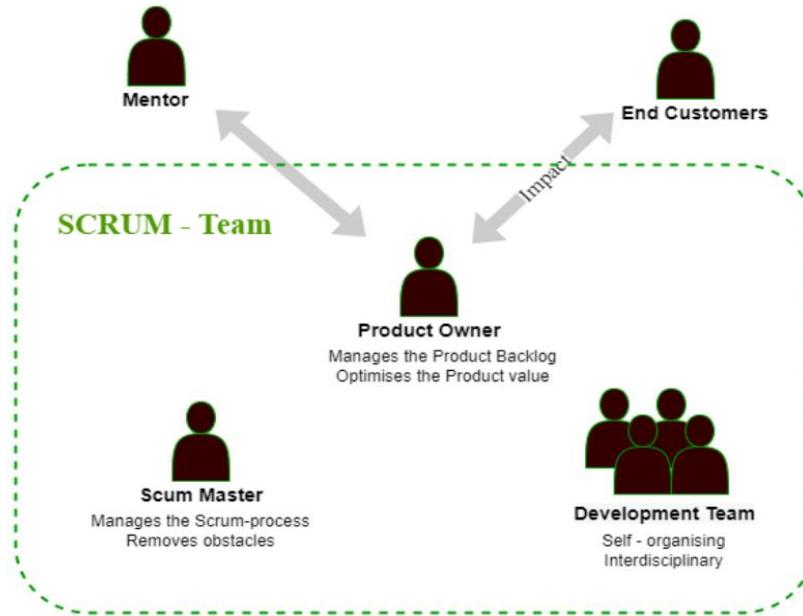


Figure 3. Organization Structure

4.2. Project Team

Table 21. Project Team

| Role | Responsibility | Name |
|----------------------|---|--------------------------|
| Product Owner | <ul style="list-style-type: none"> - A spokesperson for the customer and needs to represent them - Gathers, manages, and prioritizes the product backlog. - Has technical product knowledge or specific domain expertise. - Tracks progress towards the release of a product. | Mr. Nguyen Thanh Binh |
| Scrum Master | <ul style="list-style-type: none"> - Communicate the value of Scrum - Teach the organization on Scrum to maximize business value | Van Cong Le Ca |

| | | |
|------------------|--|-------------|
| | <ul style="list-style-type: none"> - Attend all Scrum meetings - Preserve the integrity and spirit of the Scrum framework - Maintain the focus of the Team and facilitate efforts to resolve them - Serve as a coach and mentor to members of the Team - Respectfully hold the Team, Product Owner and Stakeholders accountable for their commitments - Continually work with the Team and business to find and implement improvements - As a timekeeper - Record team meeting <p>Make the Team aware of impediments</p> | |
| Developer | <ul style="list-style-type: none"> - Responsible for quality - Responsible for delivering the potentially shippable product of the Application each sprint - Report progress based on the remaining time - Self-organized - Owns the Sprint backlog | All members |

| | | |
|---------------|--|--------------------------|
| Tester | <ul style="list-style-type: none"> - Do the Test plan - Creation of test designs, test processes, test cases and test data. - Carry out testing as per the defined procedures. - Graph the results and make sure people know when test results decline. - Prepare all reports related to software testing carried out. - Analysis and evaluate the Test result. - Ensure that all tested related work is carried out as per the defined standards and procedures. | All Members |
| Mentor | <ul style="list-style-type: none"> - Guide on the process. - Monitoring all activities of the Team. - Help with anything. - Reviews project documents - Reviews product | Mr. Nguyen Thanh Binh |

5. Communication & Reporting

Table 22. *Communication Methodology*

| Audience/ Attendees | Topic/ Deliverable | Frequency | Method |
|------------------------------|--|-----------|------------------------|
| Mentor and Team member | Project Progress Review | Weekly | Skype Meeting |
| Team Member | Project Progress Review and Daily Meeting | Daily | Facebook, Face to Face |

6. Configuration Management

Table 23. *Configuration Management*

| No | Tool | Content |
|----|-----------------|--|
| 1 | Google Sheet | Track member activities. At the end of each day, team members will post on time log and scrum master will check. |
| 2 | Google Document | Track the changing of documents & manage versions of documents. |
| 3 | GitHub | Repositories for source code version management |
| 4 | Weekly Meeting | Hold a meeting every week to assign tasks to each member. If there are some emergencies but we cannot sit together then we can use Google Meet to discuss online. |
| 5 | Document | All meetings must be documented and pictured. |
| 6 | Google Drive | Store document resources and designed components |
| 7 | Google Meet | Discuss online, stream and share problems |

7. Security Aspects

❖ **About copyright:**

Use images, logos, and information about the university to be allowed for use

❖ **About security:**

All documents, and software products must be authorized by team members before they can be obtained or referenced

❖ **About integrity:**

Software products run continuously 24 / except for external problems such as natural disasters, power outages ... and when upgrading the software

To meet the above criteria requires action:

Copyright: ask for the permission of the provider before using the resource

About security: Use 3rd party services of reputable providers and security notices for each team member

Integrity: software product data must be backed up continuously

8. References

Table 24. Acronym

| Acronym | Definition | Note |
|---------|---|------|
| CVPMS | Craft Village Pollution Monitoring System | |
| FDD | Feature-Driven Development | |

References:

- [WMS]Proposal
- What is Scrum: <https://www.scrum.org/resources/what-is-scrum>
- <https://www.javatpoint.com/manual-testing>



Capstone Project 1

CMU-CS450

Product Backlog – User Story – Sprint Backlog

Craft Village Pollution Monitor System

Submitted by
Ca, Van Cong Le
Huy, Bui Duc
Phuc, Hua Hoang
Trung, Nguyen Thanh

Approved by
Ph.D. Nguyen Thanh Binh

Proposal Review Panel Representative:

Name Signature Date

Capstone Project 1 - Mentor:



Name Signature Date

PROJECT INFORMATION

| Project acronym | CVPMS | | |
|--|---|--|------------|
| Project Title | Craft Village Pollution Monitor System | | |
| Start Date | 22/08/2022 | End Date | 07/12/2022 |
| Lead Institution | International School, Duy Tan University | | |
| Project Mentor | Ph.D. Thanh Binh, Nguyen | | |
| Scrum master / Project Leader & contact details | Ca, Van Cong Le <i>Email:</i> cascabusiness@gmail.com <i>Tel:</i> 0352707895 | | |
| Partner Organization | | | |
| Project Web URL | https://github.com/Casca113s2/craft-village-pollution-monitor-system | | |
| Team members | Name | Email | Tel |
| 25211207666 | Ca, Van Cong Le | cascabusiness@gmail.com | 0352707895 |
| 25211215894 | Huy, Bui Duc | duchuylt122@gmail.com | 0818648090 |
| 25211204084 | Phuc, Hua Hoang | phuchuho0402@gmail.com | 0905639682 |
| 25211215133 | Trung, Nguyen Thanh | nguyenttrung2601@gmail.com | 0774496838 |

Approve Document: Sign in to approve the document

| | | | |
|---------------------|------------------------|------|---|
| Mentor | Binh, Nguyen Thanh | Date | 08/11/2022 |
| | | Sign |  |
| Scrum Master | Ca, Van Cong Le | Date | 08/11/2022 |
| | | Sign |  |
| Scrum Member | Huy, Bui Duc | Date | 08/11/2022 |
| | | Sign |  |
| Scrum Member | Phuc, Hua Hoang | Date | 08/11/2022 |
| | | Sign |  |
| Scrum Member | Trung, Nguyen Thanh | Date | 08/11/2022 |
| | | Sign |  |

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1. Product Backlog

Table 1. Product Backlog

| Id | Heading | As a ... | I want to ... | so that ... | Acceptance Criteria | Remarks | Priority | Sprint No | Estimate (Hours) | Status | Remarks |
|-----------|-------------------|---|---|---|--|----------------|-----------------|------------------|-------------------------|---------------|----------------|
| PB01 | Register | Personal User Household | Create an account | I can login with my own account to access the mobile application/web application | - Username must not contain spaces and not be accented - Password must be >= 6 characters | | 3 | 1, 2, 3 | 30 | Done | |
| PB02 | Authenticate | Personal User Household Authority Admin | Login/Logout to mobile application/web application | I can start to conduct a new survey/provide the information about the craft village | - Login with registered account | | 3 | 2, 5 | 100 | Done | |
| PB03 | Authorize | Personal User Household Authority Admin | Login/Logout according to the role that has been registered | I can perform the task correctly according to the role | - Login with registered account and perform task according to the registered role | | 3 | 2 | 100 | Done | |
| PB04 | Password Recovery | Personal User | Recover password when forgot | I can change my password into the new one and | - Use the code that sent to the account's email | | 2 | 2 | 20 | Done | |

| | | | | | | | | | | | |
|------|--------------------------------|---|--|---|---|---|---|----|------|------|--|
| | | | | get my account back | which is registered in the profile to change the new password | | | | | | |
| PB05 | Edit Profile | Personal User Household Local authority Admin | Edit my profile | I can edit my personal information | - Allow users to edit any personal information they want | 2 | 2 | 20 | Done | | |
| PB06 | Create Local Authority Account | Admin | Create an local authority account | I can provide the account to the local authority user to manage their local craft village | - Allow the admin to create the a local authority account - Login with registed account | | | 3 | 30 | Done | |
| PB07 | Change Password | Personal User Household Authority Admin | Change my old password into a new password | Next time I can login using my new password and protect my account in case of password leak | - Allow user to click "Thay đổi mật khẩu" and change their current password to a new password | 3 | 2 | 30 | Done | | |

| | | | | | | | | | | |
|------|--------------------------------|-------------------------|---|---|---|---|---------|-----|------|--|
| PB08 | Conduct a new pollution survey | Personal User | Conduct a new pollution survey automatically | I can perform a quick and efficient pollution survey that contain all the information such as pollution types, location, additional information of that craft village | - Allow users to take the pollution photo sent to AI - The pollution form will be filled automatically based on the AI return result - Allow users to re-check the survey or provide additional information before they move to the next step | 3 | 3, 5 | 200 | Done | |
| PB09 | Request New Village | Personal User Household | Add a new village that does not exist on the database | I can submit a pollution survey about that new craft village that exist real life but does not exist in the database | - Allow the user to add a new craft village to the database | 3 | 2, 4, 5 | 30 | Done | |

| | | | | | | | | | | | |
|------|---------------------------------|-----------------|--|--|---|--|---|---------------|-----|------|--|
| PB10 | Accept/Decline/Add New Village | Local Authority | Accept/Decline a new village that has been submit by a personal user | I can protect the integrity of the craft village data from fault information | - Allow user to accept or decline the new village that submitted by a personal user and that village belong to their management | | 3 | 4 | 20 | Done | |
| PB11 | Change language | Personal User | Change the language of the mobile | The application language change from Vietnamese to English and vice versa | - Allow users to change the language of the application from Vietnamese to English and vice versa | | 1 | 2, 5 | 20 | Done | |
| PB12 | View finished/in progres survey | Personal User | View all the survey that I had conducted that finished/in progres | I know how many and which craft village that I had conducted the survey | - Allow users to view all the surveys that they did and submitted to the server | | 2 | 4 | 10 | Done | |
| PB13 | Pollution Detection AI | Personal User | Have an AI with the ability to detect the pollution types from an image automatically and accurately | The application can detect pollutions types automatically with a quick and | - Allow user to submit pollution photo and the AI will detect pollution types | | 3 | 1, 2, 3, 4, 5 | 400 | Done | |

| | | | | | | | | | | | |
|------|------------------------|-----------------|---|---|--|---|------|----|------|--|--|
| | | | | accureate response | then sent back to the application | | | | | | |
| PB14 | View dashboard | Local Authority | See the number of new household or new survey in month. And view new village request or total village | I know how many survey, new household or new village request each month | - Allow user to view the number of new household, new survey, village request in month anh total village | 3 | 3, 5 | 30 | Done | | |
| PB15 | Declare household info | Household | Declare my village I am living and send request if my village does not exist | I can let authority know which village I belong to | - Allow user declare village and request new village | 3 | 3 | 30 | Done | | |

2. Sprint Backlog

2.1. Sprint Plan

Table 2. *Sprint Plan*

| Sprint # | Start | End | Status |
|-----------------|--------------|------------|---------------|
| 1 | 01/Sep/22 | 15/Sep/22 | Complete |
| 2 | 18/Sep/22 | 02/Oct/22 | Complete |
| 3 | 05/Oct/22 | 19/Oct/22 | Complete |
| 4 | 22/Oct/22 | 05/Nov/22 | Complete |
| 5 | 08/Nov/22 | 22/Nov/22 | Complete |

2.2. Sprint 1

Table 3. Sprint 1

| Sprint Id | Backlog Id | Description | Owner | Status | Estimate (Hours) | Completed | Pending | Total effort | Effort vs. Estimate | Day 1 | Day 2 | Day 3 | Day 4 | Day 5 | Day 6 | Day 7 | Day 8 | Day 9 | Day 10 | Day 11 | Day 12 | Day 13 | Day 14 | |
|-----------|------------|--|-------|--------|------------------|-----------|---------|--------------|---------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|--------|--------|--------|--------|--------|-----|
| 1.1 | PB01 | [FE] Design UX/UI Register Page For Mobile Application | Ca | Done | 8 | 8 | 0 | 8 | 0 | | | 8 | | | | | | | | | | | | |
| 1.2 | PB01 | [FE] Code UX/UI Register Page For Mobile Application | Ca | Done | 8 | 8 | 0 | 8 | 0 | | | | 8 | | | | | | | | | | | |
| 1.3 | PB01 | [FE] Code Register Function For Mobile Application | Ca | Done | 12 | 12 | 0 | 8 | -4 | | | | | | | | | | | | | | | |
| 1.4 | PB09 | [DB + BE] Create Database (AD_COUNTRY, AD_PROVINCE, AD_DISTRICT, VILLAGE) and Mapping entities | Phuc | Done | 10 | 10 | 0 | 8 | -2 | | | | 10 | | | | | | | | | | | |
| 1.5 | PB09 | [DB] Crawl Data For Database (AD_COUNTRY, AD_PROVINCE, AD_DISTRICT, VILLAGE) | Trung | Done | 40 | 40 | 0 | 40 | 0 | | | | | | | | | | | | | | | 40 |
| 1.6 | PB01 | [FE] Design Web layout | Phuc | Done | 12 | 12 | 0 | 8 | -4 | | | | 12 | | | | | | | | | | | |
| 1.7 | PB02 | [FE] Design UX/UI Login Page For Mobile Application | Trung | Done | 8 | 8 | 0 | 8 | 0 | | | 8 | | | | | | | | | | | | |
| 1.8 | PB02 | [FE] Design UX/UI Home Page For Mobile Application | Trung | Done | 8 | 8 | 0 | 12 | 4 | | | | 8 | | | | | | | | | | | |
| 1.9 | PB02 | [FE] Code UX/UI Login Page For Mobile Application | Ca | Done | 12 | 12 | 0 | 8 | -4 | | | | | | | | | | | | | | 12 | |
| 1.10 | PB02 | [FE] Code UX/UI Home Page For Mobile Application | Ca | Done | 12 | 12 | 0 | 10 | -2 | | | | | | | | | | | | | | | 12 |
| 1.11 | PB02 | [FE] Code Login Function For Mobile Application | Ca | Done | 8 | 8 | 0 | 10 | 2 | | | | | | | | | | | | | | 8 | |
| 1.12 | PB02 | [FE] Code Logout Function For Mobile Application | Ca | Done | 3 | 3 | 0 | 2 | -1 | | | | | | | | | | | | | | | 3 |
| 1.13 | PB02 | [BE] Code Address API | Phuc | Done | 6 | 12 | -6 | 8 | 2 | | | | | | | | | | | | | | 6 | |
| 1.14 | PB02 | [BE] Code Village API | Phuc | Done | 9 | 3 | 6 | 2 | -7 | | | | | | | | | | | | | | 9 | |
| 1.15 | PB13 | [AI] Research Method To Build AI | Huy | Done | 26 | 26 | 0 | 26 | 0 | | | | | | | | | | | | | | | 26 |
| 1.16 | PB13 | [AI] Crawl Data For AI | Huy | Done | 26 | 26 | 0 | 26 | 0 | | | | | | | | | | | | | | | 26 |
| | | | | | Total | 208 | 208 | 0 | 192 | -16 | 0 | 0 | 26 | 28 | 0 | 38 | 0 | 0 | 18 | 17 | 0 | 12 | 29 | 40 |
| | | | | | Burn down | | | | | | 208 | 208 | 182 | 154 | 154 | 116 | 116 | 116 | 98 | 81 | 81 | 69 | 40 | 0 |
| | | | | | Burn up | | | | | | 0 | 0 | 26 | 54 | 54 | 92 | 92 | 92 | 110 | 127 | 127 | 139 | 168 | 208 |
| | | | | | Ideal Burn down | | | | | | 193 | 178 | 163 | 149 | 134 | 119 | 104 | 89 | 74 | 59 | 45 | 30 | 15 | 0 |
| | | | | | Ideal Burn up | | | | | | 0 | 15 | 30 | 45 | 59 | 74 | 89 | 104 | 119 | 134 | 149 | 163 | 178 | 193 |

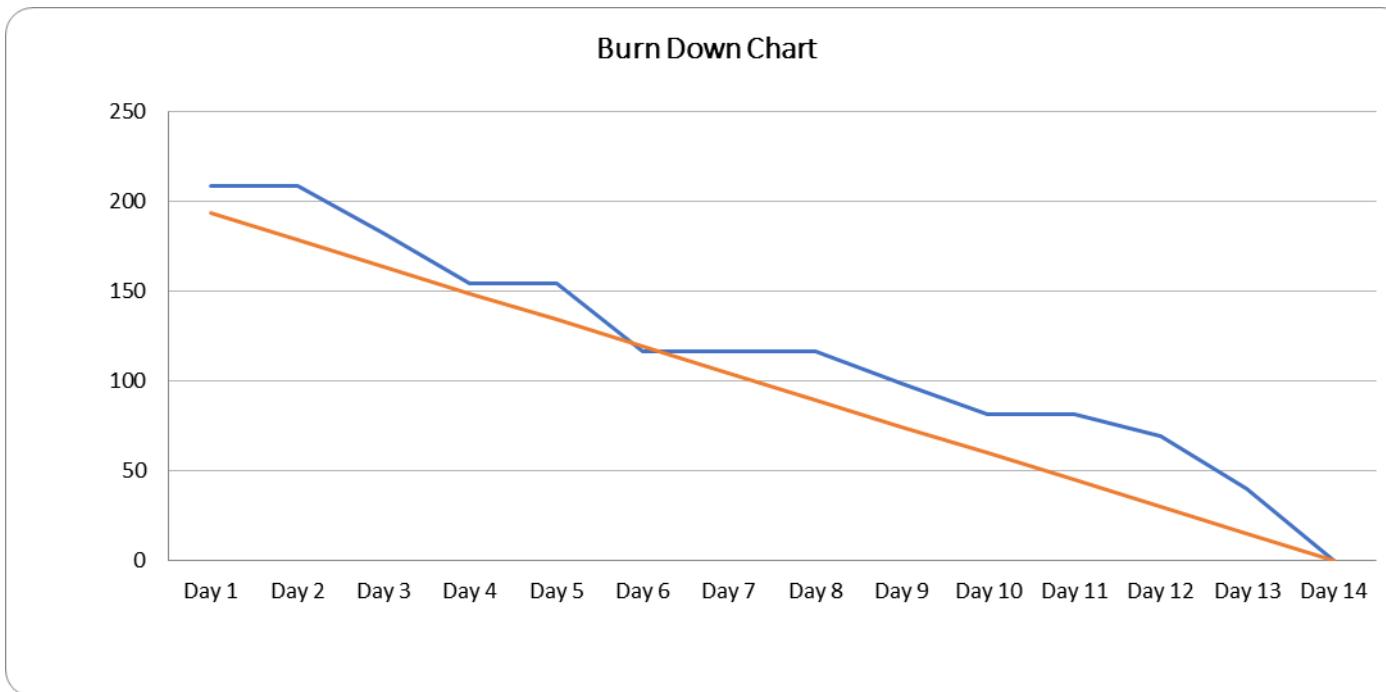


Figure 1. Sprint 1 Burn Down Chart

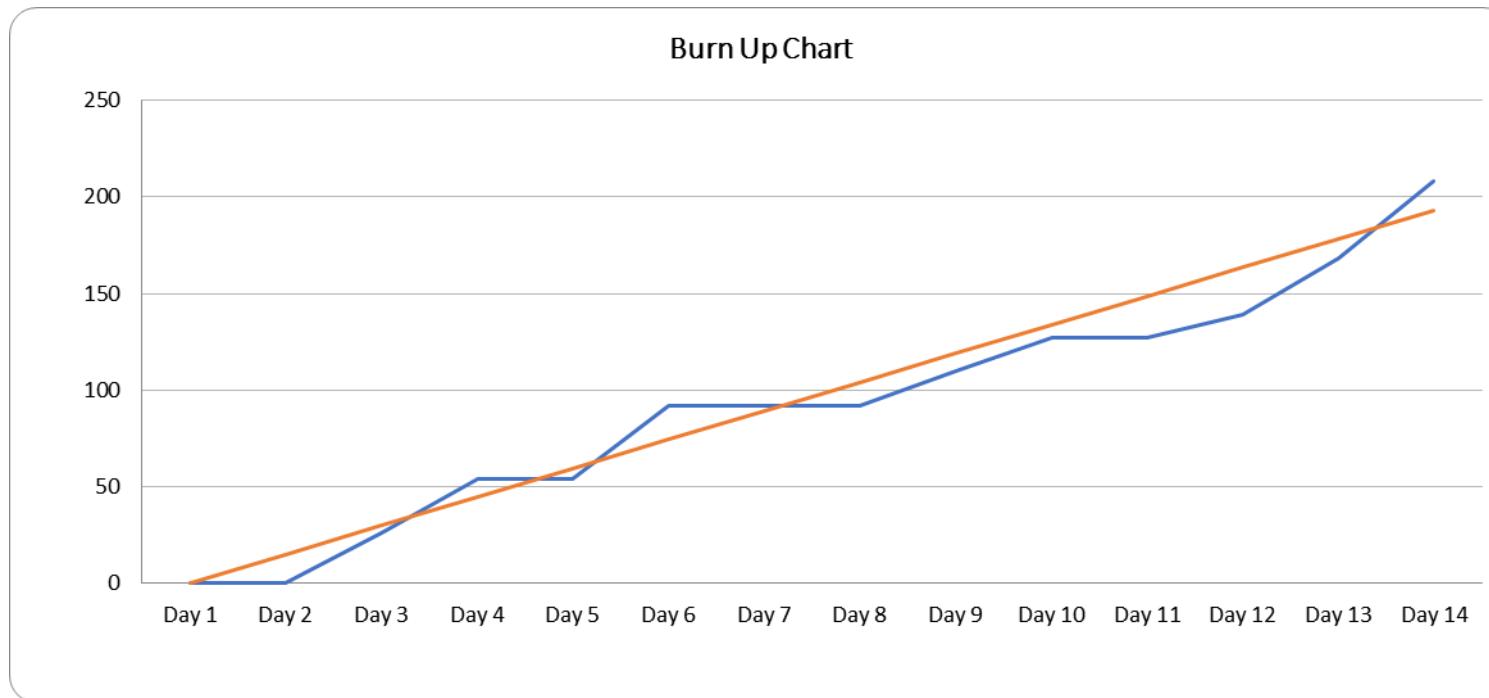


Figure 2. Sprint 1 Burn Up Chart

2.3. Sprint 2

Table 4. Sprint 2

| Sprint Id | Backlog Id | Description | Owner | Status | Estimate (Hours) | Completed | Pending | Total effort | Effort vs. Estimate | Day 1 | Day 2 | Day 3 | Day 4 | Day 5 | Day 6 | Day 7 | Day 8 | Day 9 | Day 10 | Day 11 | Day 12 | Day 13 | Day 14 |
|-----------|------------|--|-------|--------|------------------|-----------|---------|--------------|---------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|--------|--------|--------|--------|--------|
| 2.1 | PB04 | [FE] Design UX/UI Forget Password Page For Mobile Application | Ca | Done | 4 | 4 | 0 | 4 | 0 | 4 | | | | | | | | | | | | | |
| 2.2 | PB04 | [FE] Code UX/UI Forget Password Page For Mobile Application | Ca | Done | 4 | 4 | 0 | 4 | 0 | 4 | | | | | | | | | | | | | |
| 2.3 | PB04 | [FE] Code Forget Password Function For Mobile Application | Ca | Done | 3 | 3 | 0 | 3 | 0 | | 3 | | | | | | | | | | | | |
| 2.4 | PB04 | [BE] Code Forget Password Function API | Phuc | Done | 4 | 4 | 0 | 3 | -1 | 4 | | | | | | | | | | | | | |
| 2.5 | PB07 | [FE] Design UX/UI Change Password Page For Mobile Application | Ca | Done | 4 | 4 | 0 | 4 | 0 | | | 4 | | | | | | | | | | | |
| 2.6 | PB07 | [FE] Code UX/UI Change Password Page For Mobile Application | Ca | Done | 4 | 4 | 0 | 4 | 0 | | | | 4 | | | | | | | | | | |
| 2.7 | PB07 | [FE] Code Change Password Function For Mobile Application | Ca | Done | 8 | 8 | 0 | 4 | -4 | | 8 | | | | | | | | | | | | |
| 2.8 | PB07 | [BE] Code Change Password Function API | Phuc | Done | 4 | 4 | 0 | 4 | 0 | | | 4 | | | | | | | | | | | |
| 2.9 | PB01 | [FE] Design UX/UI Register Page For Web Application | Trung | Done | 8 | 8 | 0 | 8 | 0 | 8 | | | 8 | | | | | | | | | | |
| 2.10 | PB01 | [FE] Code UX/UI Register Page For Web Application | Trung | Done | 8 | 8 | 0 | 8 | 0 | | | | 8 | | | | | | | | | | |
| 2.11 | PB01 | [FE] Code Register Function For Web Application | Trung | Done | 8 | 8 | 0 | 8 | 0 | | | | | 8 | | | | | | | | | |
| 2.12 | PB03 | [DB + BE] Create Database (UR_USER, UR_ROLE, USER_ROLE, UR_SESSION) and Mapping entities | Phuc | Done | 8 | 8 | 0 | 8 | 0 | | | | | 8 | | | | | | | | | |
| 2.13 | PB03 | [BE] Code Authorize Function (Personal User, Household, Local Authority, Admin) | Phuc | Done | 12 | 12 | 0 | 12 | 0 | | | | | | 12 | | | | | | | | |
| 2.14 | PB01 | [FE] Design Web layout (household, local authority, admin) | Phuc | Done | 8 | 8 | 0 | 8 | 0 | | | | | | | 8 | | | | | | | |
| 2.15 | PB02 | [FE] Design UX/UI Login Page For Web Application | Trung | Done | 2 | 2 | 0 | 3 | 1 | | | | | | | | 2 | | | | | | |
| 2.16 | PB02 | [FE] Code UX/UI Login Page For Web Application | Trung | Done | 2 | 2 | 0 | 3 | 1 | | | | 2 | | | | | | | | | | |
| 2.17 | PB02 | [FE] Code Login Function For Web Application | Trung | Done | 4 | 4 | 0 | 4 | 0 | | | | | 4 | | | | | | | | | |
| 2.18 | PB02 | [FE] Code Logout Function For Web Application | Trung | Done | 2 | 2 | 0 | 2 | 0 | | | | | | | 2 | | | | | | | |
| 2.19 | PB05 | [FE] Design UX/UI Edit Profile Page For Mobile Application | Ca | Done | 4 | 4 | 0 | 3 | -1 | | | | 4 | | | | | | | | | | |
| 2.20 | PB05 | [FE] Code UX/UI Edit Profile Page For Mobile Application | Ca | Done | 4 | 4 | 0 | 5 | 1 | | | | | 4 | | | | | | | | | |
| 2.21 | PB05 | [FE] Code Edit Profile Function For Mobile Application | Ca | Done | 3 | 3 | 0 | 4 | 1 | | | | | | 3 | | | | | | | | |
| 2.22 | PB05 | [BE] Code Update Profile API | Phuc | Done | 3 | 3 | 0 | 3 | 0 | | | | | | | | | | | | 3 | | |
| 2.23 | PB11 | [FE] Code Change Language For Mobile Application | Ca | Done | 12 | 12 | 0 | 15 | 3 | | | | | | | | | | | | | 12 | |
| 2.24 | PB13 | [AI] Process Training Data | Huy | Done | 26 | 26 | 0 | 26 | 0 | | | | | | | | 26 | | | | | | |
| 2.25 | PB13 | [AI] Train Model | Huy | Done | 26 | 26 | 0 | 26 | 0 | | | | | | | | | | | | | 26 | |

Capstone Product Backlog – User Story – Sprint Backlog – CVPMS

| | | | | | | | | | | | | | | | | | | | | | | | |
|------|------|--|-------|------------------------|-----|-----|---|-----|---|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 2.26 | PB07 | [FE] Code & Design UX/UI Change Password For Web Application | Trung | Done | 4 | 4 | 0 | 4 | 0 | | | | | | | | 3 | | | | | | |
| 2.27 | PB07 | [FE] Code & Design UX/UI Forget Password For Web Application | Trung | Done | 4 | 4 | 0 | 4 | 0 | | | | | | | | 4 | | | | | | |
| 2.28 | PB06 | [FE] Code & Design UX/UI Add New Local Authority For Web Application(Admin page) | Trung | Done | 8 | 8 | 0 | 8 | 0 | | | | | | | | 8 | | | | | | |
| 2.29 | PB02 | [BE] Code Login/Logout API | Phuc | Done | 12 | 12 | 0 | 15 | 3 | | | | | | | | 15 | | | | | | |
| 2.30 | PB01 | [BE] Code Mail Service | Phuc | Done | 4 | 4 | 0 | 4 | 0 | | | | | | | | 4 | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | Total | 207 | 207 | 0 | 211 | 4 | 20 | 11 | 4 | 4 | 8 | 38 | 20 | 19 | 0 | 2 | 15 | 0 | 29 | 35 |
| | | | | Burn down | | | | | | 187 | 176 | 172 | 168 | 160 | 122 | 102 | 83 | 83 | 81 | 66 | 66 | 37 | 2 |
| | | | | Burn up | | | | | | 20 | 31 | 35 | 39 | 47 | 85 | 105 | 124 | 124 | 126 | 141 | 141 | 170 | 205 |
| | | | | Ideal Burn down | | | | | | 192 | 177 | 163 | 148 | 133 | 118 | 104 | 89 | 74 | 59 | 44 | 30 | 15 | 0 |
| | | | | Ideal Burn up | | | | | | 0 | 15 | 30 | 44 | 59 | 74 | 89 | 104 | 118 | 133 | 148 | 163 | 177 | 192 |

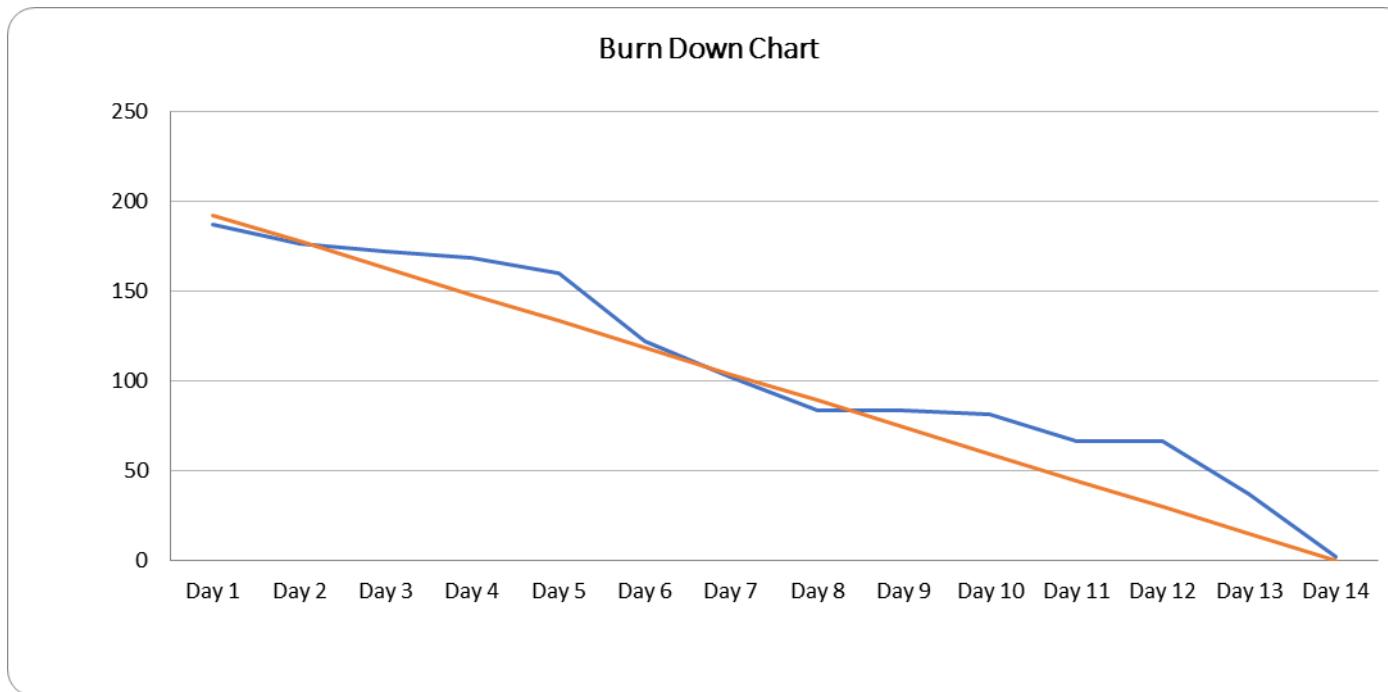


Figure 3. Sprint 2 Burn Down Chart

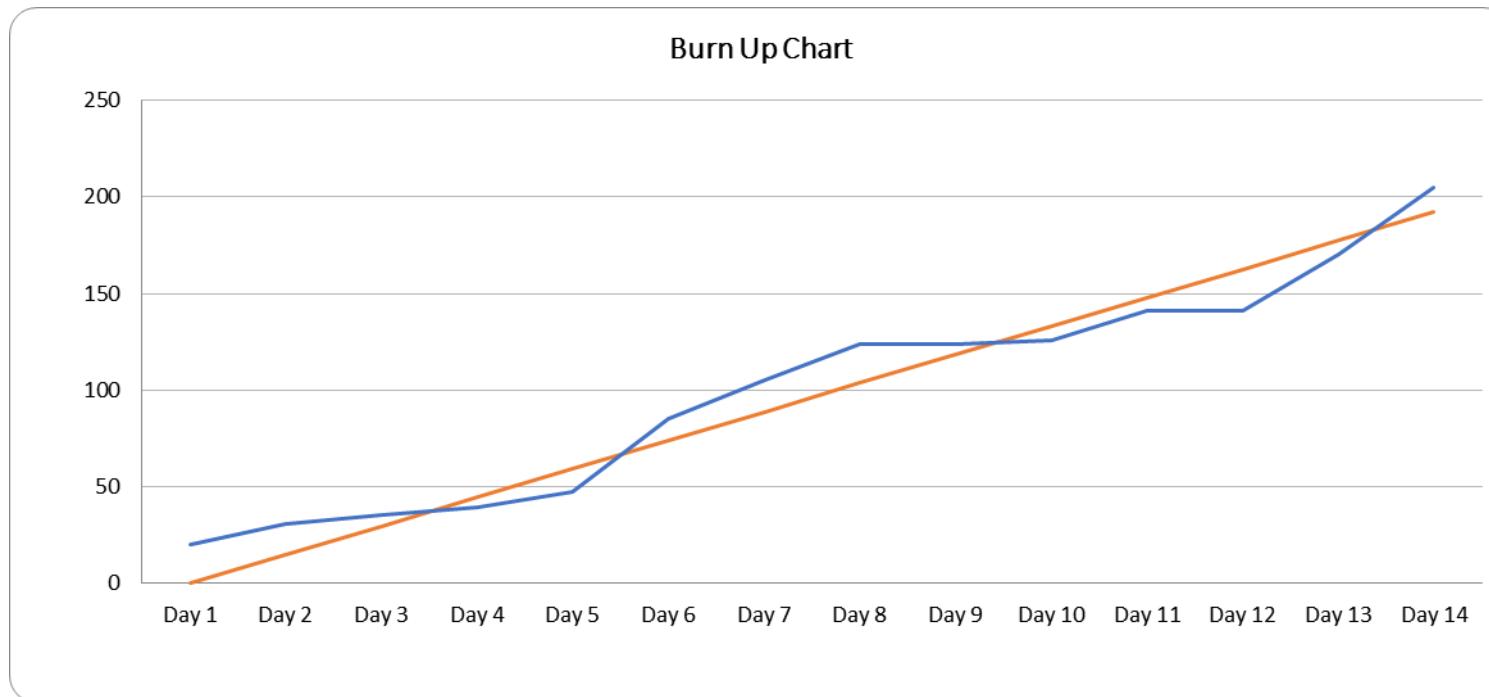


Figure 4. Sprint 2 Burn Up Chart

2.4. Sprint 3

Table 5. *Sprint 3*

| Sprint Id | Backlog Id | Description | Owner | Status | Estimate (Hours) | Completed | Pending | Total effort | Effort vs. Estimate | Day 1 | Day 2 | Day 3 | Day 4 | Day 5 | Day 6 | Day 7 | Day 8 | Day 9 | Day 10 | Day 11 | Day 12 | Day 13 | Day 14 | |
|-----------|------------|--|-------|--------|------------------|-----------|---------|--------------|---------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|--------|--------|--------|--------|--------|----|
| 3.1 | PB08 | [FE] Design UX/UI Survey Page For Mobile Application (Personal User) | Ca | Done | 8 | 8 | 0 | 10 | 2 | | | | 8 | | | | | | | | | | | |
| 3.2 | PB08 | [FE] Code UX/UI Survey Page For Mobile Application (Personal User) | Ca | Done | 8 | 8 | 0 | 8 | 0 | | | | 8 | | | | | | | | | | | |
| 3.3 | PB08 | [FE] Code Take Photo Function | Ca | Done | 4 | 4 | 0 | 4 | 0 | | | | | 4 | | | | | | | | | | |
| 3.4 | PB08 | [FE] Code Location Base Function | Ca | Done | 8 | 8 | 0 | 7 | -1 | | | | | | | | 8 | | | | | | | |
| 3.5 | PB08 | [FE] Code Automatic Fill Data Function | Ca | Done | 8 | 8 | 0 | 12 | 4 | | | | | | | | | | | | | 8 | | |
| 3.6 | PB08 | [FE] Code Encryption Image Function | Ca | Done | 8 | 8 | 0 | 5 | -3 | | | | | | | | | | | | | 8 | | |
| 3.7 | PB08 | [FE] Code Submit Survey Function | Ca | Done | 8 | 8 | 0 | 10 | 2 | | | | | | | | | | | | | | 8 | |
| 3.8 | PB08 | [BE] Code Location detection API | Phuc | Done | 10 | 10 | 0 | 8 | -2 | | | | 10 | | | | | | | | | | | |
| 3.9 | PB08 | [DB + BE] Create table User_Survey and Mapping entity | Phuc | Done | 12 | 12 | 0 | 10 | -2 | | | | | | | | | 12 | | | | | 18 | |
| 3.10 | PB08 | [BE] Code Survey API | Phuc | Done | 18 | 18 | 0 | 18 | 0 | | | | | | | | | | | | | | | 18 |
| 3.11 | PB14 | [FE] Design UX/UI Declare Page For Web Application (Household) | Trung | Done | 8 | 8 | 0 | 9 | 1 | | | | 8 | | | | | | | | | | | |
| 3.12 | PB14 | [FE] Code UX/UI Declare Page For Web Application (Household) | Trung | Done | 8 | 8 | 0 | 8 | 0 | | | | 8 | | | | | | | | | | | |
| 3.13 | PB14 | [BE] Code Household API | Phuc | Done | 8 | 8 | 0 | 8 | 0 | | | | | | | | | | | | | | | 8 |
| 3.14 | PB15 | [FE] Design UX/UI Household Page | Trung | Done | 4 | 4 | 0 | 4 | 0 | | | | | | | | 4 | | | | | | | |
| 3.15 | PB15 | [FE] Code UX/UI Household Page | Trung | Done | 12 | 12 | 0 | 16 | 4 | | | | | | | | | 16 | | | | | | |
| 3.16 | PB06 | [BE] Code Admin API | Phuc | Done | 8 | 8 | 0 | 8 | 0 | | | | | | | | | | | | | | | 8 |
| 3.17 | PB13 | [AI] Test And Retrain AI Model | Huy | Done | 45 | 45 | 0 | 45 | 0 | | | | | | | | | | | | | 45 | | |
| 3.18 | PB13 | [AI] Write Pollution Detection API | Huy | Done | 8 | 8 | 0 | 8 | 0 | | | | | | | | | | | | | 8 | | |
| 3.19 | PB08 | [FE] Write Detection Pollution Function | Ca | Done | 8 | 8 | 0 | 12 | 4 | | | | | | | | | | | | | | | 8 |
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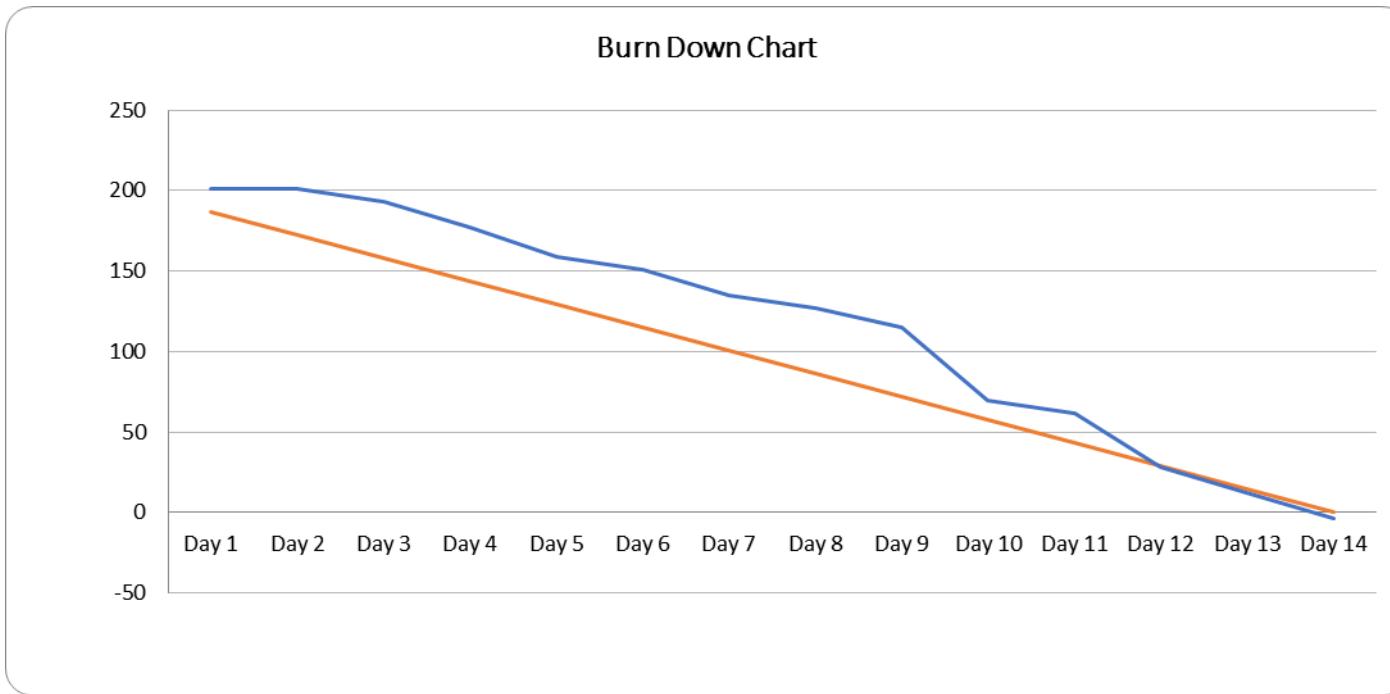


Figure 5. Sprint 3 Burn Down Chart

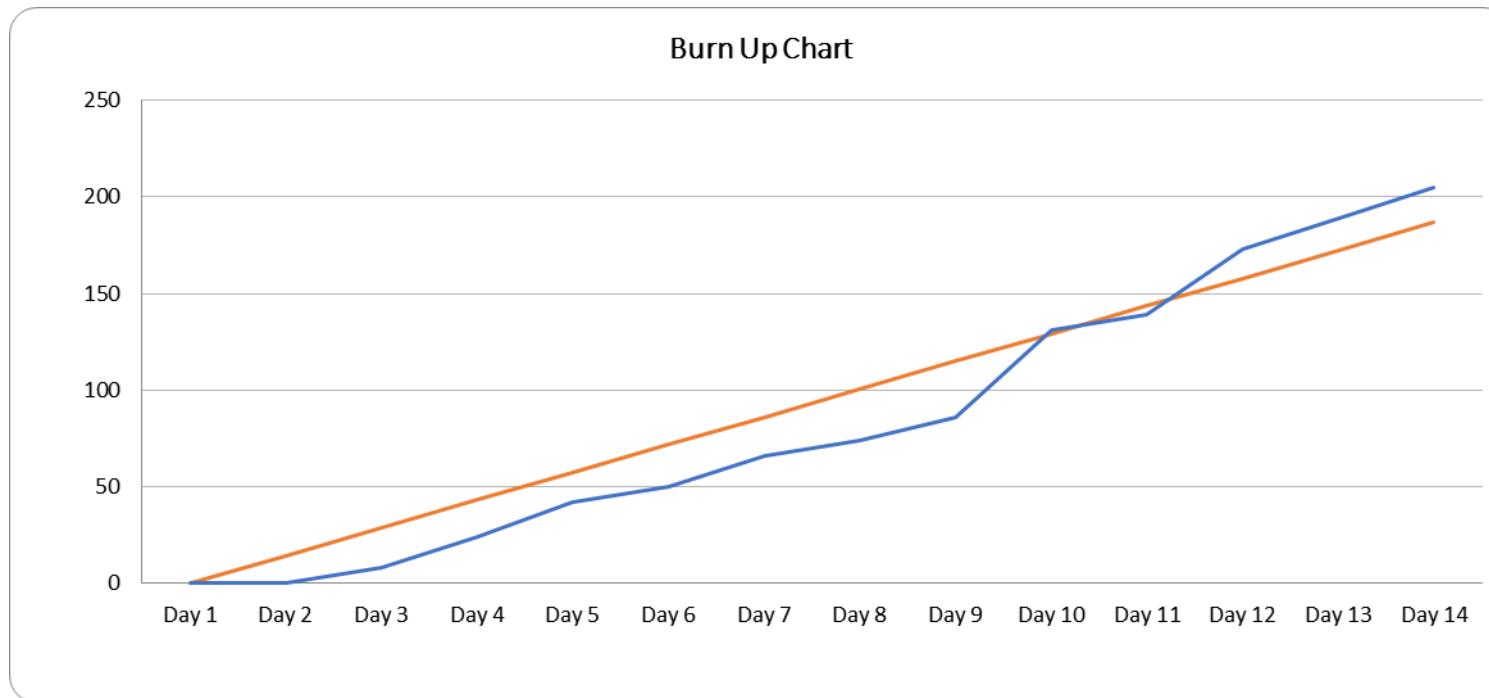


Figure 6. Sprint 3 Burn Up Chart

2.5. Sprint 4

Table 6. Sprint 4

| Sprint Id | Backlog Id | Description | Owner | Status | Estimate (Hours) | Completed | Pending | Total effort | Effort vs. Estimate | Day 1 | Day 2 | Day 3 | Day 4 | Day 5 | Day 6 | Day 7 | Day 8 | Day 9 | Day 10 | Day 11 | Day 12 | Day 13 | Day 14 | |
|-----------|------------|---|-------|--------|------------------|-----------|---------|--------------|---------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|--------|--------|--------|--------|--------|-----|
| 4.1 | PB12 | [FE] Redesign UX/UI View Finished Surveys Page For Mobile Application | Ca | Done | 8 | 8 | 0 | 10 | 2 | 8 | | | | | | | | | | | | | | |
| 4.2 | PB12 | [FE] Update UX/UI View Finished Surveys Page For Mobile Application | Ca | Done | 8 | 8 | 0 | 8 | 0 | | 8 | | | | | | | | | | | | | |
| 4.3 | PB12 | [FE] Update Function View Finished Surveys For Mobile Application | Ca | Done | 4 | 4 | 0 | 4 | 0 | | | 4 | | | | | | | | | | | | |
| 4.4 | PB12 | [BE] Update View Finished Surveys API | Phuc | Done | 12 | 12 | 0 | 10 | -2 | | 12 | | | | | | | | | | | | | |
| 4.5 | PB10 | [FE] Design UX/UI Accept/Decline New Village Page For Web Application | Trung | Done | 8 | 8 | 0 | 7 | -1 | 8 | | | | | | | | | | | | | | |
| 4.6 | PB10 | [FE] Code UX/UI Accept/Decline New Village Page For Web Application | Trung | Done | 8 | 8 | 0 | 8 | 0 | | 8 | | | | | | | | | | | | | |
| 4.7 | PB10 | [FE] Code Function Accept/Decline New Village For Web Application | Trung | Done | 8 | 8 | 0 | 9 | 1 | | | 8 | | | | | | | | | | | | |
| 4.8 | PB09 | [FE] Redesign UX/UI Survey Page With Add New Village For Mobile Application (Personal User) | Ca | Done | 4 | 4 | 0 | 5 | 1 | | | 4 | | | | | | | | | | | | |
| 4.9 | PB09 | [FE] Update UX/UI Survey Page With Add New Village For Mobile Application (Personal User) | Ca | Done | 8 | 8 | 0 | 8 | 0 | | | 8 | | | | | | | | | | | | |
| 4.10 | PB09 | [FE] Update Submit Survey With New Village Function | Ca | Done | 8 | 8 | 0 | 7 | -1 | | | | 8 | | | | | | | | | | | |
| 4.11 | PB14 | [BE] Code Dashboard API | Phuc | Done | 8 | 8 | 0 | 7 | -1 | | 8 | | | | | | | | | | | | | |
| 4.12 | PB13 | [AI] Research Multi-Label Classification Machine Learning | Huy | Done | 26 | 26 | 0 | 26 | 0 | | | 26 | | | | | | | | | | | | |
| 4.13 | PB13 | [AI] Crawl Training Data | Huy | Done | 26 | 26 | 0 | 26 | 0 | | | | 26 | | | | | | | | | | | |
| 4.14 | PB11 | [FE] Update Change Language For Mobile Application | Ca | Done | 8 | 8 | 0 | 8 | 0 | | | 8 | | | | | | | | | | | | |
| 4.15 | PB01 | [FE] ReDesign UX/UI Register Page For Mobile Application | Ca | Done | 4 | 4 | 0 | 4 | 0 | | | | 4 | | | | | | | | | | | |
| 4.16 | PB01 | [FE] Update Register Function Using Mail For Mobile Application | Ca | Done | 8 | 8 | 0 | 8 | 0 | | | | 8 | | | | | | | | | | | |
| 4.17 | PB14 | [FE] Design UX/UI Dashboard Page For Web Application | Trung | Done | 4 | 4 | 0 | 4 | 0 | | 4 | | | | | | | | | | | | | |
| 4.18 | PB14 | [FE] Code UX/UI Dashboard Page For Web Application | Trung | Done | 8 | 8 | 0 | 8 | 0 | | | 8 | | | | | | | | | | | | |
| 4.19 | PB01 | [BE] Update Register API Response Format | Phuc | Done | 12 | 12 | 0 | 10 | -2 | | | 12 | | | | | | | | | | | | |
| 4.20 | PB08 | [DB] Crawl Craft Village Data (VILLAGE) | Trung | Done | 25 | 25 | 0 | 25 | 0 | | | | | | | | | | | | | | 25 | |
| | | | | | Total | 205 | 205 | 0 | 202 | -3 | 16 | 28 | 0 | 4 | 8 | 12 | 34 | 4 | 20 | 8 | 0 | 8 | 4 | 59 |
| | | | | | Burn down | | | | | | 189 | 161 | 161 | 157 | 149 | 137 | 103 | 99 | 79 | 71 | 71 | 63 | 59 | 0 |
| | | | | | Burn up | | | | | | 16 | 44 | 44 | 48 | 56 | 68 | 102 | 106 | 126 | 134 | 134 | 142 | 146 | 205 |
| | | | | | Ideal Burn down | | | | | | 190 | 176 | 161 | 146 | 132 | 117 | 103 | 88 | 73 | 59 | 44 | 29 | 15 | 0 |
| | | | | | Ideal Burn up | | | | | | 0 | 15 | 29 | 44 | 59 | 73 | 88 | 103 | 117 | 132 | 146 | 161 | 176 | 190 |

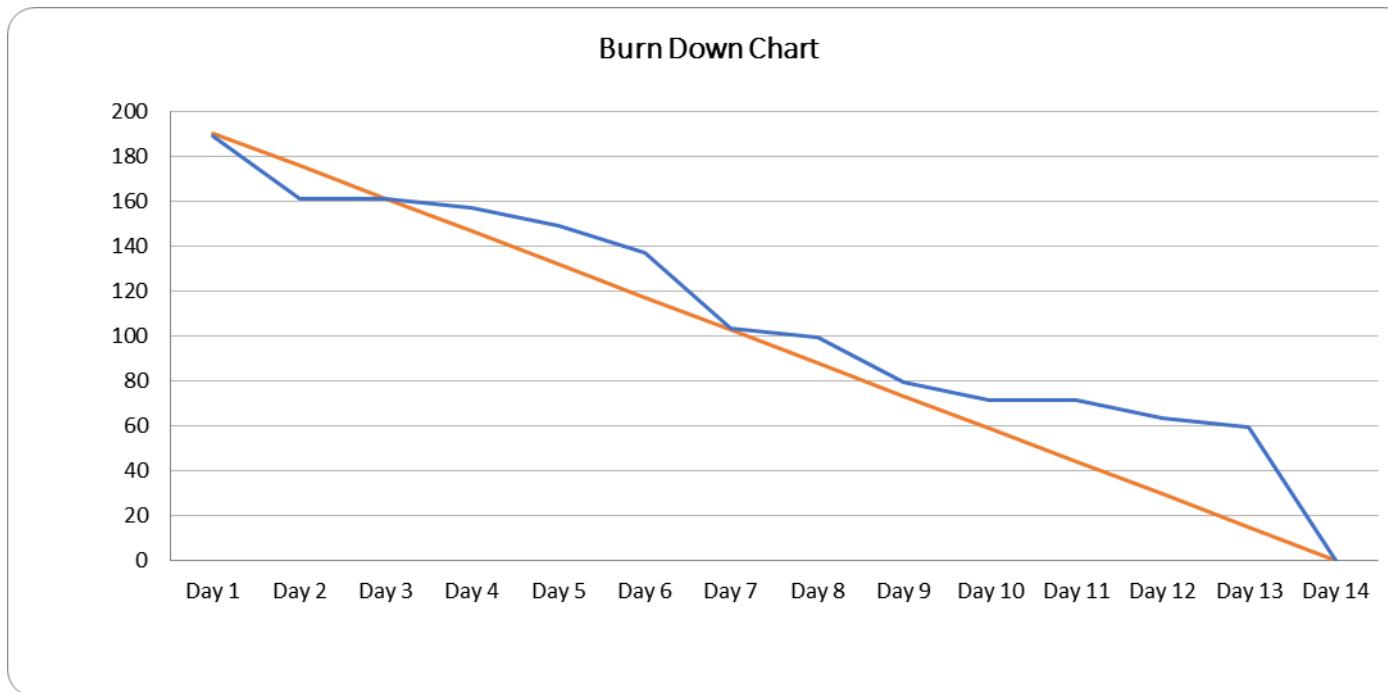


Figure 7. Sprint 4 Burn Down Chart

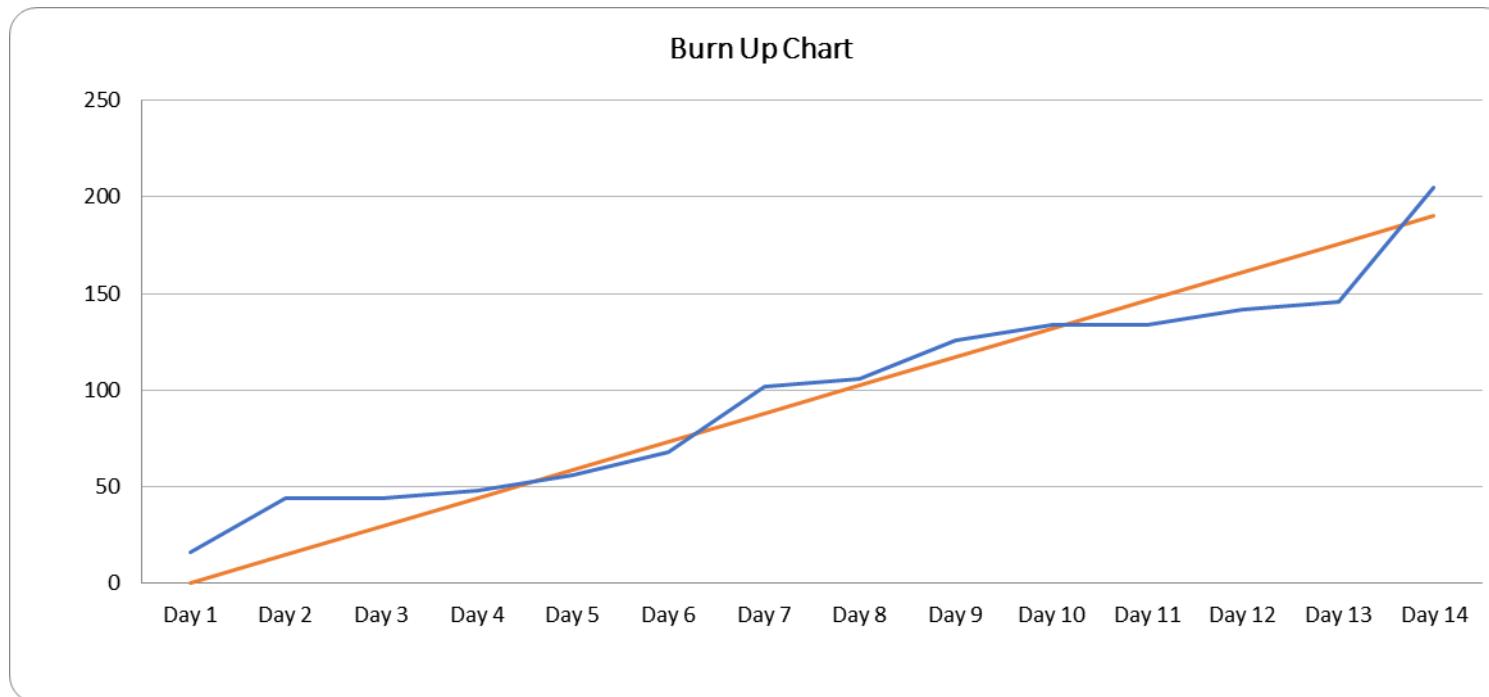


Figure 8. Sprint 4 Burn Up Chart

2.6. Sprint 5

Table 7. Sprint 5

| Sprint Id | Backlog Id | Description | Owner | Status | Estimate (Hours) | Completed | Pending | Total effort | Effort vs. Estimate | Day 1 | Day 2 | Day 3 | Day 4 | Day 5 | Day 6 | Day 7 | Day 8 | Day 9 | Day 10 | Day 11 | Day 12 | Day 13 | Day 14 | |
|-----------|------------|--|-------|--------|------------------|-----------|---------|--------------|---------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|--------|--------|--------|--------|--------|-----|
| 5.1 | PB13 | [AI] Process Training Data | Huy | Done | 20 | 20 | 0 | 20 | 0 | | | | | | 20 | | | | | | | | | |
| 5.2 | PB13 | [AI] Train New Model | Huy | Done | 20 | 20 | 0 | 20 | 0 | | | | | | | | 20 | | | | | | | |
| 5.3 | PB13 | [AI] Write Pollution Detection API | Huy | Done | 12 | 12 | 0 | 10 | -2 | | | | | | | | | | | | 12 | | | |
| 5.4 | PB08 | [FE] Write Detection Pollution Function | Ca | Done | 8 | 8 | 0 | 8 | 0 | | | | | | | | | | | | | 8 | | |
| 5.5 | PB08 | [FE] Code Submit Survey With New Village Function | Ca | Done | 8 | 8 | 0 | 8 | 0 | | | | | | | | | | | | | | 8 | |
| 5.6 | PB08 | [FE] Add Scroll Up Button For All Page | Phuc | Done | 8 | 8 | 0 | 8 | 0 | | | | | | 8 | | | | | | | | | |
| 5.7 | PB02 | [FE] Redesign UX/UI Home Page For Mobile Application | Ca | Done | 8 | 8 | 0 | 8 | 0 | | | | | | 8 | | | | | | | | | |
| 5.8 | PB02 | [FE] Update UX/UI Home Page For Mobile Application | Ca | Done | 12 | 12 | 0 | 8 | -4 | | | | | | | 12 | | | | | | | | |
| 5.9 | PB08 | [DB] Crawl Craft Village Data (VILLAGE) | Trung | Done | 40 | 40 | 0 | 40 | 0 | | | | | | | | | | | | | | 40 | |
| 5.10 | PB08 | [FE] Update Location Base Function | Ca | Done | 8 | 8 | 0 | 7 | -1 | | | | | | | | | | | | | 8 | | |
| 5.11 | PB08 | [BE] Update Location Base API | Phuc | Done | 8 | 8 | 0 | 8 | 0 | | | | | | | | 8 | | | | 8 | | | |
| 5.12 | PB15 | [FE] Redesign UX/UI Household Page For Web Application | Trung | Done | 8 | 8 | 0 | 6 | -2 | | | | | | 8 | | | | | | | | | |
| 5.13 | PB15 | [FE] Update UX/UI Household Page For Web Application | Trung | Done | 8 | 8 | 0 | 8 | 0 | | | | | | | 8 | | | | | | | | |
| 5.14 | PB08 | [BE] Update Submit Survey API | Phuc | Done | 8 | 8 | 0 | 7 | -1 | | | | | | | | | | | | | 8 | | |
| 5.15 | PB09 | [FE] Redesign UX/UI Survey Page For Mobile Application (Personal User) | Ca | Done | 8 | 8 | 0 | 8 | 0 | | | | | | | | | | | | | 8 | | |
| 5.16 | PB09 | [FE] Update UX/UI Survey Page For Mobile Application (Personal User) | Ca | Done | 8 | 8 | 0 | 8 | 0 | | | | | | | | | | | | | 8 | | |
| 5.17 | PB11 | [FE] Update Change Language For Mobile Application | Ca | Done | 8 | 8 | 0 | 8 | 0 | | | | | | 8 | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | Total | 200 | 200 | 0 | 190 | -10 | 0 | 0 | 8 | 16 | 16 | 32 | 0 | 8 | 8 | 28 | 20 | 16 | 0 | 48 |
| | | | | | Burn down | | | | | | 200 | 200 | 192 | 176 | 160 | 128 | 128 | 120 | 112 | 84 | 64 | 48 | 48 | 0 |
| | | | | | Burn up | | | | | | 0 | 0 | 8 | 24 | 40 | 72 | 72 | 80 | 88 | 116 | 136 | 152 | 200 | |
| | | | | | Ideal Burn down | | | | | | 186 | 171 | 157 | 143 | 129 | 114 | 100 | 86 | 71 | 57 | 43 | 29 | 14 | 0 |
| | | | | | Ideal Burn up | | | | | | 0 | 14 | 29 | 43 | 57 | 71 | 86 | 100 | 114 | 129 | 143 | 157 | 171 | 186 |

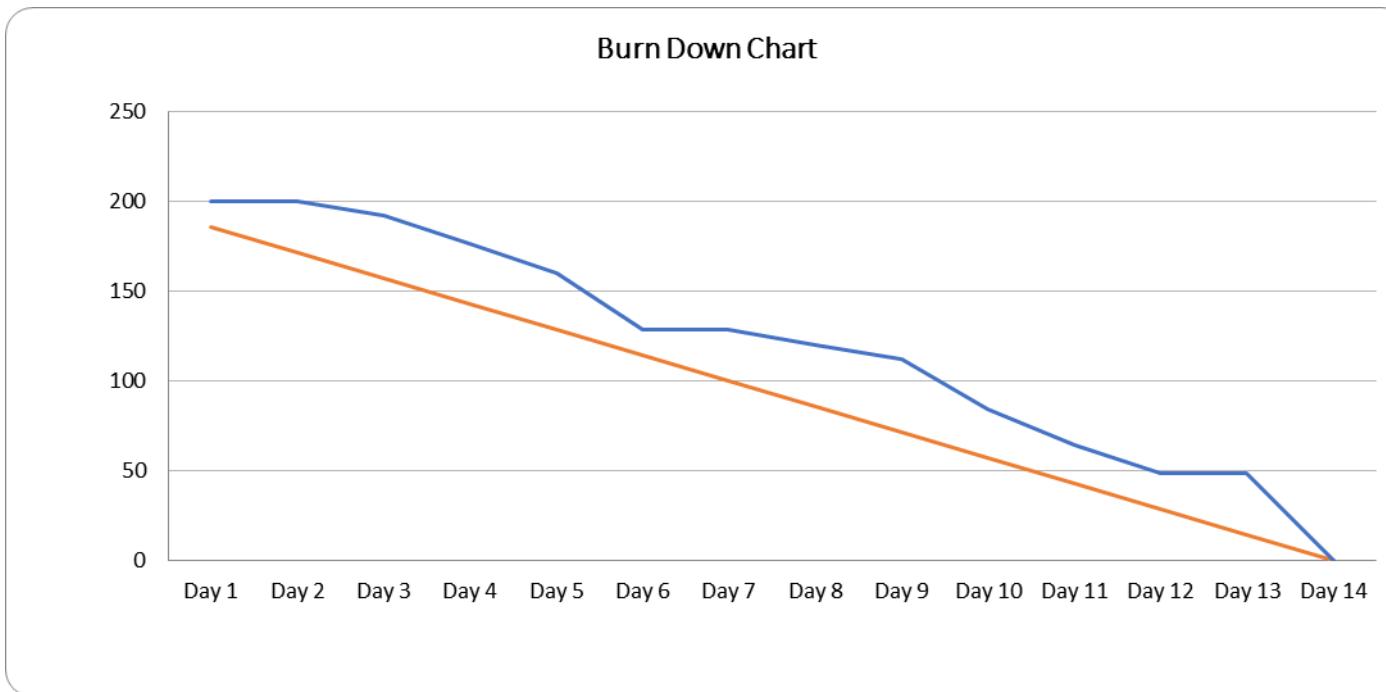


Figure 9. Sprint 5 Burn Down Chart

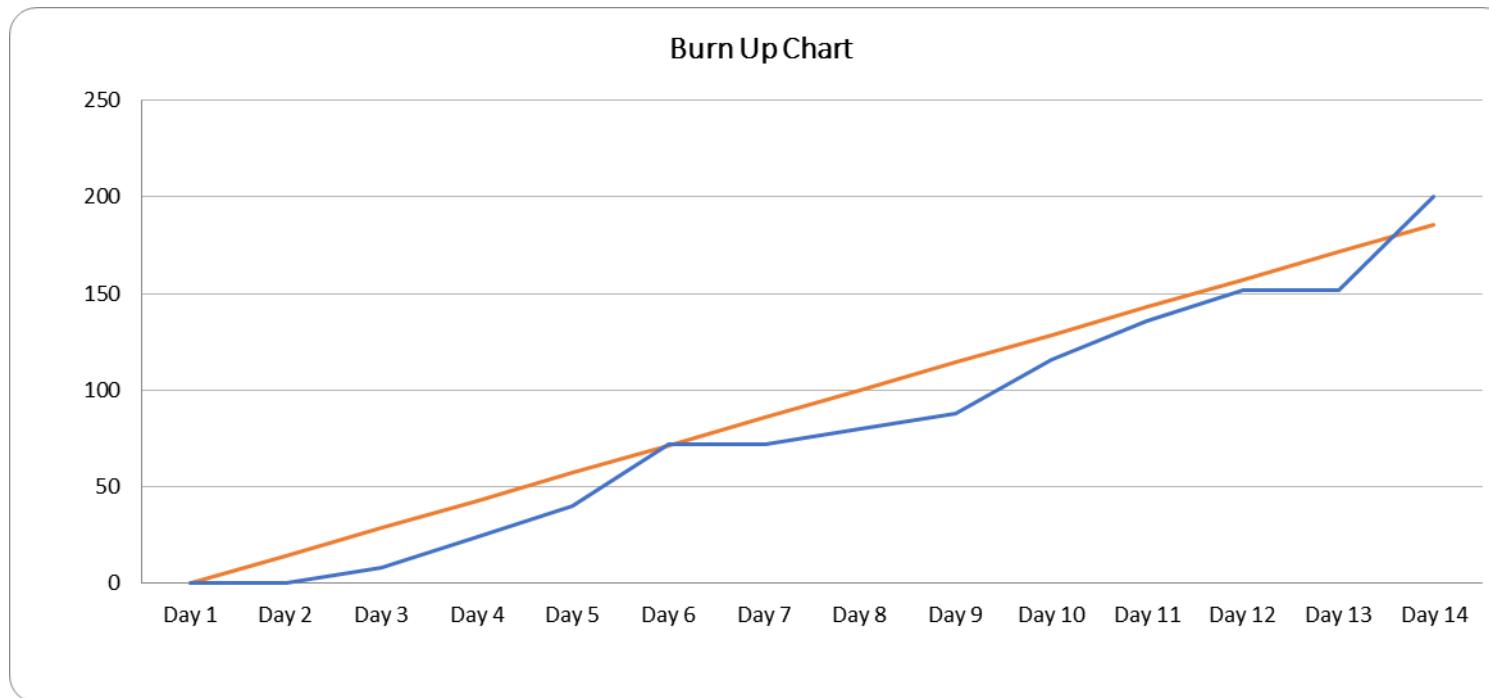


Figure 10. Sprint 5 Burn Up Chart

3. Impediments

Table 8. Impediments

| Id | Description | Raised By | Raised On | Owner | Status | Resolution | Resolved On |
|-----------|--|------------------|------------------|--------------|---------------|---|--------------------|
| 1 | I have a hardware problem when try to run the emulator for the project (Low on memory and storage) | Ca | 01/Sep/22 | Ca | Done | Buy hardware upgrade form the shop | 02/Sep/22 |
| 2 | My computer broke and I need two days for repair | Huy | 04/Sep/22 | Huy | Done | Bring the computer to the repair shop | 06/Sep/22 |
| 3 | I still haven't got the database software to work with | Trung | 03/Sep/22 | Phuc | Done | Use a remote software to help install the database software | 03/Sep/22 |
| 4 | I can't contact the group members immediately when I need to ask about problems in the project | Phuc | 09/Sep/22 | Ca | Done | Set up a meeting with the team and agree that we will have a daily meeting | 10/Sep/22 |
| 5 | I can't keep up with the daily meeting because I still have to go to school and the internship | Huy | 21/Sep/22 | Ca | Done | Set up a meeting with the team and agree that we will have a meeting every two or three days and the schedule will be set up in advance | 21/Sep/22 |
| 6 | I struggling to understand how to use the API and would like someone to help me out | Trung | 22/Sep/22 | Phuc | Done | The owner will set up a meeting with the member for support | 22/Sep/22 |

| | | | | | | | |
|---|--|----|-----------|----|------|-----------------------------------|-----------|
| 7 | I don't have an Android phone to test the mobile application | Ca | 15/Oct/22 | Ca | Done | Buy an Android phone for the shop | 17/Oct/22 |
|---|--|----|-----------|----|------|-----------------------------------|-----------|

4. Retrospective

Table 9. Retrospective

| Sprint # | Sprint # | Owner | Start Doing (Improvement) | Continue Doing (What Went Well) | Stop Doing (Even better if) | Remarks |
|----------|----------|-------|---|---|--|---------|
| 1 | 2 | Huy | | | Let daily meeting become discussions. Keep them short. | |
| 1 | 2 | Ca | | | Having conversations via email and not in the task. | |
| 1 | 2 | Phuc | | Attend meeting on time. | | |
| 2 | 3 | Huy | We completed the user stories we set out to do. | | | |
| 2 | 3 | Ca | | | We didn't finish all the user stories. | |
| 2 | 3 | Trung | We should start doing individual code reviews as we go. | | | |
| 2 | 3 | Phuc | | We should increase the amount we communicate as a team. | | |

| | | | | | | |
|---|---|-------|---|--|--|--|
| 3 | 4 | Ca | We were able to demo a working product to the mentor. | | | |
| 3 | 4 | Phuc | | We should continue having regular demos with the mentor. | | |
| 3 | 4 | Trung | Collect mentor feedback on new features. | | | |
| 3 | 4 | Huy | Going through the entire Bug log. | | | |
| 3 | 4 | Trung | | We should continue working as a team. | | |
| 3 | 4 | Phuc | Review stories with mentor before implementation. | | | |
| 4 | 5 | Trung | | Great teamwork. | | |



Capstone Project 1

CMU-CS450

Architecture Document
Version 1.1
Date: 17/10/2022

Craft Village Pollution Monitor System

Submitted by
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Huy, Bui Duc
Phuc, Hua Hoang
Trung, Nguyen Thanh

Approved by
Ph.D. Nguyen Thanh Binh

Proposal Review Panel Representative:

Name Signature Date

Capstone Project 1 - Mentor:

A handwritten signature in blue ink, appearing to read 'Nguyễn Thành Bình'.

Name Signature Date

PROJECT INFORMATION

| Project acronym | CVPMS | | |
|--|---|--|------------|
| Project Title | Craft Village Pollution Monitor System | | |
| Start Date | 22/08/2022 | End Date | 07/12/2022 |
| Lead Institution | International School, Duy Tan University | | |
| Project Mentor | Ph.D. Thanh Binh, Nguyen | | |
| Scrum master / Project Leader & contact details | Ca, Van Cong Le <i>Email:</i> cascabusiness@gmail.com <i>Tel:</i> 0352707895 | | |
| Partner Organization | | | |
| Project Web URL | https://github.com/Casca113s2/craft-village-pollution-monitor-system | | |
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DOCUMENT NAME

| | | | |
|-----------------------|-----------------------|------------------|---|
| Document Title | Architecture Document | | |
| Author(s) | Bui Duc Huy | | |
| Date | 17/10/2022 | File Name | C1SE.06_CVPMS_Architecture-Document_v1.1.docx |

REVISION HISTORY

| Version | Date | Comments | Author | Approval |
|---------|------------|--|-------------|---|
| 1.0 | 21/08/2022 | Initial Release | Bui Duc Huy |  |
| 1.1 | 17/10/2022 | Update C&C, Module View diagrams | Bui Duc Huy |  |

Approve Document: Sign in to approve the document

| | | | |
|---------------------|------------------------|------|---|
| Mentor | Binh, Nguyen Thanh | Date | 17/10/2022 |
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| Scrum Member | Huy, Bui Duc | Date | 17/10/2022 |
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| Scrum Member | Phuc, Hua Hoang | Date | 17/10/2022 |
| | | Sign |  |
| Scrum Member | Trung, Nguyen Thanh | Date | 17/10/2022 |
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1. Introduction

1.1. Purpose

This document will cover the following information:

- Brief description of the project (project overview, business goals, general constraints about technical and business problems).
- Architectural drivers (functional requirements, quality attributes and constraints).
- Architectural design (C&C View type, Module View type, Allocation View type).

1.2. Business needs

- Desiring to help people have more awareness of pollution from craft villages, a system that will allow people to submit data of craft village and keep track its pollution status.
- A system that will provide the user the abilities such as take a survey, include the image of the pollution, view survey history, etc.
- An AI system will also provide the application to analyze the pollution based on the user's provided image.
- The system should also give the administrator the ability to manage their user and data.

1.3. Proposed solution

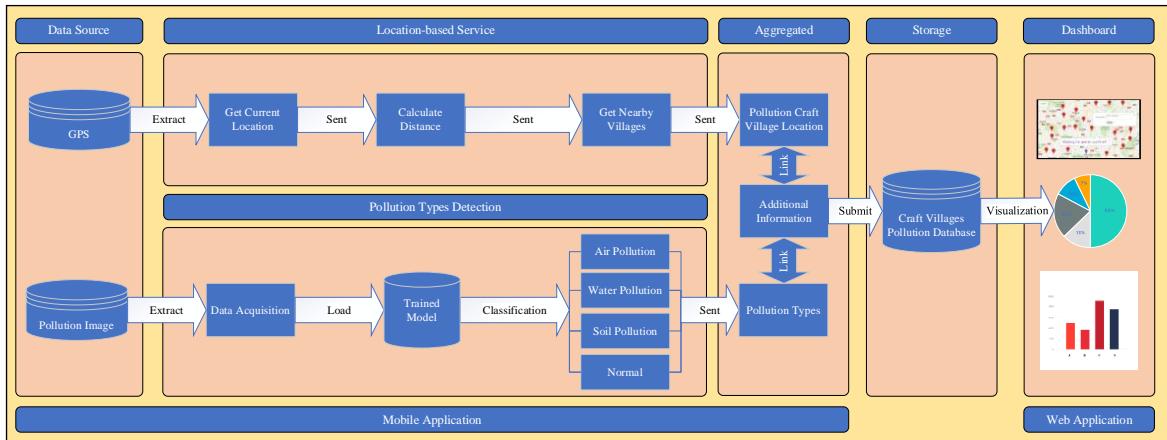


Figure 1. Craft Village Pollution Monitor System

Our team will wrap around the above problems and help everyone monitor and resolve the pollution problems from their craft village area more effectively. Some aspects that will make our system that the people will find much more effective:

- ❖ Our system will help everyone to monitor your local craft village despite where your location. This means whether you stay in a big city or a small village at the top of the mountain our system will still function.
- ❖ Our system will provide a function that lets people make an instant report to the local environment department.
- ❖ Our system will detect all kinds of pollution instead of focusing on some specific kinds. This will help to collect a variety of data that could help people to a bigger picture about their pollution levels in the area.
- ❖ Our system will have an AI that will take images from people then analyzes the image to know what kind of pollution the user is facing and the result will be automatically filled into the form which will be sent directly to the local environment department to resolve the problem. This is so easy to use that even an elementary school child can do and it also reduces a massive amount of the cumbersome and bureaucratic process that people have to go through.
- ❖ Our system is also integrated with location-based technology to detect the location of the pollution and layout the data on the map for the user to monitor.

1.4. Business drivers

Based on the business needs and business solution our team decides to make a Craft Village Pollution Monitor System.

1.5. Project goal

The goal of the project is to build a Craft Village Pollution Monitor System (CVPMS) within the budget of \$3000 and deliver on time by the end of December of 2022.

2. Architectural drivers

2.1. Functional requirements

Table 1. Functional requirements

| ID | Function | Description |
|------|---------------------------|--|
| FE01 | Login | Use username/password to login into the system, can use the function of the system. |
| FE02 | Register | Use to register a new account |
| FE03 | Forgot Password | Use to recover password |
| FE04 | Change Password | Use to change current password to new password |
| FE05 | Send Mail | Use to sent verify code or new password to registered email |
| FE06 | Edit User's Information | Use to change registered information |
| FE07 | Change Language | Use to change application language from English to Vietnamese and vice versa |
| FE08 | Take Pollution Photo | Use to take pollution photo |
| FE09 | Detect Location | Use to detect location of user automatically |
| FE10 | Auto Fill Information | Use to autofill necessary information after application detect pollution types from image and get location |
| FE11 | Add New Village | Use to add new village to database |
| FE12 | Detection Pollution Types | Use to auto detect pollution types from image |

| | | |
|------|--------------------------------|--|
| FE13 | Add Additional Information | Use to add additional information for the survey |
| FE14 | Submit Survey | Use to sent survey to database |
| FE15 | View Finished Survey | Use to load the finshied survey for user to review |
| FE16 | View In Progress Survey | Use to load the in progess survey for user to review |
| FE17 | Accept/Decline New Village | Use to give an accept/decline a new village |
| FE18 | Create Local Authority Account | Use to create a new local authority account |
| FE19 | Display Dashboard | Use to load necessary according to user role |

2.2. Business constraints

- ❖ Project begins from Aug 22nd, 2022 to Dec 07th, 2022. After delivery, the team will rectify defects in the deliverable (no additional functionalities or features).
- ❖ Resource availability is defined below: 22/08 – 07/12 with 4 members.
- ❖ Product follows Mentor's requirement.

2.3. Technical constraints

❖ Technical to develop

- Language: Java (Spring Boot), Dart (Flutter), Python (Flask, FastAI)
- Develop tool: Visual Studio Code, SpringToolSuite4
- Version Control System: Git/GitHub
- Database Management System: Oracle SQL Developer

❖ Environment

- Operation systems: Microsoft Windows, MacOS, Android, iOS

2.4. Quality Attribute

Table 2. *Quality Attributes: Availability*

| | |
|--------------------------|--|
| Scenario | A1 |
| Attribute concern | Downtime of system |
| Description | The operating time of the system should be 95% to have time for backup data, maintenance and repair. |
| Source | Internal to system |
| Stimulus | System pause |
| Artifact | System |
| Environment | The system works normally |
| Response | Be temporarily unavailable while backup data, maintenance and repair are being effected |
| Response Measure | Uptime of the system should be 95%, downtime is about 1.2 hours per day |

Table 3. *Quality Attributes: Performance*

| | |
|--------------------------|--|
| Scenario | P2 |
| Attribute concern | The latency of initiating transactions |
| Description | Users initiate transactions under normal operations. The system processes the transactions with latency less than 5 seconds. |
| Source | Users |
| Stimulus | Initiate transactions |
| Artifact | System |
| Environment | Under normal operations |
| Response | Transactions are processed |
| Response Measure | With latency less than 5 seconds |

Table 4. Quality Attributes: Performance

| | |
|--------------------------|--|
| Scenario | P3 |
| Attribute concern | The throughput of the system |
| Description | At peak load, the system is able to complete 100 normalized transactions per second. |
| Source | Internal to system |
| Stimulus | Multiple transactions at the same time |
| Artifact | System |
| Environment | Peak load |
| Response | Throughput |
| Response Measure | Throughput is 100 transactions per second |

Table 5. Quality Attributes: Usability

| | |
|--------------------------|--|
| Scenario | U4 |
| Attribute concern | Using effectively |
| Description | Craft Village Pollution Monitor can be easy for end-users to create a report after 10 minutes using. |
| Source | End-users |
| Stimulus | Create a report |
| Artifact | System |
| Environment | The system work normally |
| Response | Easy to use |
| Response Measure | Easy to use after 10 minutes using |

2.5. Context Diagram

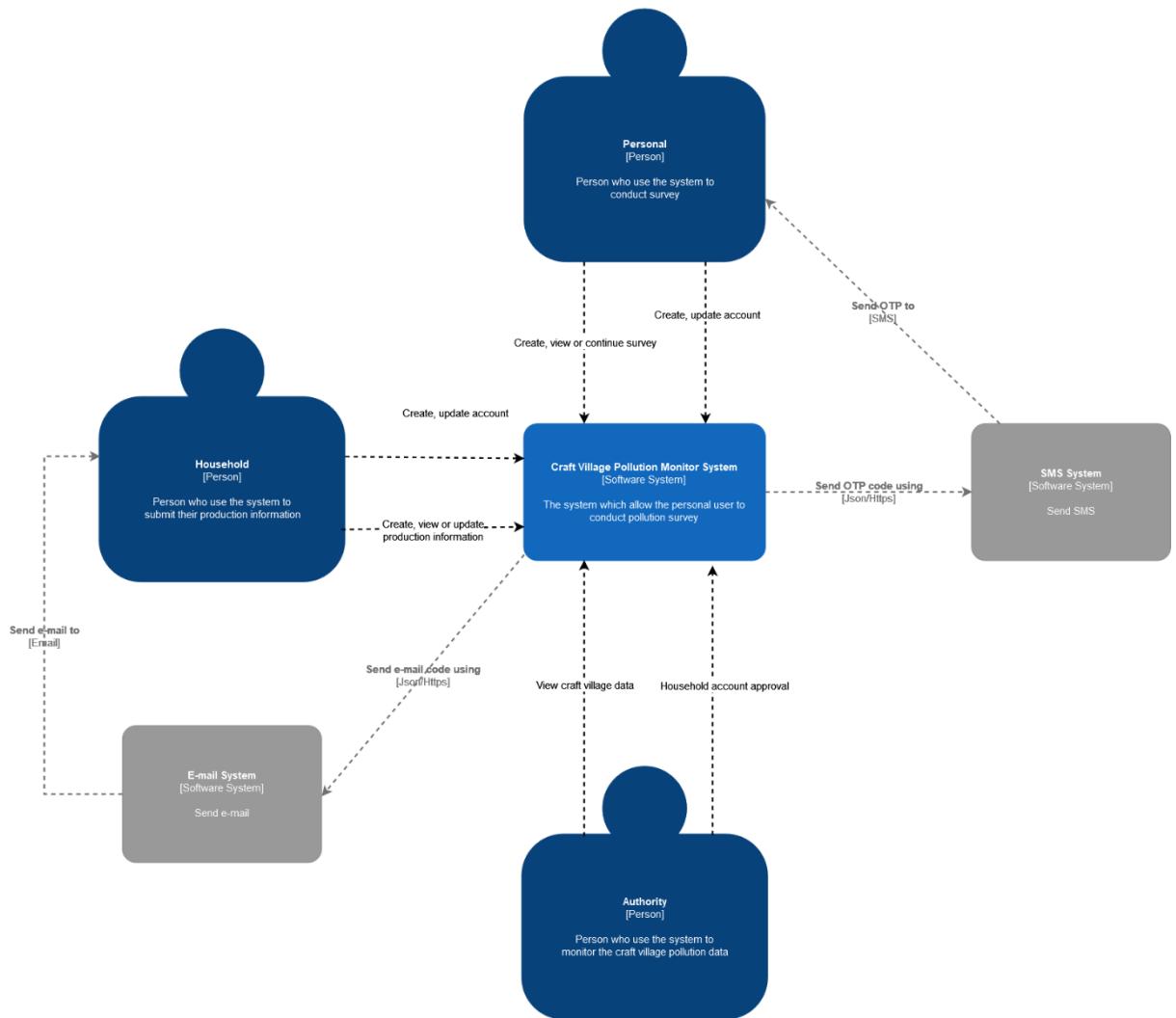


Figure 2. System Context Diagram Overview

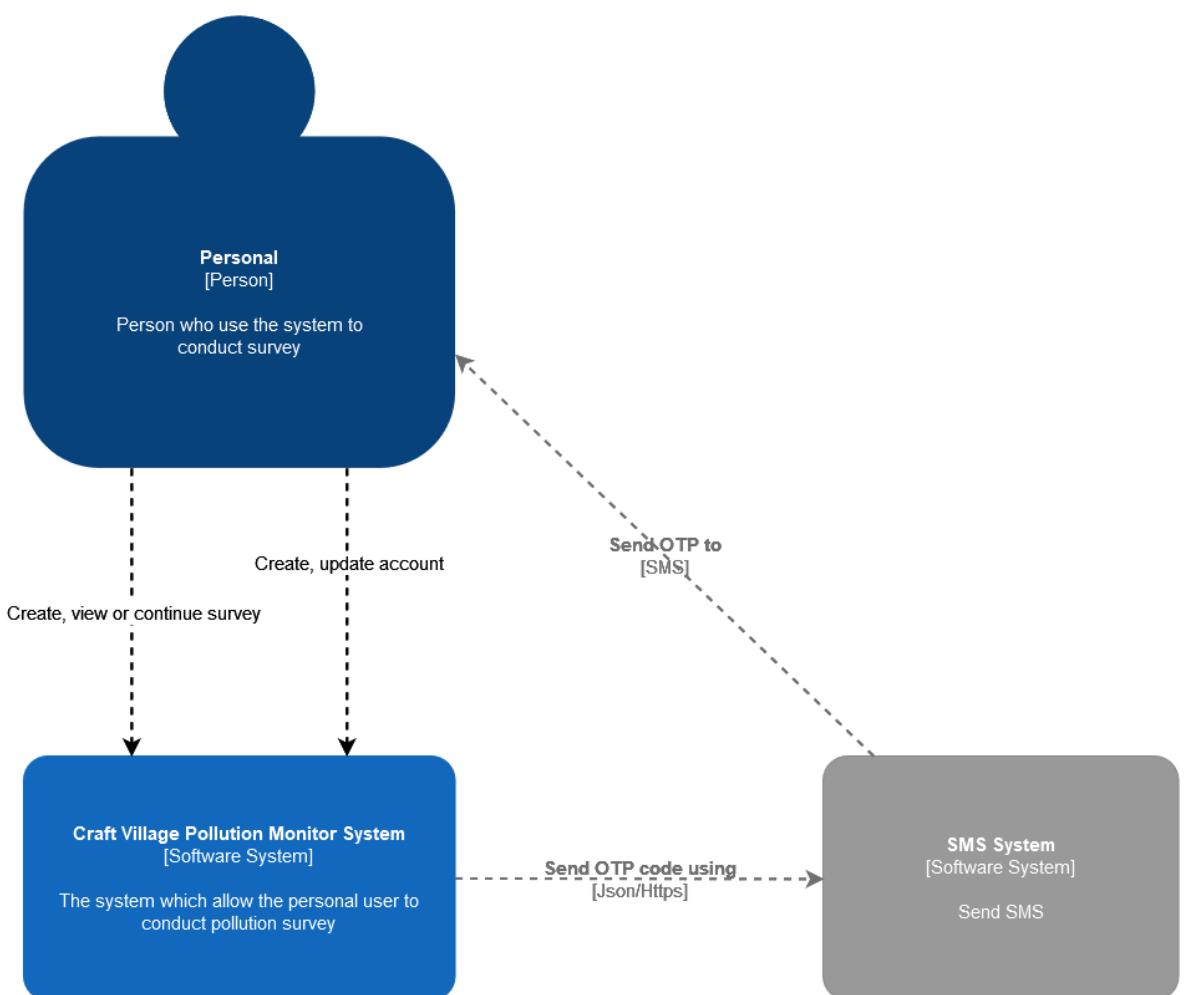


Figure 3. Personal System Context Diagram

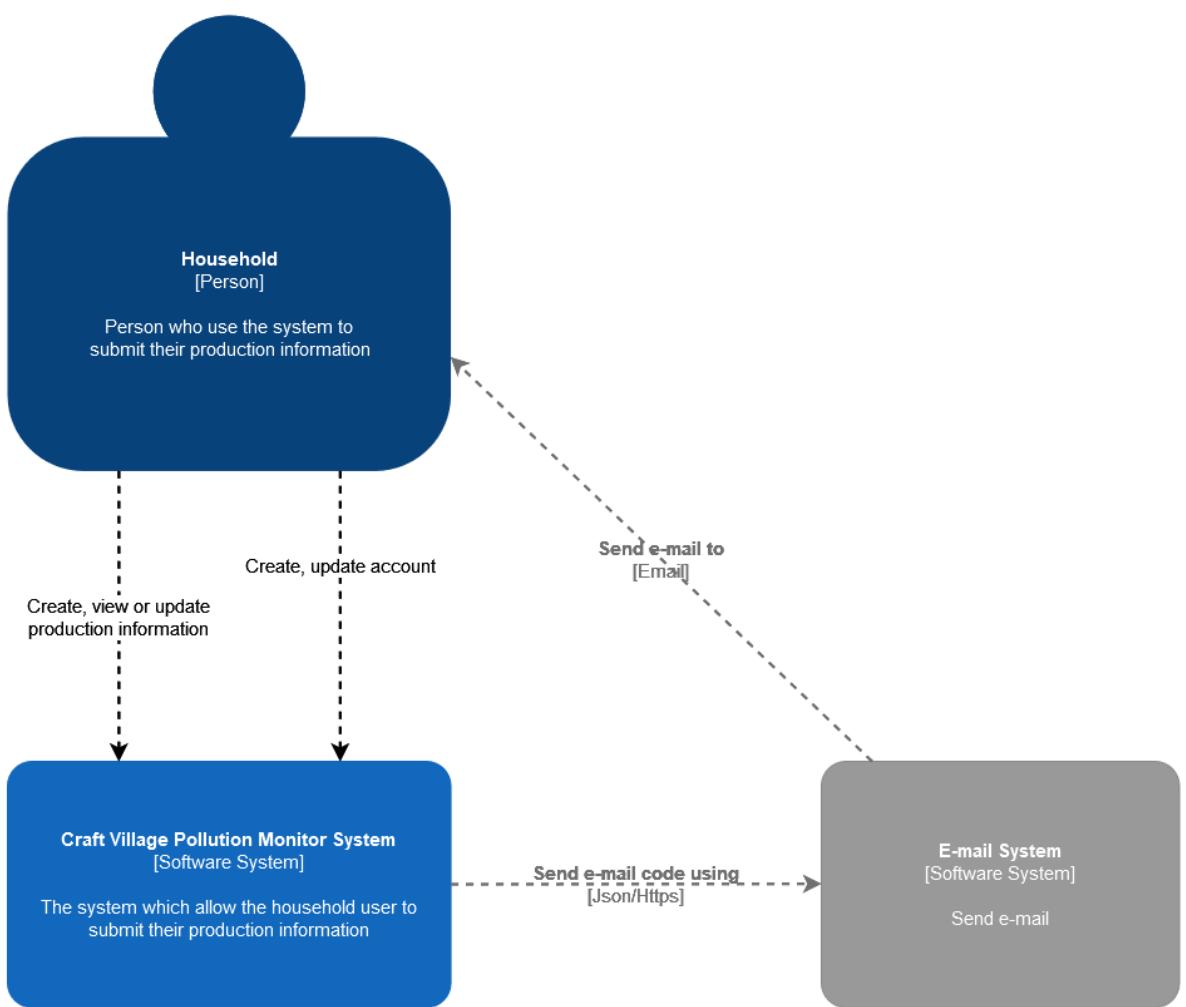


Figure 4. Household System Context Diagram

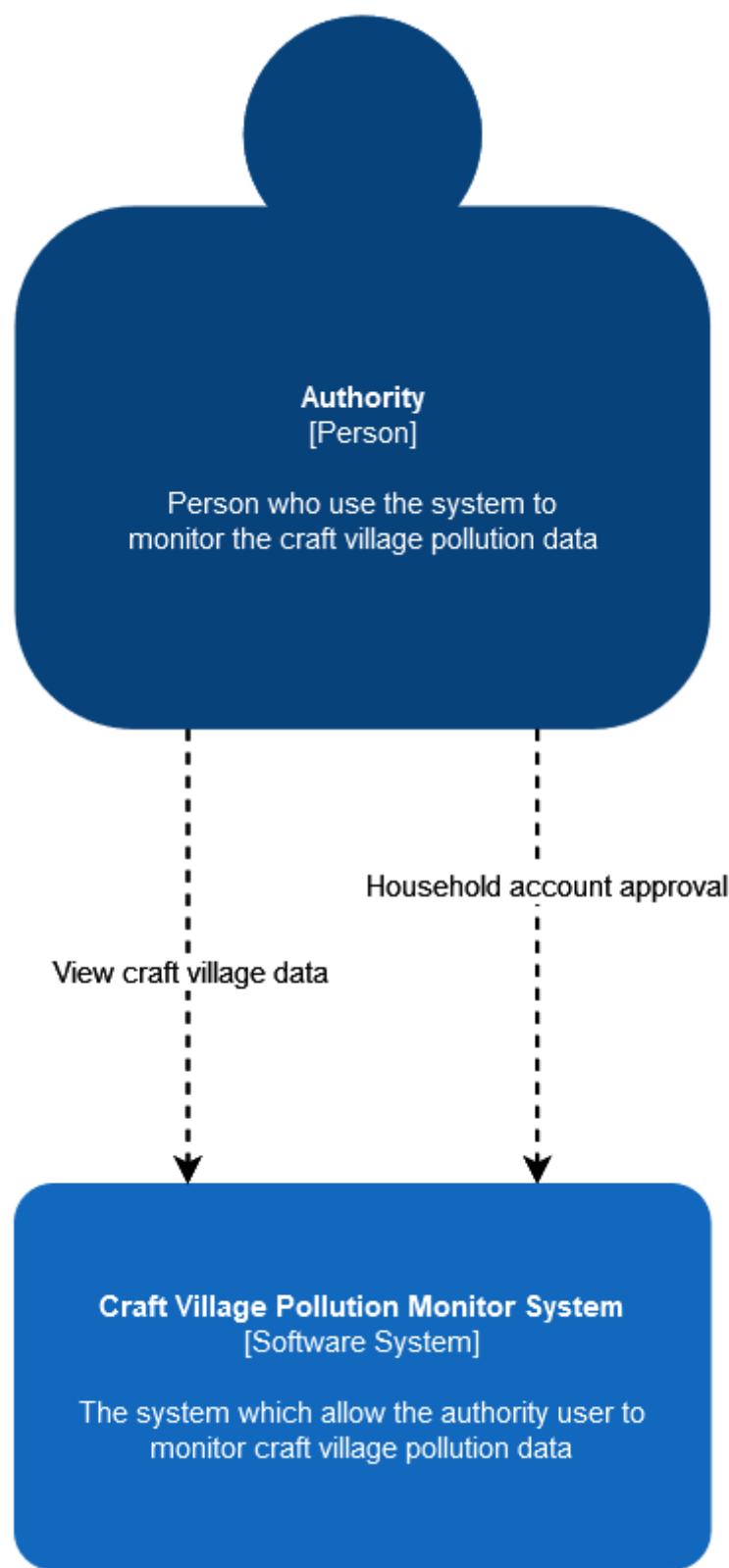


Figure 5. Authority System Context Diagram

Prose:

- ❖ The personal user, they can:
 - Create a new survey;
 - View previous survey;
 - Continue unfinished survey;
 - Create a new account using their personal phone number;
- ❖ The household, they can:
 - Submit their production information;
 - View previous submission
 - Update their production information
 - Create a new account using their personal email;
- ❖ The authority, they can:
 - View craft village's data (village production information, pollution status, etc);
 - Give an approval for new household account.

3. Activity Diagram

Activity diagram is a graphical representation of workflows of stepwise activities and actions with support for choice, iteration, and concurrency.

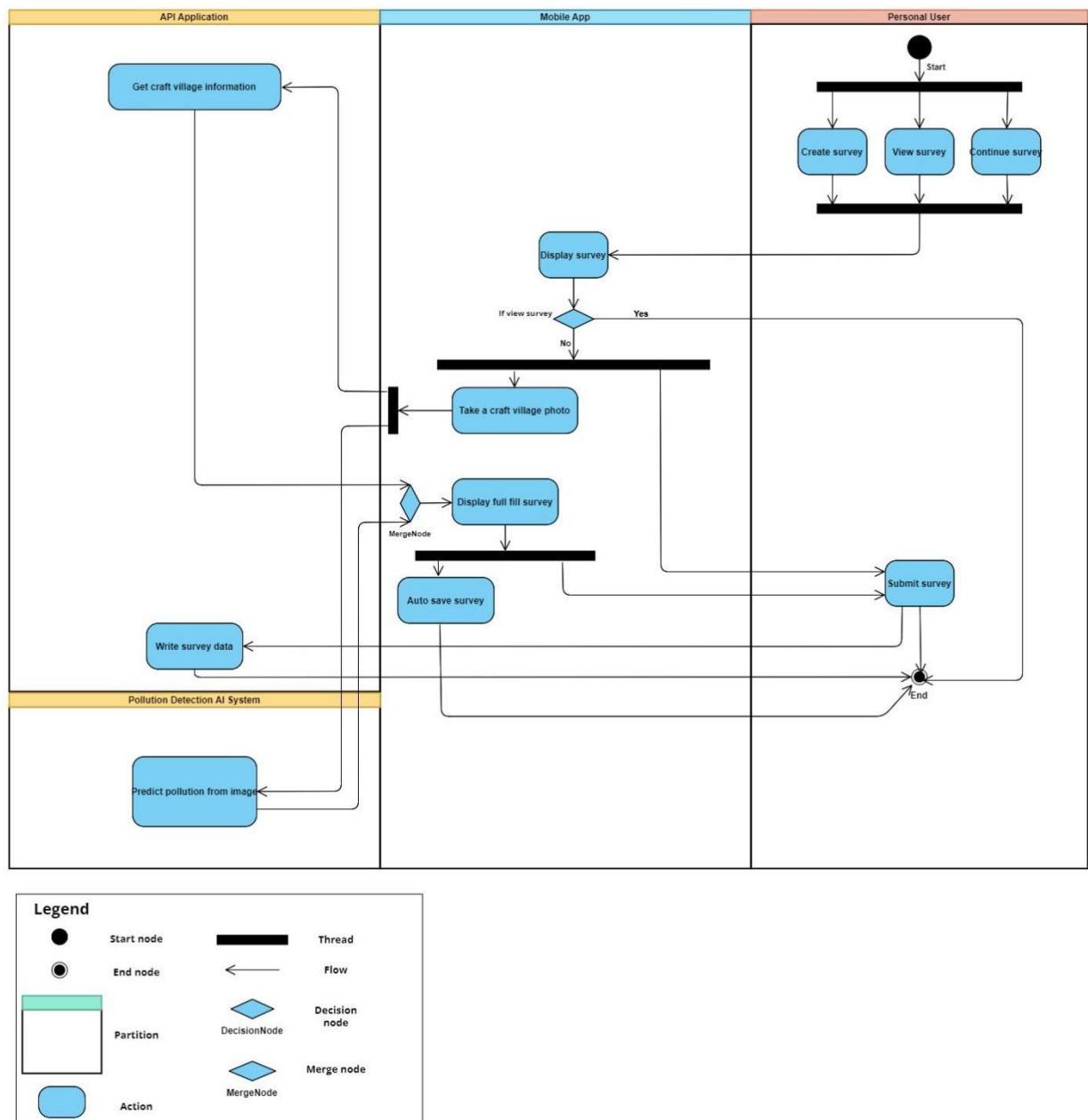
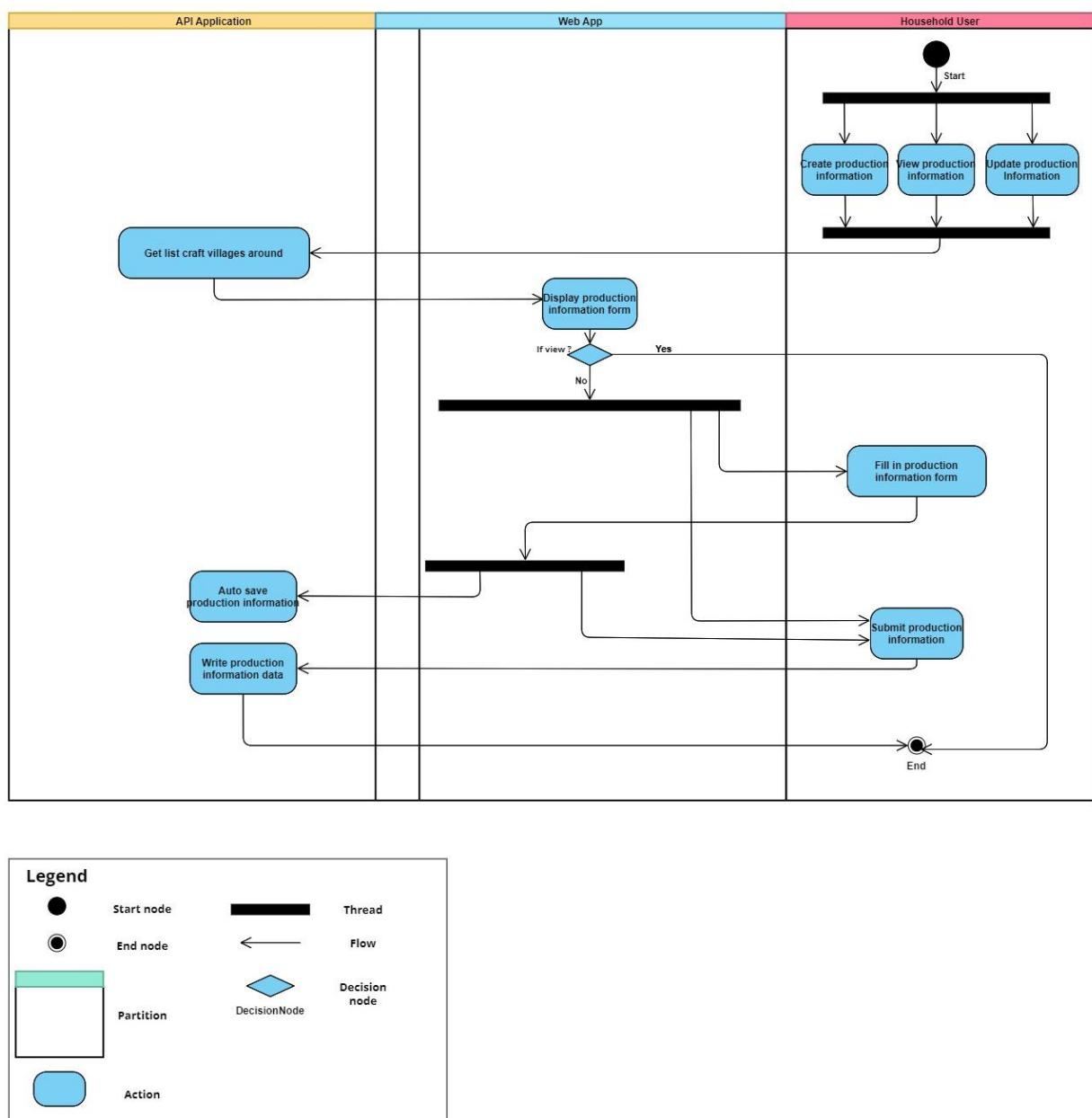
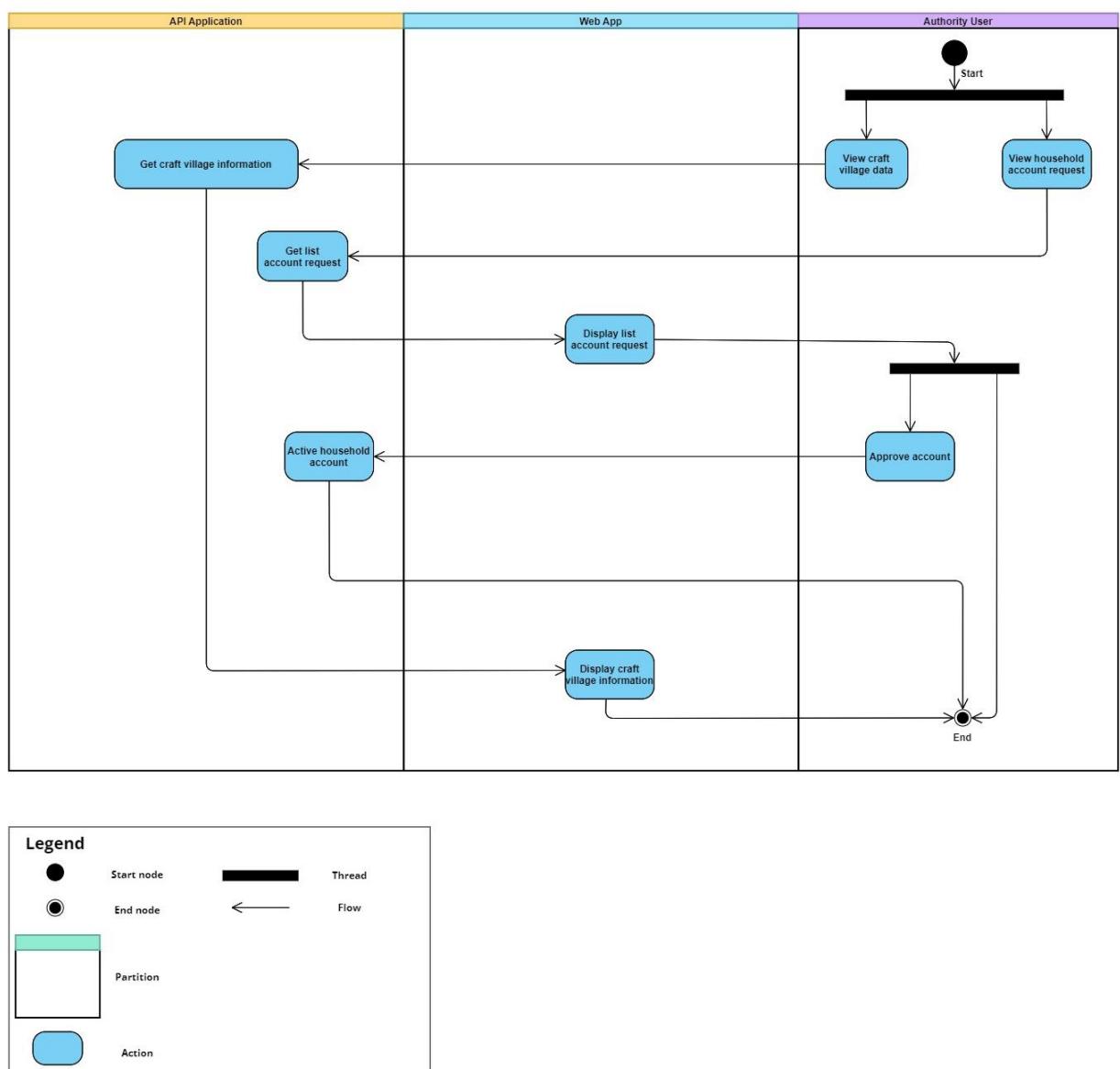


Figure 6. Activity Diagram (Personal)

**Figure 7. Activity Diagram (Household)**

**Figure 8. Activity Diagram (Authority)**

4. C&C view

The diagram below shows the overview architecture including components and other related components.

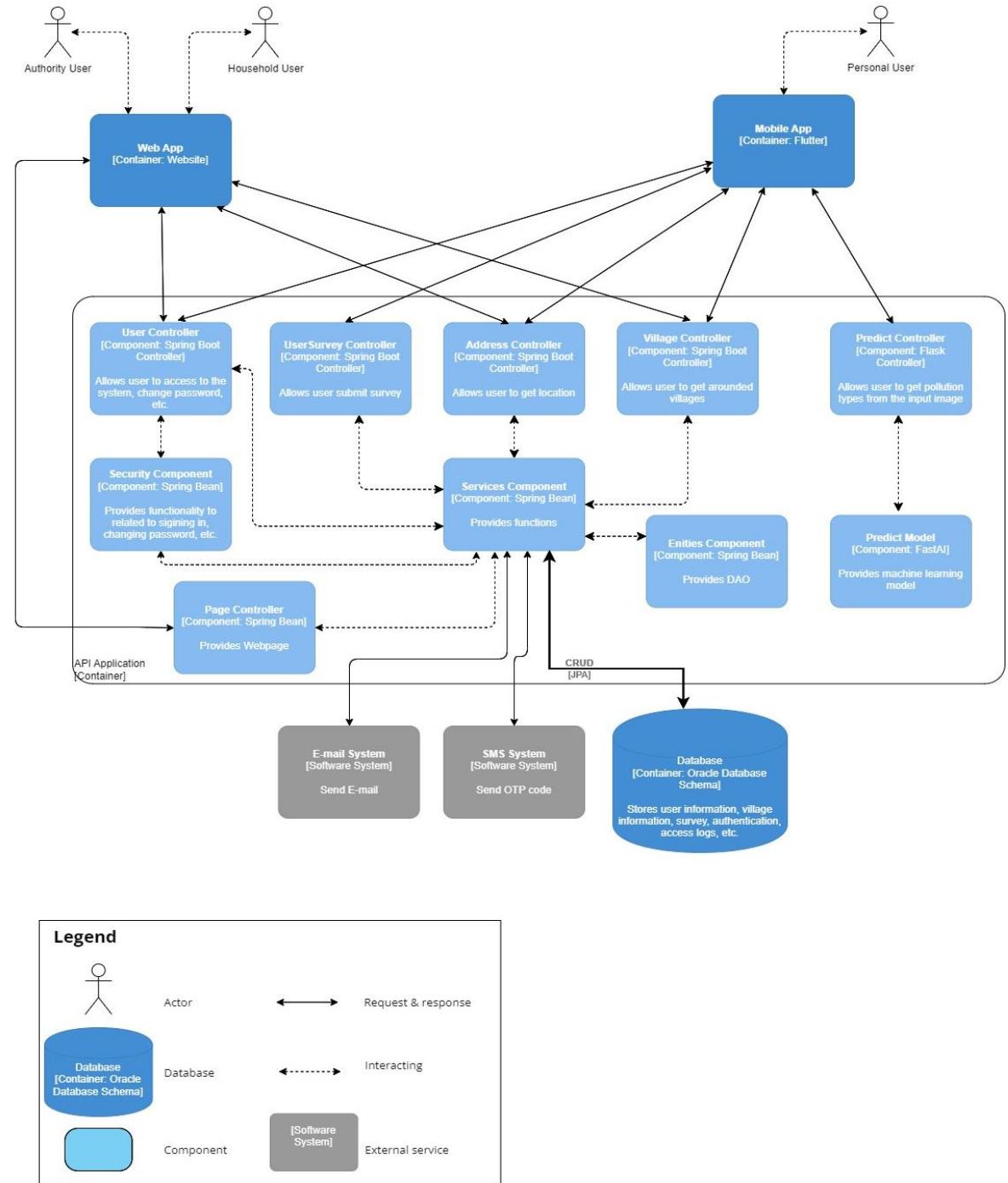


Figure 9. Component & connector view

5. Module View

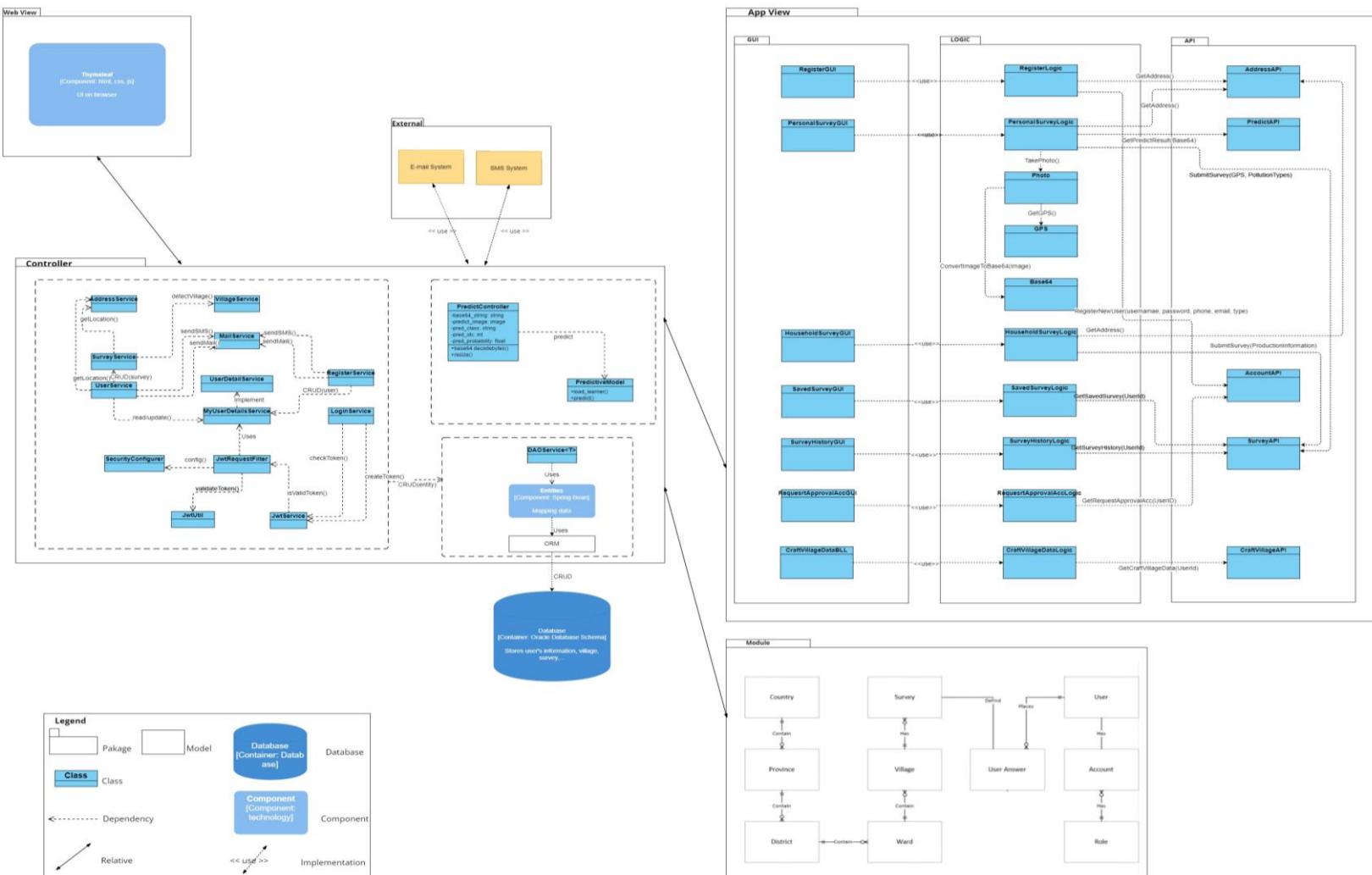


Figure 10. Module view

Prose:

- The CVPMS includes 5 packages and a database that helps the app run effectively.
- In the Web View package, we use Thymeleaf (Java template engine) to process and generate HTML, Javascript, and CSS.
- The App View package which has 22 classes are often used and we customize it to fit our requirements.
- The Controller package contains 16 classes, the Entities component, and the ORM model. The PredictController and the PredictiveModel are used to predict and return the types of pollution. We build a "bridge" between the software and relational databases using the ORM model and the Entities component.
- The Module package contains 10 models and the relation between them.
- In the External package, we use the E-mail System and the SMS System.
- Finally, the app is connected to the Oracle Database.

6. Allocation view

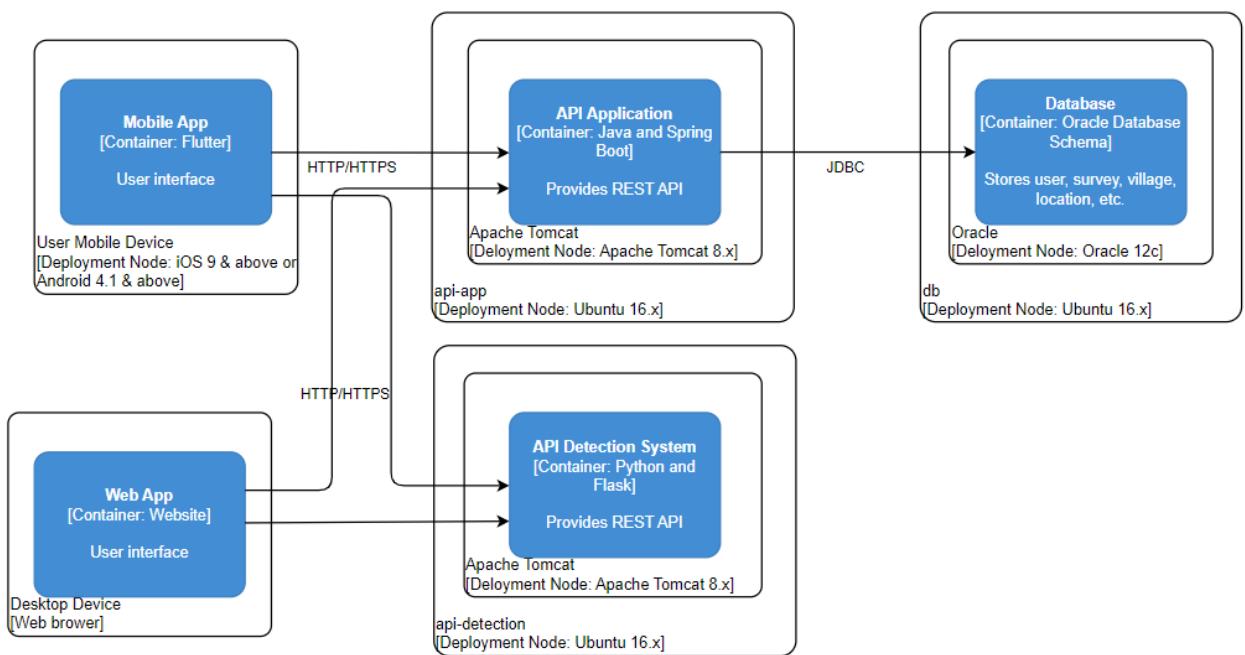
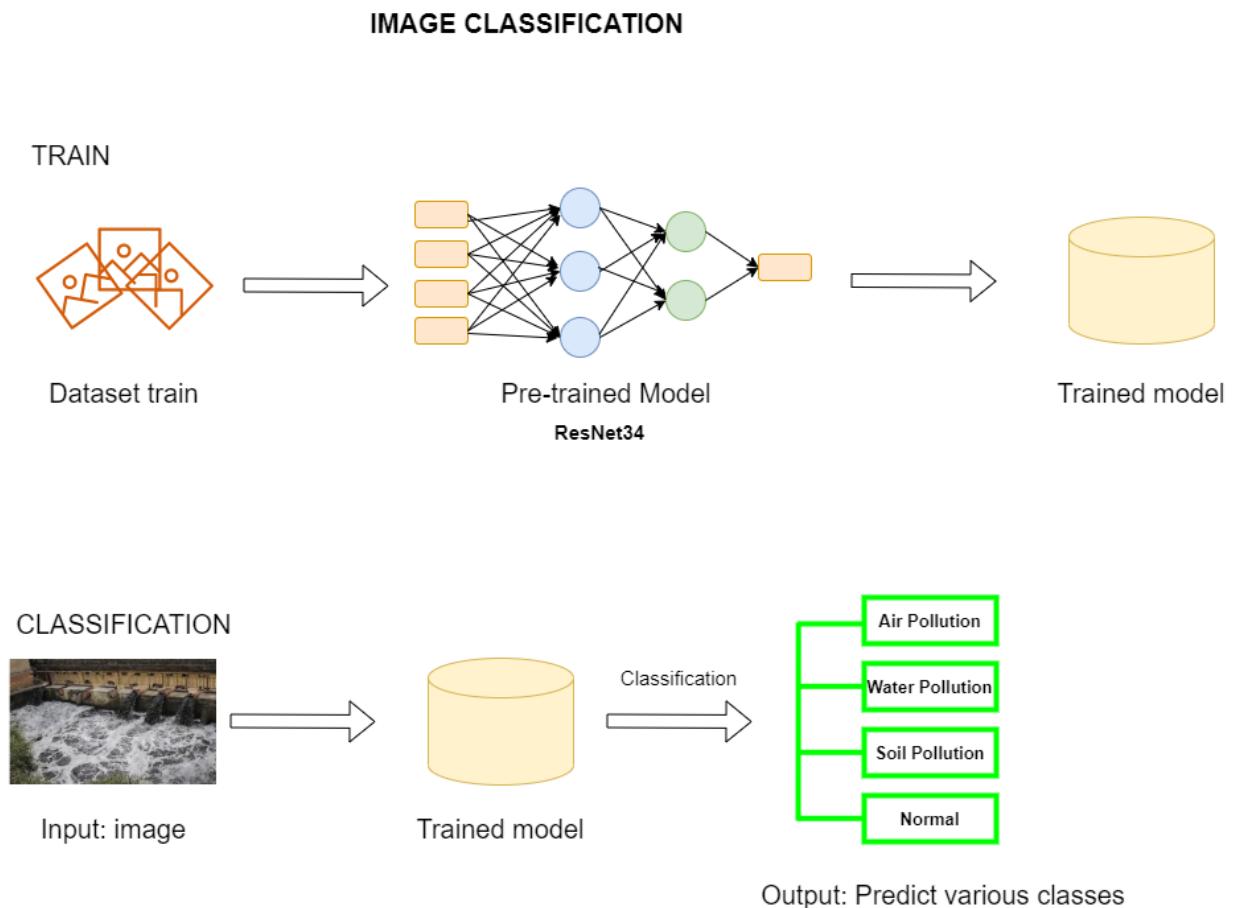


Figure 11. Allocation view

Prose:

The user can access our system by using Web App (Household User and Authority User) and Mobile App (Personal User) via internet.

7. Proposed architecture for Image Classification



Air Figure 12. Image Classification Architecture

Prose:

To train a machine learning model, we use the dataset and the Pre-trained Model (ResNet34). From an input image, the trained model can predict various pollution classes.

8. References

| No. | References | Document Information |
|-----|--------------------------------------|---|
| 1 | Design standards, Document standards | https://www.softwarearchitecturebook.com/svn/main/slides/ppt/26_Standards.ppt |
| | | https://standards.ieee.org/standard/1471-2000.html |
| | | https://c4model.com/ |
| 2 | Patterns | https://en.wikipedia.org/wiki/Architectural_pattern |
| 3 | Evaluation standards | https://www.iso.org/obp/ui/#iso:std:iso-iec-ieee:42030:ed-1:v1:en |
| | | https://gabrielfs7.github.io/software-architecture/2019/10/18/atam-analyze-evaluate-architecture/ |
| 4 | Draw.io | https://www.draw.io |
| 5 | Visual Paradigm Online | https://online.visual-paradigm.com/ |



Capstone Project 1

CMU-CS450

Database Design Document
Version 1.2
Date: 20/10/2022

Craft Village Pollution Monitor System

Submitted by
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Huy, Bui Duc
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Approved by
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Proposal Review Panel Representative:

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PROJECT INFORMATION

| Project acronym | CVPMS | | |
|--|---|--|------------|
| Project Title | Craft Village Pollution Monitor System | | |
| Start Date | 22/08/2022 | End Date | 07/12/2022 |
| Lead Institution | International School, Duy Tan University | | |
| Project Mentor | Ph.D. Thanh Binh, Nguyen | | |
| Scrum master / Project Leader & contact details | Ca, Van Cong Le <i>Email:</i> cascabusiness@gmail.com <i>Tel:</i> 0352707895 | | |
| Partner Organization | | | |
| Project Web URL | https://github.com/Casca113s2/craft-village-pollution-monitor-system | | |
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DOCUMENT NAME

| | | | |
|-----------------------|--------------------------|------------------|--|
| Document Title | Database Design Document | | |
| Author(s) | Hua Hoang Phuc | | |
| Date | 20/10/2022 | File Name | C1SE.06_CVPMS_Database-Design-Document_v1.2.docx |

REVISION HISTORY

| Version | Date | Comments | Author | Approval |
|----------------|-------------|--------------------------|----------------|---|
| 1.0 | 18/09/2022 | Create location entities | Hua Hoang Phuc |  |
| 1.1 | 02/10/2022 | Create user system | Hua Hoang Phuc |  |
| 1.2 | 20/10/2022 | Create survey system | Hua Hoang Phuc |  |

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1. Introduction

1.1. Purpose

Place information system's database design document describes structure of database and file structure of system. Database Design document will introduce all attribute the System that will help developer and tester base on this design to implement and test.

1.2. Goal

To create database tables most accurate.

1.3. Scope

- ❖ This Database Design Document provides the basic for “Craft Village Pollution Monitor System” Database design.
- ❖ It defines the database that will support the “Craft Village Pollution Monitor System” Data Model.
- ❖ It describes both logical and physical definition, non-functional issues, and the database interfaces; storage aspects are defined in the physical database design sections.
- ❖ The following topics are covered in this document:
 - Assumptions and decisions on database design.
 - Entity-mapping.
 - Table column definitions.
 - Primary, unique and foreign key definitions.
 - Column and row level validation rules (check constraints).
 - Rule for populating specific columns (sequences, derivations, demoralized (column)).
 - Interfaces and dependencies with other components.
 - Data access description.
- ❖ The database design for “Craft Village Pollution Monitor System” is composed of definitions for database objects derived by mapping entities to tables attributes to columns, unique identifiers to unique keys and relationship to foreign keys.

- ❖ During design, these initial definitions are enhanced to support the functionality described in the functional specification/ user stories and defined in the primary and supporting modules of the application high level design.

1.4. Definitions, Acronyms and Abbreviations

Table 1. Definitions, Acronyms and Abbreviations

| Abbreviations | Description | Comment |
|---------------|-----------------------------|---|
| PK/FK | Primary/ Foreign Key | Use to indicate a file is a Primary or Foreign key in a table |
| ERD | Entity Relationship Diagram | Show the relationship between entities in the system |
| Auto | Auto increment | Auto increment |

2. Database Design For Sprint 1

2.1. Table Overview

Table 2. Table Overview Sprint 1

| No | Table name | Short Description |
|----|-------------|---|
| 1 | AD_COUNTRY | This table contains the information about countries. |
| 2 | AD_PROVINCE | This table contains the information about provinces |
| 3 | AD_DISTRICT | This table contains the information about districts |
| 4 | AD_WARD | This table contains the information about wards |
| 5 | VILLAGE | This table contains the information about craft villages. |

2.2. Entity Relationship Diagram

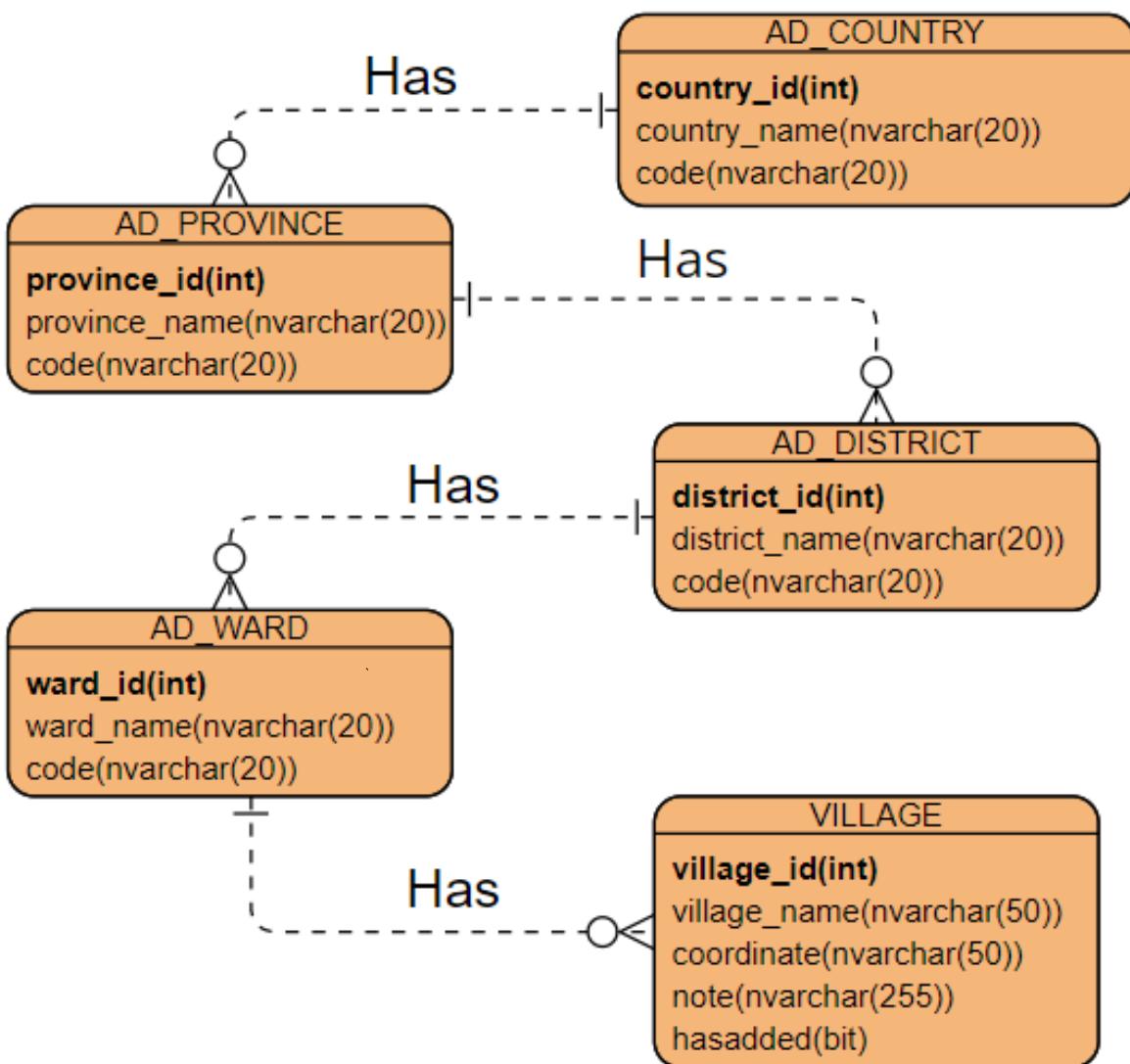


Figure 1. Entity Relationship Diagram Sprint 1

2.3. Table Relationship Diagram

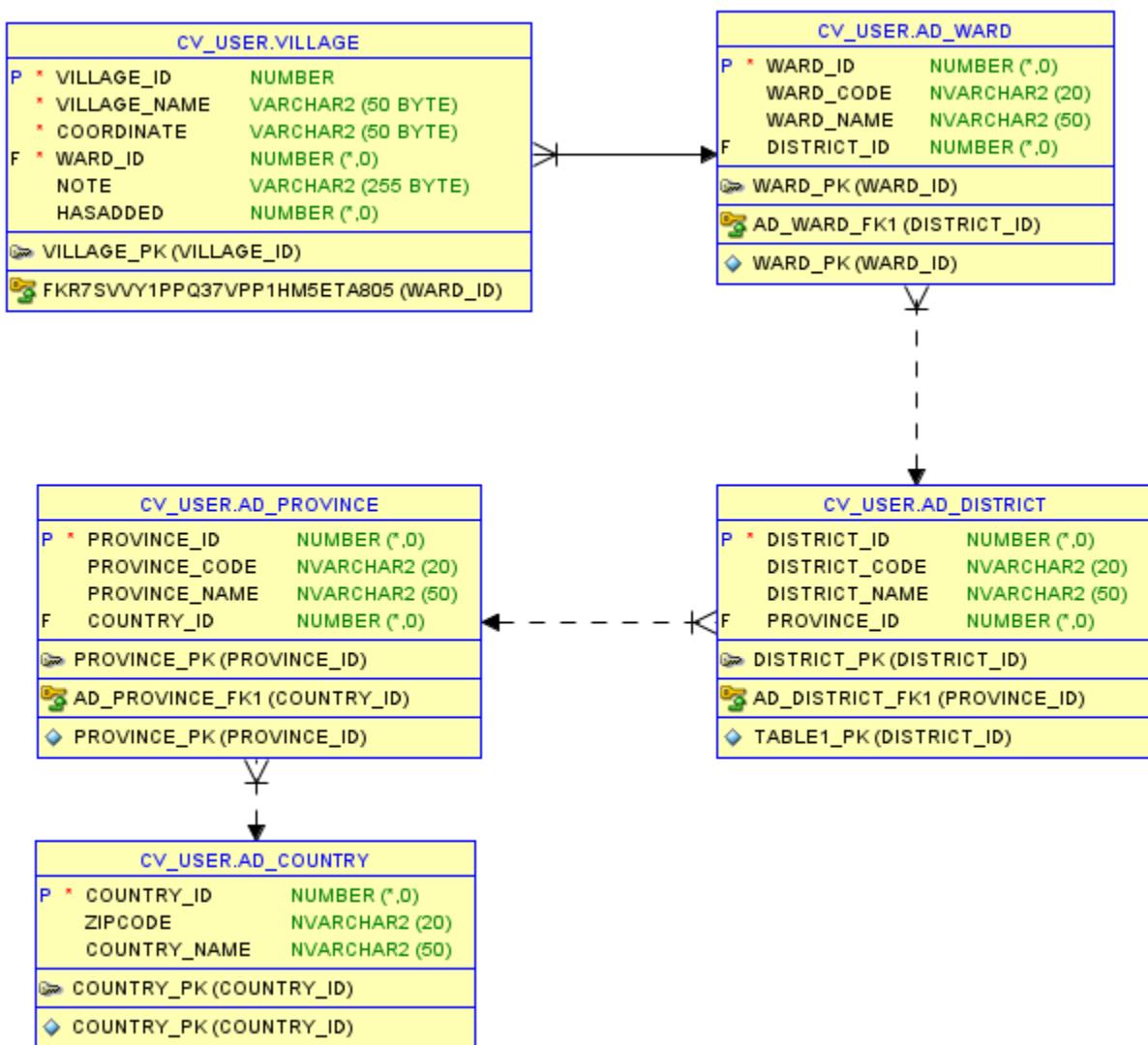


Figure 2. Table Relationship Diagram Sprint 1

2.4. Detail

2.4.1. AD_COUNTRY

Table 3. *AD_COUNTRY*

| Attributes | Datatype | Null | Key | Default | Extra |
|--------------|--------------|-------|-----|---------|-------|
| Country_id | int | Not | PK | | Auto |
| Country_name | nvarchar(50) | Not | | | |
| code | nvarchar(20) | Allow | | | |

2.4.2. AD_PROVINCE

Table 4. *AD_PROVINCE*

| Attributes | Datatype | Null | Key | Default | Extra |
|---------------|--------------|-------|-----|---------|-------|
| Province_id | int | Not | PK | | Auto |
| Province_name | nvarchar(50) | Not | | | |
| code | nvarchar(20) | Allow | | | |
| Country_id | int | Not | FK | | |

2.4.3. AD_DISTRICT

Table 5. *AD_DISTRICT*

| Attributes | Datatype | Null | Key | Default | Extra |
|---------------|--------------|-------|-----|---------|-------|
| District_id | int | Not | PK | | Auto |
| District_name | nvarchar(50) | Not | | | |
| Code | nvarchar(20) | Allow | | | |
| Province_id | int | Not | FK | | |

2.4.4. AD_WARD

Table 6. *AD_WARD*

| Attributes | Datatype | Null | Key | Default | Extra |
|-------------|--------------|-------|-----|---------|-------|
| ward_id | int | Not | PK | | Auto |
| ward_name | nvarchar(50) | Not | | | |
| Code | nvarchar(20) | Allow | | | |
| district_id | int | Not | FK | | |

2.4.5. VILLAGE

Table 7. VILLAGE

| Attributes | Datatype | Null | Key | Default | Extra |
|--------------|---------------|-------|-----|---------|-------|
| village_id | int | Not | PK | | Auto |
| village_name | nvarchar(50) | Not | | | |
| Coordinate | nvarchar(50) | Not | | | |
| Note | nvarchar(255) | Allow | | | |
| Hasadded | bit | Not | | 0 | |
| ward_id | int | Not | FK | | |

3. Database Design For Sprint 2

3.1. Table Overview

Table 8. Table Overview Sprint 2

| No | Table name | Short Description |
|----|------------|--|
| 1 | UR_USER | This table shows all information of user |
| 2 | UR_ROLE | This table contains the roles |
| 3 | USER_ROLE | This table shows the roles of users |
| 4 | UR_SESSION | This table saves the sessions |

3.2. Entity Relationship Diagram

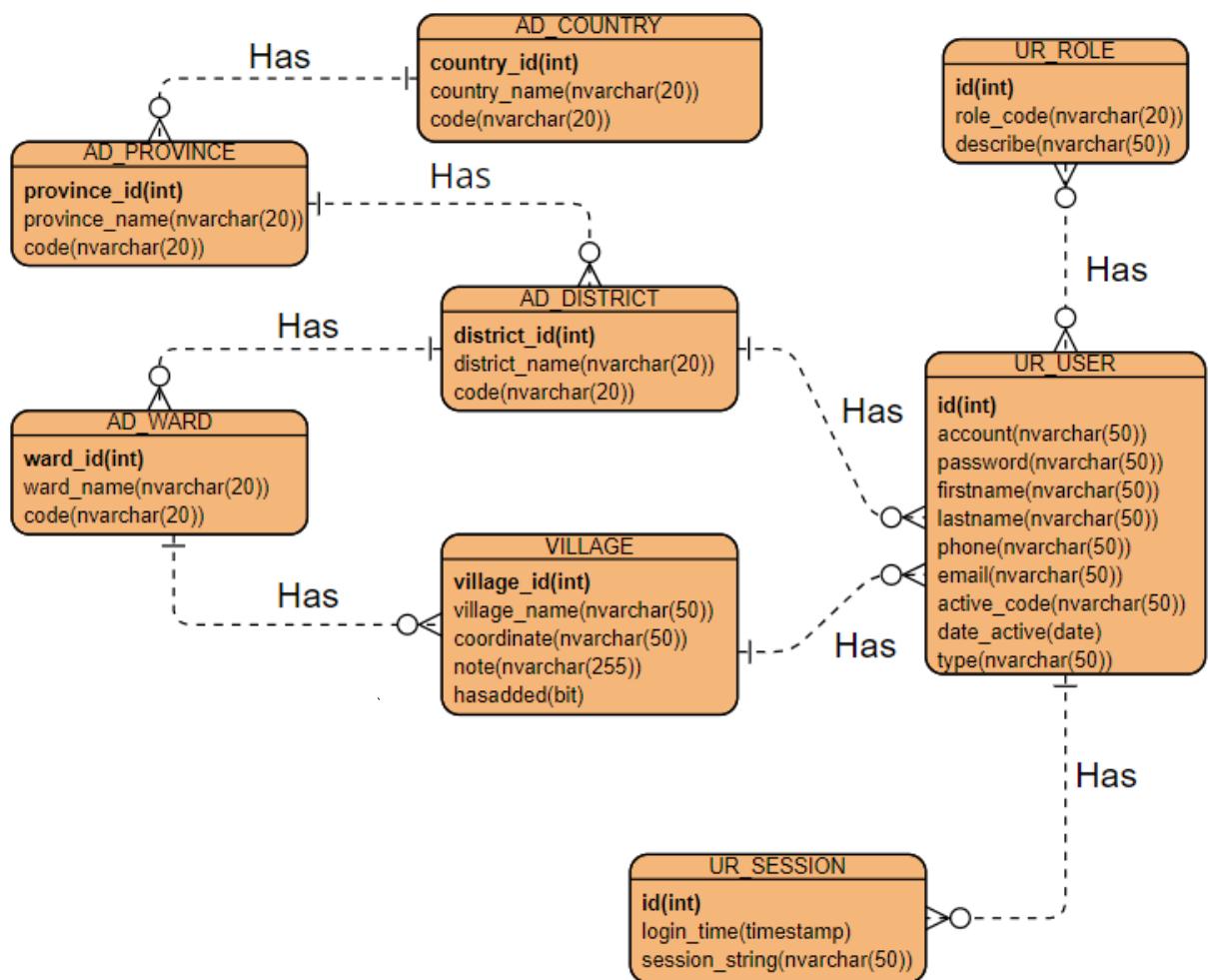


Figure 3. Entity Relationship Diagram Sprint 2

3.3. Table Relationship Diagram

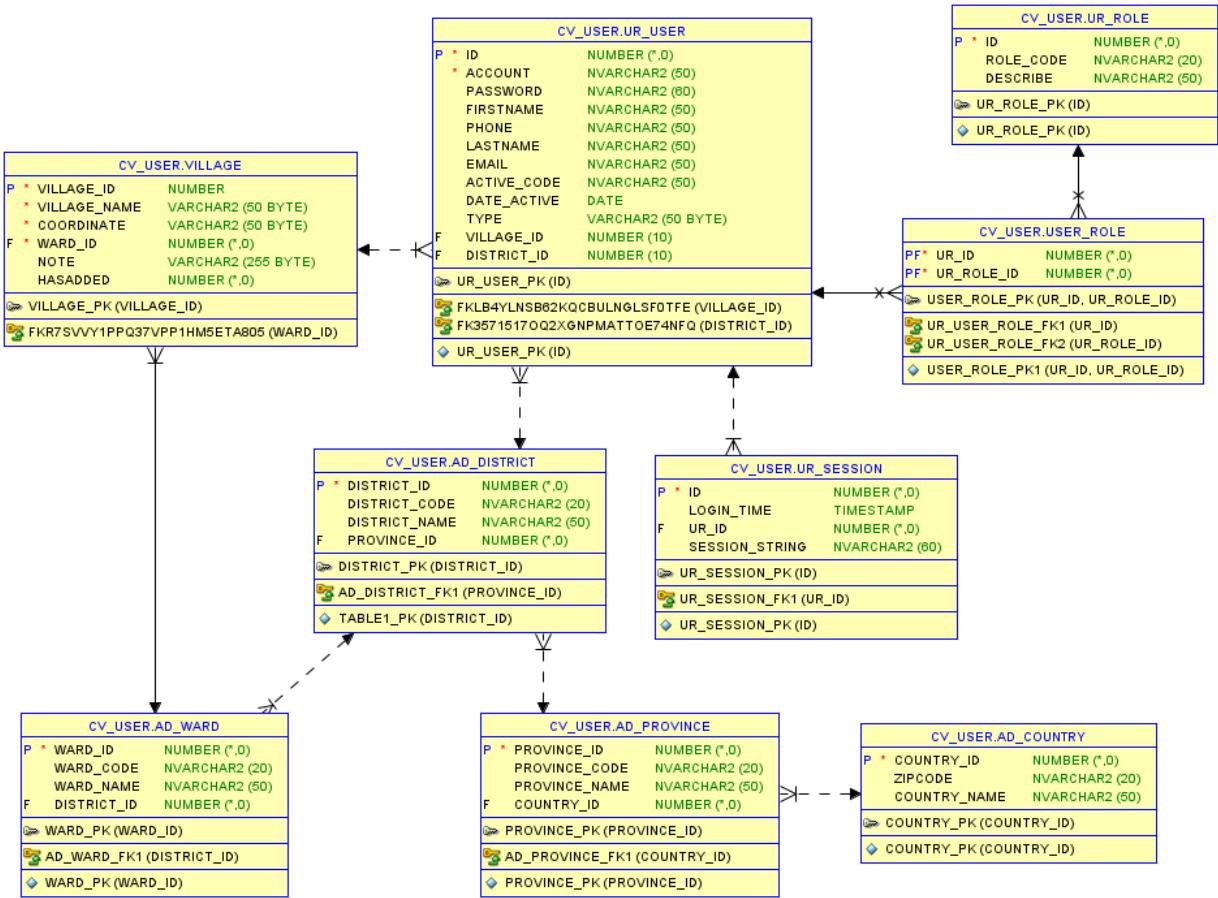


Figure 4. Table Relationship Diagram Sprint 2

3.4. Detail

3.4.1. UR_USER

Table 9. *UR_USER*

| Attributes | Datatype | Null | Key | Default | Extra |
|-------------|--------------|-------|-----|---------|-------|
| Id | int(11) | Not | PK | | Auto |
| Account | nvarchar(50) | Not | | | |
| password | nvarchar(50) | Not | | | |
| Firstname | nvarhcar(50) | Not | | | |
| Lastname | nvarchar(50) | Not | | | |
| Phone | nvarchar(50) | Not | | | |
| Active_code | nvarchar(50) | Not | | | |
| Date_active | timestamp | Not | | | |
| District_id | int | Allow | FK | | |
| Village_id | int | Allow | FK | | |

3.4.2. UR_ROLE

Table 10. *UR_ROLE*

| Attributes | Datatype | Null | Key | Default | Extra |
|------------|--------------|-------|-----|---------|-------|
| Id | int | Not | PK | | Auto |
| Role_code | nvarchar(20) | Not | | | |
| Describe | nvarchar(50) | Allow | | | |

3.4.3. USER_ROLE

Table 11. *USER_ROLE*

| Attributes | Datatype | Null | Key | Default | Extra |
|------------|----------|------|--------|---------|-------|
| Ur_id | int | Not | PK, FK | | |
| Ur_role_id | int | Not | PK, FK | | |

3.4.4. UR_SESSION

Table 12. *UR_SESSION*

| Attributes | Datatype | Null | Key | Default | Extra |
|----------------|--------------|------|-----|---------|-------|
| Id | int | Not | PK | | Auto |
| Login_time | timestamp | Not | | | |
| Session_string | nvarchar(50) | Not | | | |
| Ur_id | int | Not | FK | | |

4. Database Design For Sprint 3

4.1. Table Overview

Table 13. *Table Overview Sprint 3*

| No | Table name | Short Description |
|----|-------------|---|
| 1 | USER_SURVEY | This table saves surveys of personal user |

4.2. Entity Relationship Diagram

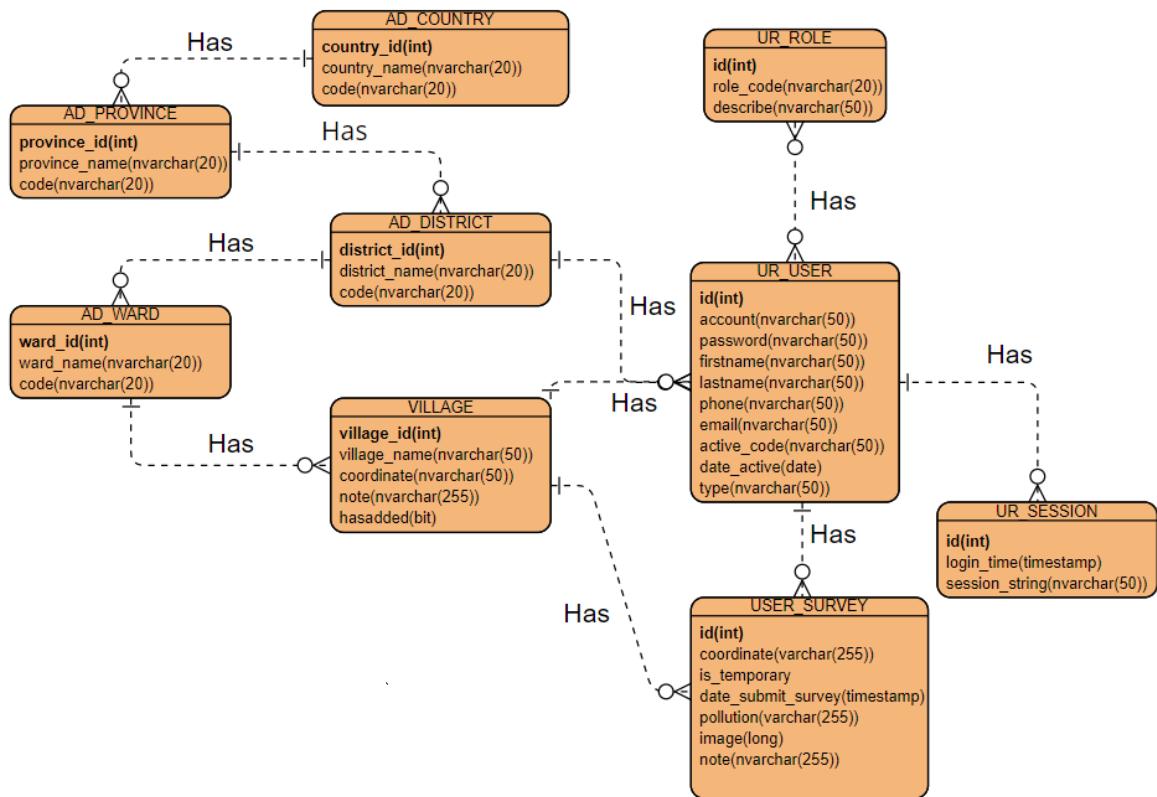


Figure 5. Entity Relationship Diagram Sprint 3

4.3. Table Relationship Diagram

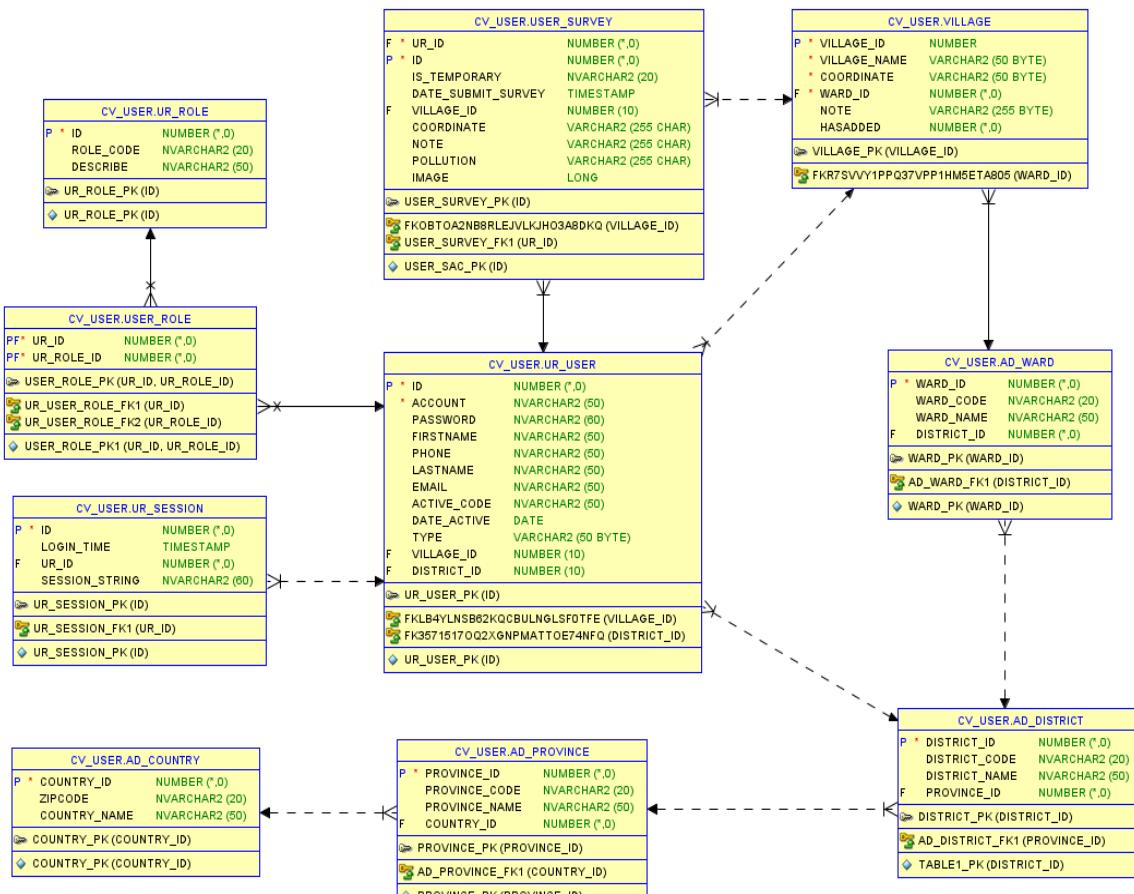


Figure 6. Table Relationship Diagram Sprint 3

4.4. Detail

4.4.1. USER_SURVEY

Table 14. USER_SURVEY

| Attributes | Datatype | Null | Key | Default | Extra |
|--------------------|---------------|-------|-----|---------|-------|
| Id | int | Not | PK | | Auto |
| Coordinate | varchar(255) | Not | | | |
| Is_temporary | nvarchar(20) | Not | | | |
| Date_submit_survey | timestamp | Not | | | |
| Pollution | varchar(255) | Not | | | |
| Note | nvarchar(255) | Allow | | | |
| Image | long | Not | | | |
| Village_id | int | Not | FK | | |
| Ur_id | int | Not | FK | | |



Capstone Project 1

CMU-CS450

User Interface Design Document

Version 1.3
Date: 08/11/2022

Craft Village Pollution Monitor System

Submitted by
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Huy, Bui Duc
Phuc, Hua Hoang
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Ph.D. Nguyen Thanh Binh

Proposal Review Panel Representative:

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PROJECT INFORMATION

| Project acronym | CVPMS | | |
|--|---|--|------------|
| Project Title | Craft Village Pollution Monitor System | | |
| Start Date | 22/08/2022 | End Date | 07/12/2022 |
| Lead Institution | International School, Duy Tan University | | |
| Project Mentor | Ph.D. Thanh Binh, Nguyen | | |
| Scrum master / Project Leader & contact details | Ca, Van Cong Le <i>Email:</i> cascabusiness@gmail.com <i>Tel:</i> 0352707895 | | |
| Partner Organization | | | |
| Project Web URL | https://github.com/Casca113s2/craft-village-pollution-monitor-system | | |
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DOCUMENT NAME

| | | | |
|-----------------------|--------------------------------|------------------|--|
| Document Title | User Interface Design Document | | |
| Author(s) | Nguyen Thanh Trung | | |
| Date | 08/11/2022 | File Name | C1SE.06_CVPMS_User-Interface-Design-Document_v1.3.docx |

REVISION HISTORY

| Version | Date | Comments | Author | Approval |
|----------------|-------------|---|--------------------|---|
| 1.0 | 18/09/2022 | Create Document | Nguyen Thanh Trung |  |
| 1.1 | 05/10/2022 | Update Document (Survey page) | Nguyen Thanh Trung |  |
| 1.2 | 22/10/2022 | Create survey system (Survey page, Register page) | Nguyen Thanh Trung |  |
| 1.3 | 08/11/2022 | Create survey system (Survey page, Homepage) | Nguyen Thanh Trung |  |

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1. Introduction

1.1. Purpose

- This document helps to better understand the interface of the Comment Scraper Tool, detailed specification components and function of the system.
- With this document, the development team can understand detail the structure and composition to create a consistent and complete system.

1.2. Scope

- Overview of the stages and modules of the system.
- Create complete interfaces and describe them clearly.

2. List of User Interface

2.1. Private User

Table 1. List of Private User User Interface

| User Interface ID | UI Name | Description |
|-------------------|--------------------------|--|
| Mobile | | |
| UI-01 | Login page | This is the login page of the User |
| UI-02 | Sign up page | This page for user account registration |
| UI-03 | Forget password page | This page to receive the password of the used account |
| UI-04 | Home page | This page shows the new survey creation function and the number of completed surveys |
| UI-05 | View all finished survey | This page to see all the surveys that users have taken |
| UI-06 | Sidebar | This page includes the function of view personal information, logout and change password |
| UI-07 | Change password page | This page to change the password for the account in use |

| | | |
|----------------|-------------------|---|
| UI-08 | Edit profile page | This page to change personal information |
| UI-09 | Survey Page | This page for users to take surveys |
| Website | | |
| UI-10 | Login Page | This is the login page of the User |
| UI-11 | Change Password | This page to change the password for the account in use |

2.2. Local Authority

Table 2. List of Local Authority User Interface

| User Interface ID | UI Name | Description |
|-------------------|---------------------------|---|
| UI-12 | Login | This is the login page of Local Authority |
| UI-13 | Change Password | This page to change the password for the account in use |
| UI-14 | Forget Password | This page to receive the password of the used account |
| UI-15 | Local Authority Home Page | This page to see statistics about craft villages |
| UI-16 | Village Management Page | This page allows local authorities to add, remove proposals or create new craft villages. |

2.3. Household

Table 3. List of Household User Interface

| User Interface ID | UI Name | Description |
|-------------------|-----------------|---|
| UI-17 | Login | This is the login page of Household |
| UI-18 | Change Password | This page to change the password for the account in use |
| UI-19 | Forget Password | This page to receive the password of the used account |
| UI-20 | Register Page | This page is used to register a new account for Household |
| UI-21 | Survey Page | This page allows household heads to register their craft villages or register new craft villages if that craft village does not exist in the database |

2.4. Admin

Table 4. List of Admin User Interface

| User Interface ID | UI Name | Description |
|-------------------|---------------------------------|---|
| UI-22 | Login | This is the login page of Admin |
| UI-23 | Change Password | This page to change the password for the account in use |
| UI-24 | Forget Password | This page to receive the password of the used account |
| UI-25 | Create New Local Authority Page | This page to create a new local authority account. |

3. Describe the User Interface

3.1. Private User

3.1.1. Login



Figure 1. UI Login

Table 5. Element of UI Login

| From | Condition | Control Type | Target | Notes |
|-------------|------------------|---------------------|-------------------------------------|--------------|
| 1 | View | Image | Display image | |
| 2 | View | Lable | Display text | |
| 3 | Input | Textbox | Enter username | |
| 4 | Input | Textbox | Enter password | |
| 5 | Click | Hyperlink | Click to go to forget password page | |
| 6 | Click | Button | Click to log in | |
| 7 | Click | Hyperlink | Click to go to sign up page | |

3.1.2. Sign Up



Figure 2. UI Sign Up

Table 6. Elements of UI Sign Up

| From | Condition | Control Type | Target | Notes |
|-------------|------------------|---------------------|----------------------------|--------------|
| 1 | Input | Textbox | Enter username | |
| 2 | Input | Textbox | Enter password | |
| 3 | Input | Textbox | Enter password | |
| 4 | Input | Textbox | Enter first name | |
| 5 | Input | Textbox | Enter last name | |
| 6 | Input | Textbox | Enter phone number | |
| 7 | Input | Textbox | Enter email address | |
| 8 | Click | Button | Click to register account | |
| 9 | Click | Hyperlink | Click to go to log in page | |

3.1.3. Forget password page



Figure 3. UI Forget Password

Table 7. Elements of UI Forget Password

| From | Condition | Control Type | Target | Notes |
|-------------|------------------|---------------------|--|--------------|
| 1 | Input | Textbox | Enter username | |
| 2 | Input | Textbox | Enter email address | |
| 3 | Click | Button | Click to receive new password by email | |
| 4 | Click | Hypertext | Click to go to the sign-up page | |
| 5 | Click | Hypertext | Click to go to the login page | |

3.1.4. Home page



Figure 4. UI Home page

Table 8. *Elements of Home Page*

| From | Condition | Control Type | Target | Notes |
|-------------|------------------|---------------------|---|--------------|
| 1 | View | Image | Display profile picture | |
| 2 | View | Lable | Display the first and last name of the user | |
| 3 | Click | DropDownList | Click to select display language | |
| 4 | Click | Image Button | Click to create a new survey | |
| 5 | Click | Hyperlink | Click to view all finished survey | |

3.1.5. View all finished survey

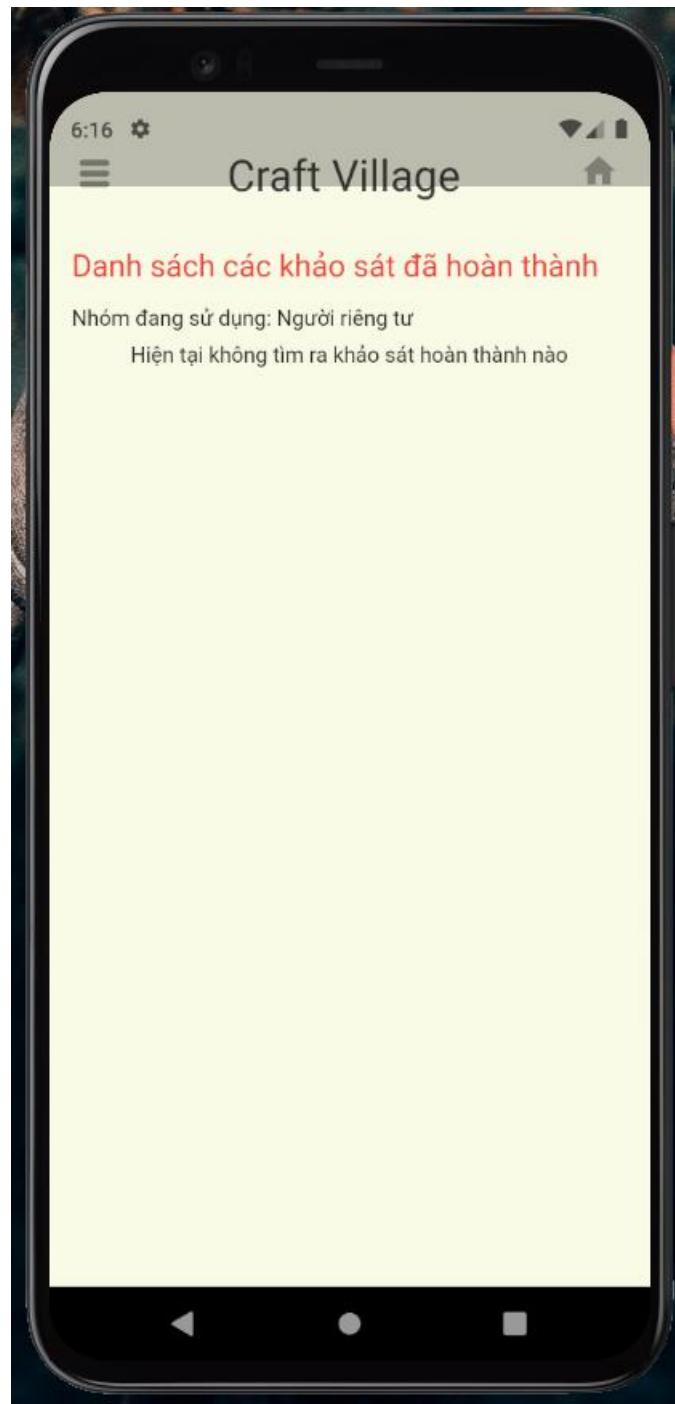


Figure 5. UI View All Finished Survey

Table 9. *Elements of View All Finished Survey*

| From | Condition | Control Type | Target | Notes |
|------|-----------|--------------|--------------------------|-------|
| 1 | Click | Button | Update class information | |
| 2 | Click | Button | Delete class | |

3.1.6. Sidebar

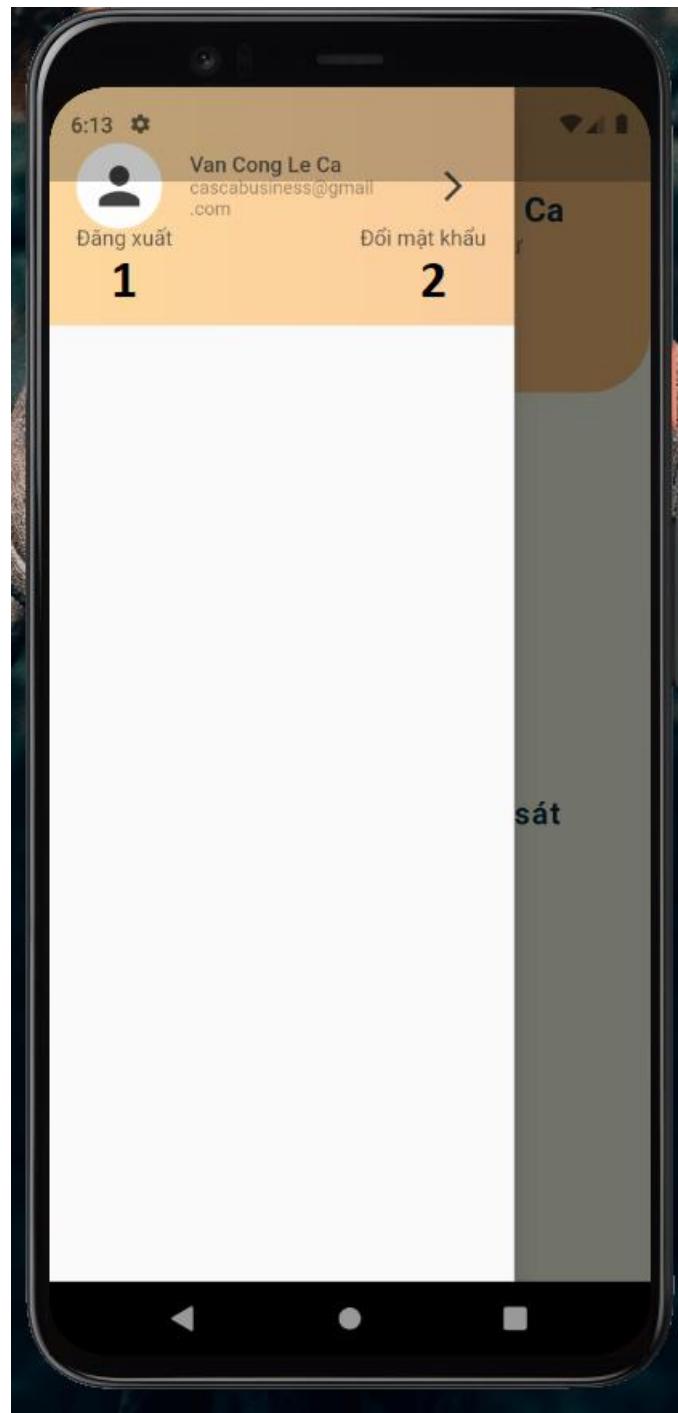


Figure 6. UI Sidebar

Table 10. *Elements of UI Sidebar*

| From | Condition | Control Type | Target | Notes |
|------|-----------|--------------|-------------------------------------|-------|
| 1 | Click | Hyperlink | Click to go to login page | |
| 2 | Click | Hyperlink | Click to go to change password page | |

3.1.7. Change password



Figure 7. UI Change Password

Table 11. Elements of UI Change Password

| From | Condition | Control Type | Target | Notes |
|------|-----------|--------------|------------------------------|-------|
| 1 | Input | Textbox | Enter the current password | |
| 2 | Input | Textbox | Enter the new password | |
| 3 | Input | Textbox | Enter the new password again | |
| 4 | Click | Button | Click to change password | |

3.1.8. Edit profile

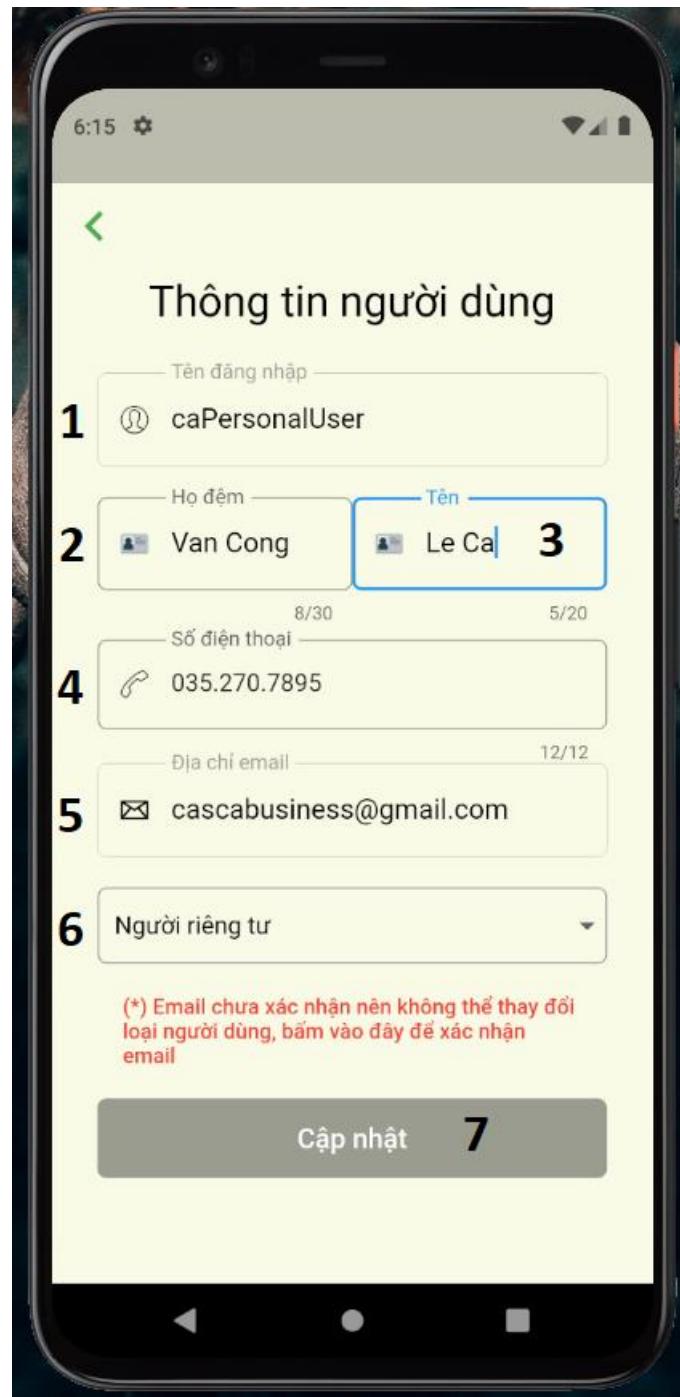


Figure 8. UI of Edit Profile

Table 12. Elements of UI Edit Profile

| From | Condition | Control Type | Target | Notes |
|-------------|------------------|---------------------|--------------------------------------|--------------|
| 1 | Input | Textbox | Enter the username | |
| 2 | Input | Textbox | Enter the firstname | |
| 3 | Input | Textbox | Enter the lastname | |
| 4 | Input | Textbox | Enter the phone number | |
| 5 | Input | Textbox | Enter the email address | |
| 6 | Click | DropDownList | Click to choose the account type | |
| 7 | Click | Button | Click to update personal information | |

3.1.9. Survey page



Figure 9. UI of Survey Page 1

Table 13. Elements of Survey Page 1

| From | Condition | Control Type | Target | Notes |
|-------------|------------------|---------------------|--|--------------|
| 1 | Click | ImageButton | Click to show the sidebar | |
| 2 | Click | ImageButton | Click to go to the home page | |
| 3 | Input | Image | Take a photo | |
| 4 | Click | DropDownList | Click to select province/city | |
| 5 | Click | DropDownList | Click to select district | |
| 6 | Click | DropDownList | Click to select ward | |
| 7 | Click | TaskButton | Click to fill in the information | |
| 8 | Click | TaskButton | Click to fill in the new craft village information | |
| 9 | Click | DropDownList | Click to select a craft village | |
| 10 | Input | Textbox | Enter the description of the craft village | |



Figure 10. UI of Survey Page 2

Table 14. *Elements of UI Survey Page 2*

| From | Condition | Control Type | Target | Notes |
|------|-----------|--------------|--|-------|
| 1 | Input | Textbox | Enter the name of craft village | |
| 2 | Input | Textbox | Enter the description of the craft village | |



Figure 11. UI of Survey Page 3

Table 15. Elements of UI Survey Page 3

| From | Condition | Control Type | Target | Notes |
|-------------|------------------|---------------------|--|--------------|
| 1 | Input | Textbox | Enter latitude | |
| 2 | Input | Textbox | Enter longitude | |
| 3 | Click | RadioButtonList | Click to select pollution type | |
| 4 | Input | Textbox | Enter relevant information about pollution | |
| 5 | Click | Button | Click to confirm and submit the survey | |

3.2. Local Authority

3.2.1. Login Page

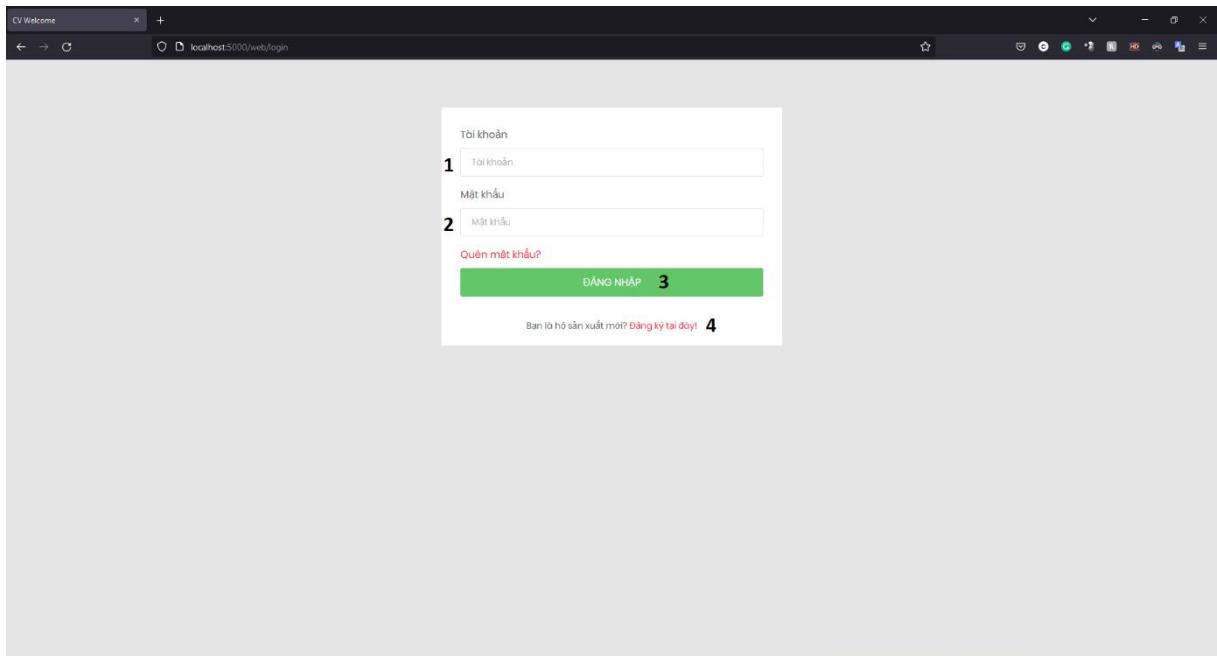


Figure 12. UI of Login Page on Website

Table 16. Elements of UI Login on Website

| From | Condition | Control Type | Target | Notes |
|------|-----------|--------------|------------------------------|-------|
| 1 | Input | Textbox | Enter the username | |
| 2 | Input | Textbox | Enter the password | |
| 3 | Click | Button | Click to go to home page | |
| 4 | Click | Hyperlink | Click to go to register page | |

3.2.2. Change Password Page

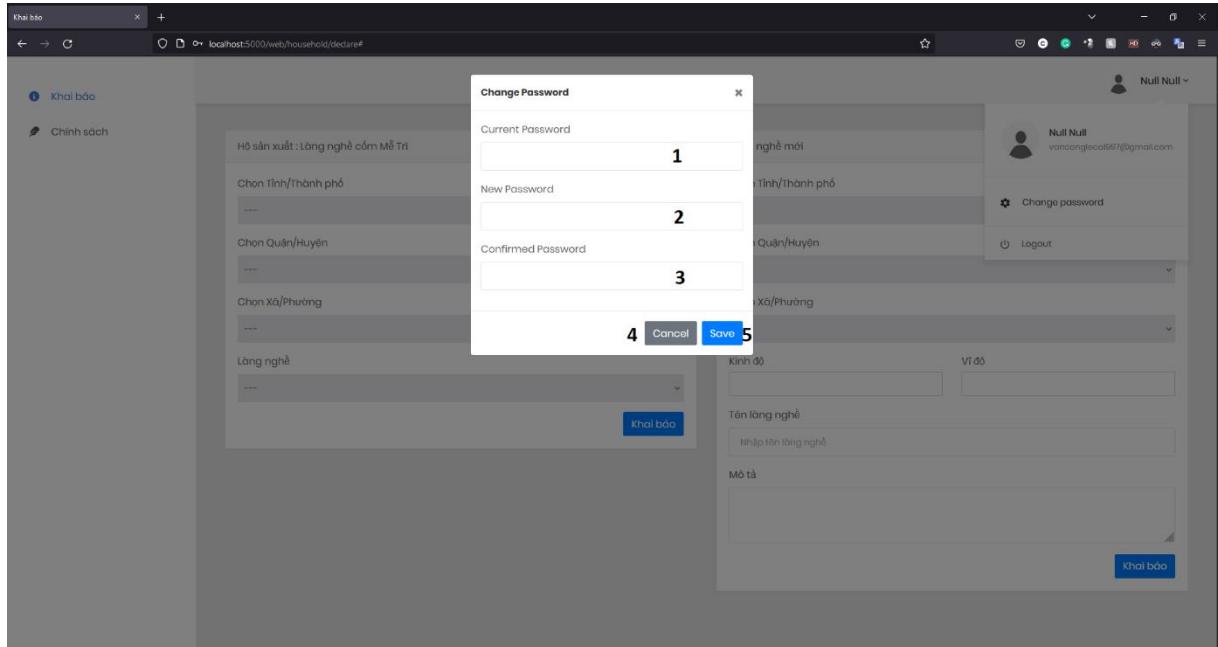


Figure 13. UI of Change Password Page

Table 17. Elements of UI Change Password Page

| From | Condition | Control Type | Target | Notes |
|------|-----------|--------------|--|-------|
| 1 | Input | Textbox | Enter the current password | |
| 2 | Input | Textbox | Enter the new password | |
| 3 | Input | Textbox | Enter the new password again | |
| 4 | Click | Button | Cancel the password change operation | |
| 5 | Click | Button | Click to change the password for the account | |

3.2.3. Local Authority Home Page

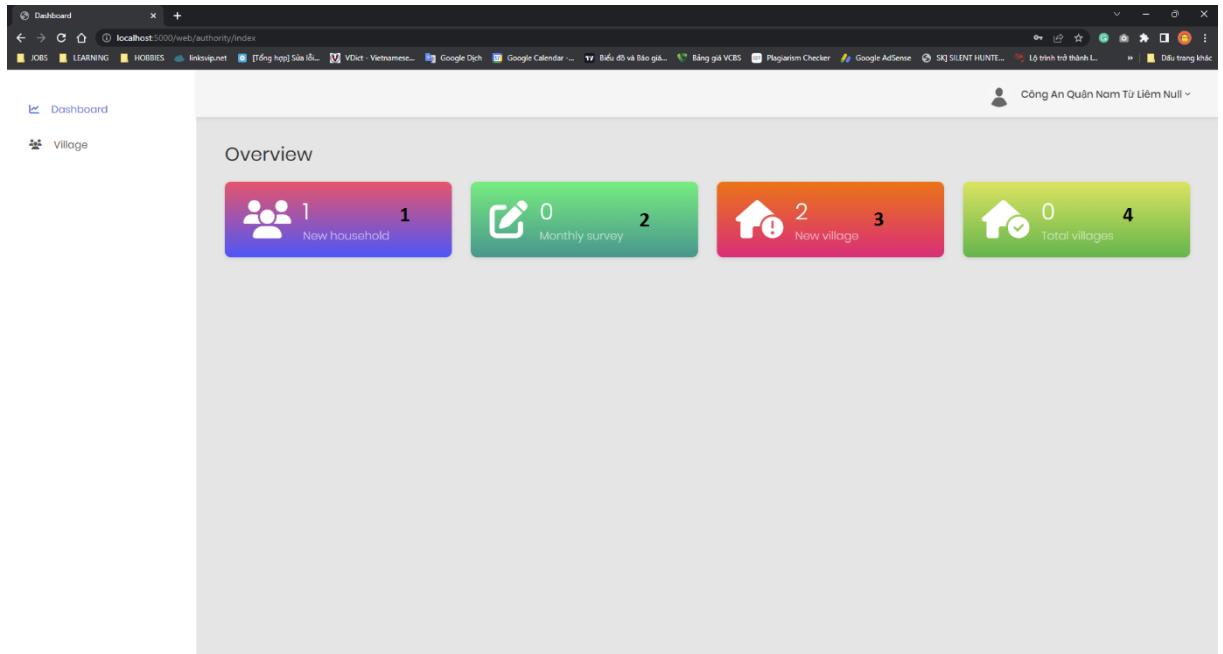


Figure 14. UI of Local Authority Home Page

Table 18. Elements of UI Local Authority Home Page

| From | Condition | Control Type | Target | Notes |
|------|-----------|--------------|---------------------------------------|-------|
| 1 | View | Lable | Display the number of new households | |
| 2 | View | Lable | Display the number of surveys | |
| 3 | View | Lable | Display the number of the new village | |
| 4 | View | Lable | Display the total village of the ward | |

3.2.4. Village Management Page

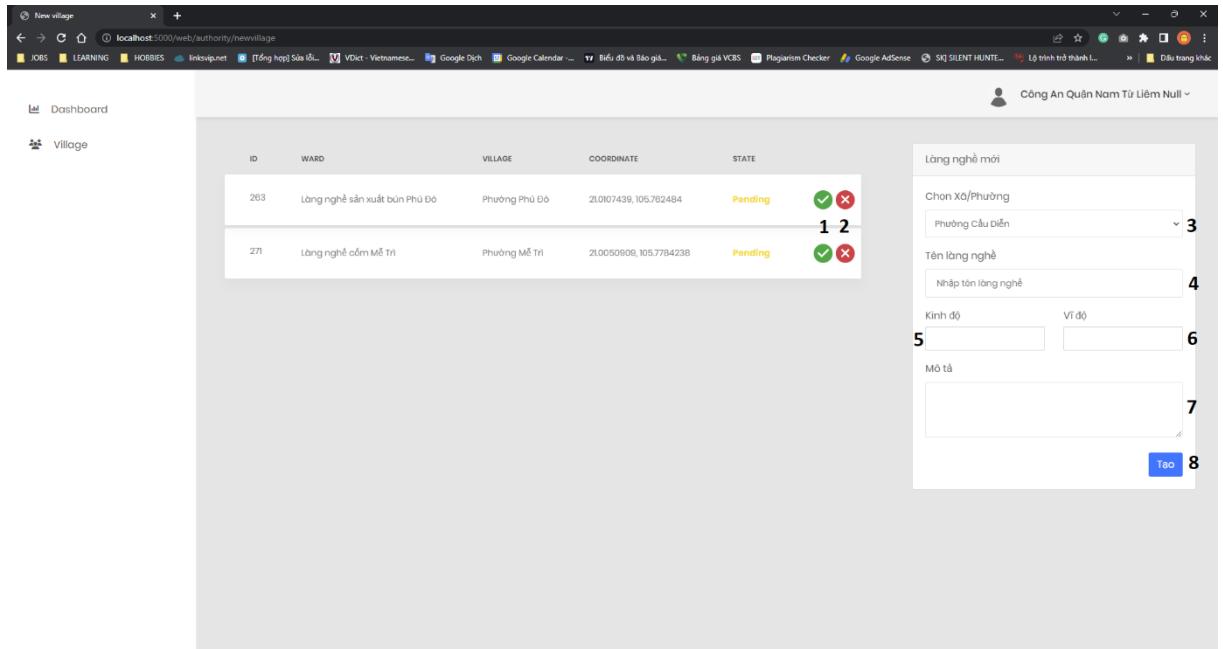


Figure 15. UI of Village Management Page

Table 19. Elements of UI Village Management Page

| From | Condition | Control Type | Target | Notes |
|------|-----------|--------------|--|-------|
| 1 | Click | Button | Accept the request to add a new craft village | |
| 2 | Click | Button | Decline the request to add a new craft village | |
| 3 | Click | DropDownList | Select ward | |
| 4 | Input | Textbox | Enter the name of village | |
| 5 | Input | Textbox | Enter longitude | |
| 6 | Input | Textbox | Enter latitude | |
| 7 | Input | Textbox | Enter a description of the craft village | |
| 8 | Click | Button | Add new craft village | |

3.3. Household

3.3.1. Login Page

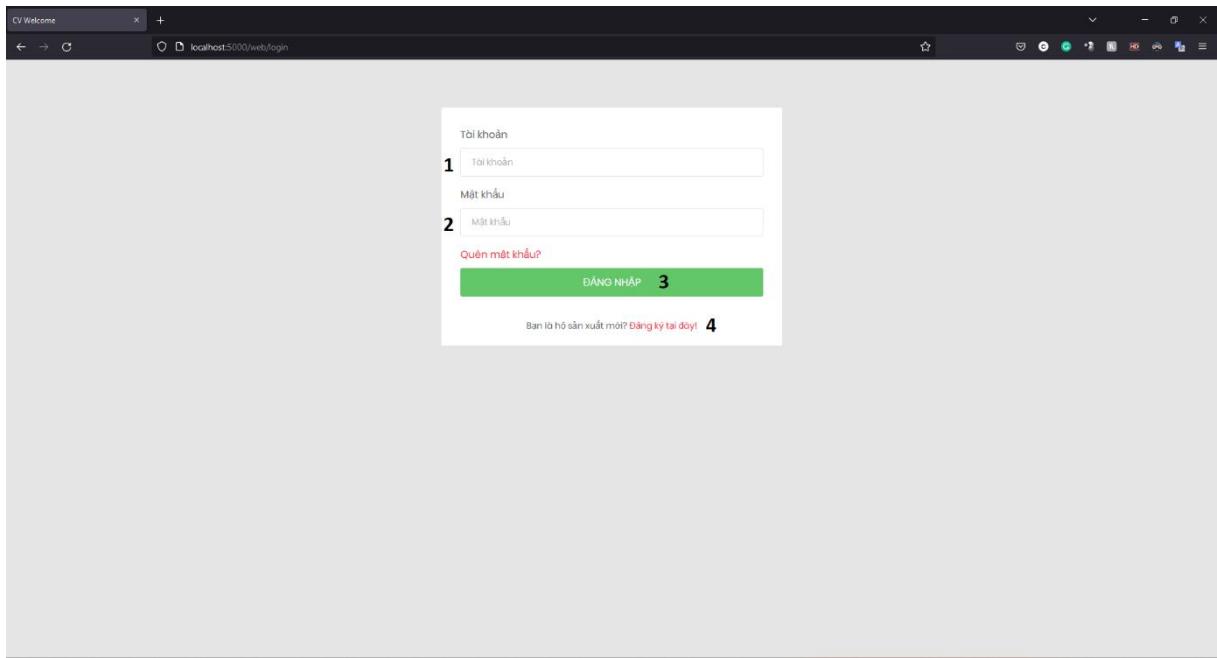


Figure 16. UI of Login Page on Website

Table 20. Elements of UI Login Page on Website

| From | Condition | Control Type | Target | Notes |
|------|-----------|--------------|------------------------------|-------|
| 1 | Input | Textbox | Enter the username | |
| 2 | Input | Textbox | Enter the password | |
| 3 | Click | Button | Click to go to home page | |
| 4 | Click | Hyperlink | Click to go to register page | |

3.3.2. Change Password Page

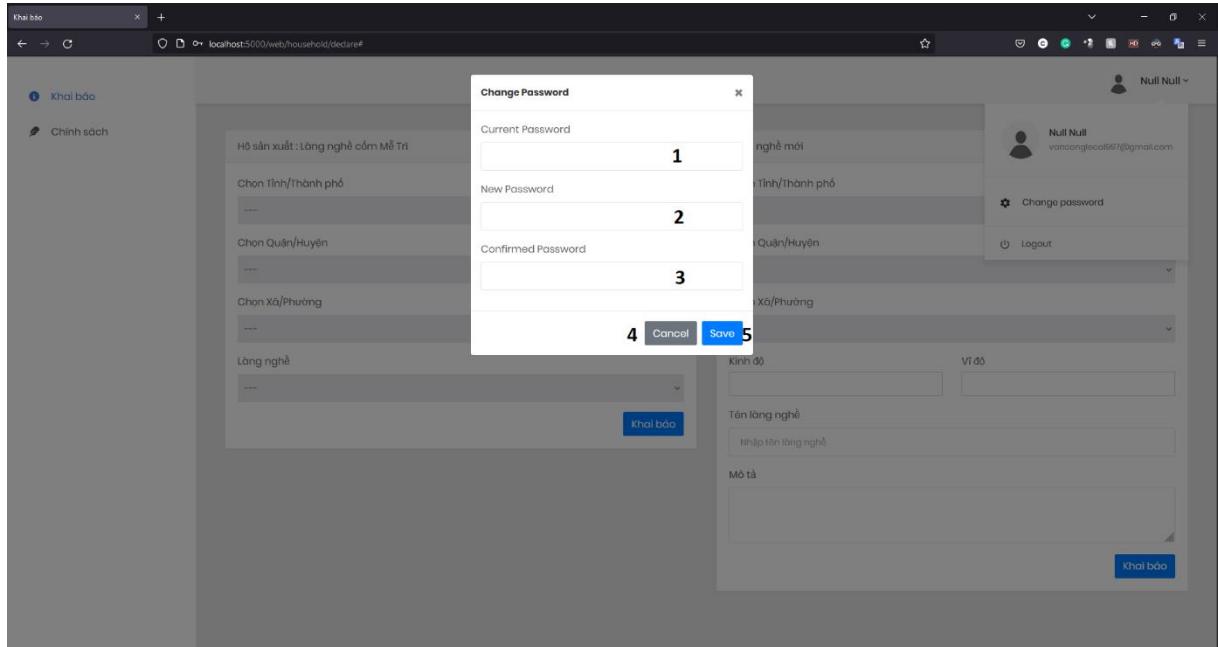


Figure 17. UI of Change Password Page

Table 21. Elements of UI Change Password Page

| From | Condition | Control Type | Target | Notes |
|------|-----------|--------------|--|-------|
| 1 | Input | Textbox | Enter the current password | |
| 2 | Input | Textbox | Enter the new password | |
| 3 | Input | Textbox | Enter the new password again | |
| 4 | Click | Button | Cancel the password change operation | |
| 5 | Click | Button | Click to change the password for the account | |

3.3.3. Register Page

The screenshot shows a registration form titled "Đăng Ký Tài Khoản". The form includes fields for:

- Tên đăng nhập (1)
- Mật khẩu (2)
- Nhập lại mật khẩu (3)
- Số điện thoại (4)
- Địa chỉ mail (5)
- Mã xác nhận (7)
- Gửi mã (6)
- Đăng ký (8)
- Trở lại trang đăng nhập (9)

Figure 18. UI of Register Page

Table 22. Elements of UI Register Page

| From | Condition | Control Type | Target | Notes |
|------|-----------|--------------|--|-------|
| 1 | Input | Textbox | Enter the username | |
| 2 | Input | Textbox | Enter the password | |
| 3 | Input | Textbox | Enter the password again | |
| 4 | Input | Textbox | Enter the phone number | |
| 5 | Input | Textbox | Enter the email address | |
| 6 | Click | Button | Click to send confirmation code to email | |
| 7 | Input | Textbox | Enter the confirmation code from email | |
| 8 | Click | Button | Click to complete account registration | |
| 9 | Click | Hyperlink | Click to return the login page | |

3.3.4. Household Survey Page

The screenshot shows a web browser window with two forms side-by-side. The left form is for declaring a new craft village, while the right form is for editing an existing one. Both forms require selecting location levels (Province/City, District, Ward, Village) and providing longitude (Kinh độ) and latitude (Vĩ độ). They also allow entering the name of the village (Tên làng nghề) and a description (Mô tả). Buttons labeled 'Khai báo' are present at the bottom of both forms.

Figure 19. UI of Survey Page

Table 23. Elements of UI Survey Page

| From | Condition | Control Type | Target | Notes |
|------|-----------|--------------|--|-------|
| 1 | Click | DropDownList | Click to select province/city | |
| 2 | Click | DropDownList | Click to select district | |
| 3 | Click | DropDownList | Click to select ward | |
| 4 | Click | DropDownList | Click to select village | |
| 5 | Click | Button | Click to declare a new craft village | |
| 6 | Input | Textbox | Enter the longitude | |
| 7 | Input | Textbox | Enter the latitude | |
| 8 | Input | Textbox | Enter the name of village | |
| 9 | Input | Textbox | Enter a description of the craft village | |
| 10 | Click | Button | Click to declare a new craft village | |

3.4. Admin

3.4.1. Login Page

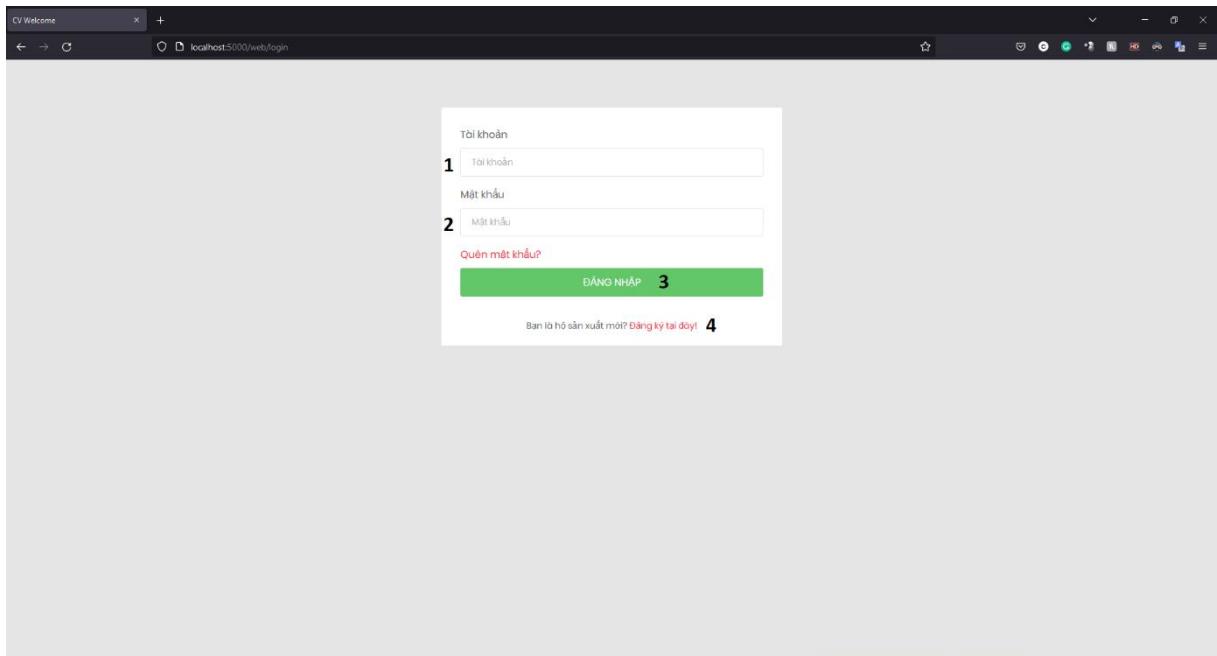


Figure 20. UI of Login Page on Website

Table 24. Elements of UI Login Page on Website

| From | Condition | Control Type | Target | Notes |
|------|-----------|--------------|------------------------------|-------|
| 1 | Input | Textbox | Enter the username | |
| 2 | Input | Textbox | Enter the password | |
| 3 | Click | Button | Click to go to home page | |
| 4 | Click | Hyperlink | Click to go to register page | |

3.4.2. Change Password Page

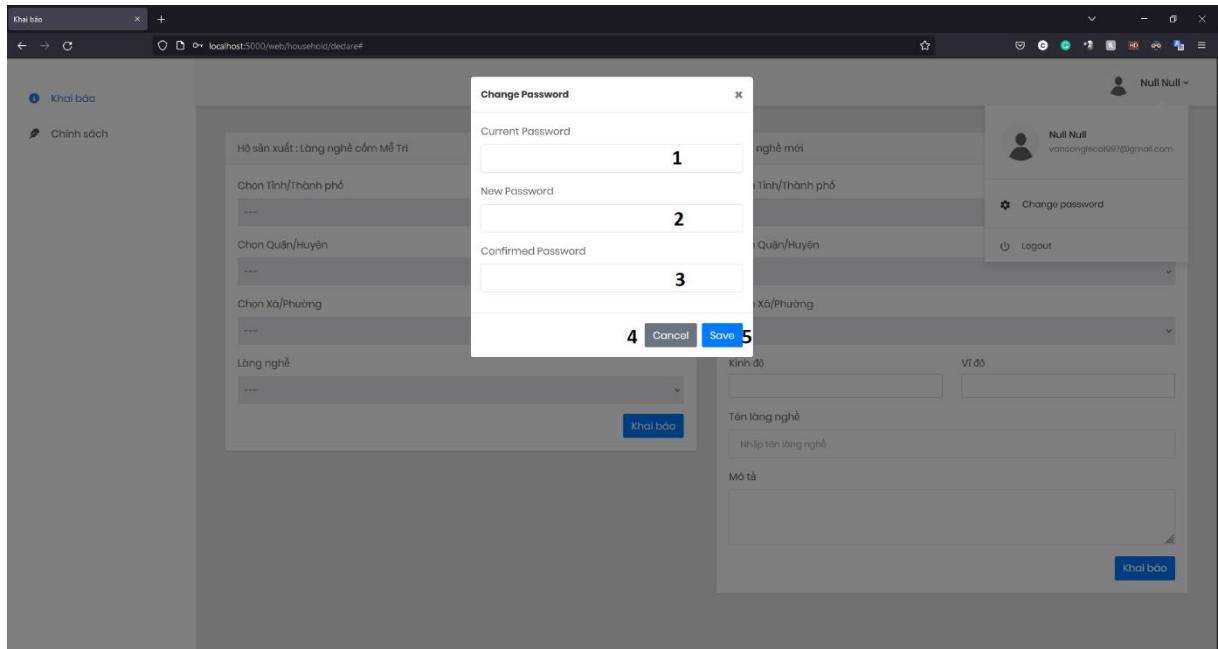


Figure 21. UI of Change Password Page

Table 25. Elements of UI Change Password Page

| From | Condition | Control Type | Target | Notes |
|------|-----------|--------------|--|-------|
| 1 | Input | Textbox | Enter the current password | |
| 2 | Input | Textbox | Enter the new password | |
| 3 | Input | Textbox | Enter the new password again | |
| 4 | Click | Button | Cancel the password change operation | |
| 5 | Click | Button | Click to change the password for the account | |

3.4.3. Create New Local Authority Page

The screenshot shows a web-based form titled "Create Account". The form includes the following fields and controls:

- Province/City:** A dropdown menu labeled "1" with three options.
- District:** A dropdown menu labeled "2" with three options.
- Organization:** An input field labeled "3" with placeholder "Name".
- Username:** An input field labeled "4".
- Password:** An input field labeled "5".
- Phone:** An input field labeled "6".
- Email:** An input field labeled "7".
- Create:** A blue button labeled "8" located at the bottom right of the form.

Figure 22. UI of Create New Local Authority Page

Table 26. Elements of UI Create New Local Authority Page

| From | Condition | Control Type | Target | Notes |
|------|-----------|--------------|---------------------------------------|-------|
| 1 | Click | DropDownList | Click to select province/city | |
| 2 | Click | DropDownList | Click to select district | |
| 3 | Input | Textbox | Enter the name of organization | |
| 4 | Input | Textbox | Enter the username | |
| 5 | Input | Textbox | Enter the password | |
| 6 | Input | Textbox | Enter the phone number | |
| 7 | Input | Textbox | Enter the email address | |
| 8 | Click | Button | Click to create a new local authority | |



Capstone Project 1

CMU-CS450

Test Plan Document
Version 1.4
Date: 08/11/2022

Craft Village Pollution Monitor System

Submitted by
Ca, Van Cong Le
Huy, Bui Duc
Phuc, Hua Hoang
Trung, Nguyen Thanh

Approved by
Ph.D. Nguyen Thanh Binh

Proposal Review Panel Representative:

Name Signature Date

Capstone Project 1 - Mentor:

A handwritten signature in blue ink, appearing to read 'Nguyễn Thành Bình'.

Name Signature Date

PROJECT INFORMATION

| Project acronym | CVPMS | | |
|--|---|--|------------|
| Project Title | Craft Village Pollution Monitor System | | |
| Start Date | 22/08/2022 | End Date | 07/12/2022 |
| Lead Institution | International School, Duy Tan University | | |
| Project Mentor | Ph.D. Thanh Binh, Nguyen | | |
| Scrum master / Project Leader & contact details | Ca, Van Cong Le <i>Email:</i> cascabusiness@gmail.com <i>Tel:</i> 0352707895 | | |
| Partner Organization | | | |
| Project Web URL | https://github.com/Casca113s2/craft-village-pollution-monitor-system | | |
| Team members | Name | Email | Tel |
| 25211207666 | Ca, Van Cong Le | cascabusiness@gmail.com | 0352707895 |
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DOCUMENT NAME

| | | | |
|-----------------------|--|------------------|--|
| Document Title | Test Plan Document | | |
| Author(s) | Van Cong Le Ca Hua Hoang Phuc Nguyen Thanh Trung | | |
| Date | 08/11/2022 | File Name | C1SE.06_CVPMS_Test-Plan-Document_v1.4.docx |

REVISION HISTORY

| Version | Date | Comments | Author | Approval |
|----------------|-------------|-------------------------------|--|---|
| 1.0 | 01/09/2022 | Create Test Plan Document | Van Cong Le Ca Hua Hoang Phuc Nguyen Thanh Trung |  |
| 1.1 | 18/09/2022 | Update Test Plan for Sprint 2 | Van Cong Le Ca Hua Hoang Phuc Nguyen Thanh Trung |  |
| 1.2 | 05/10/2022 | Update Test Plan for Sprint 3 | Van Cong Le Ca Hua Hoang Phuc Nguyen Thanh Trung |  |
| 1.3 | 22/10/2022 | Update Test Plan for Sprint 4 | Van Cong Le Ca Hua Hoang Phuc Nguyen Thanh Trung |  |
| 1.4 | 08/11/2022 | Update Test Plan for Sprint 5 | Van Cong Le Ca Hua Hoang Phuc Nguyen Thanh Trung |  |

Approve Document: Sign in to approve the document

| | | | |
|---------------------|------------------------|------|---|
| Mentor | Binh, Nguyen Thanh | Date | 08/11/2022 |
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| Scrum Member | Huy, Bui Duc | Date | 08/11/2022 |
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| Scrum Member | Phuc, Hua Hoang | Date | 08/11/2022 |
| | | Sign |  |
| Scrum Member | Trung, Nguyen Thanh | Date | 08/11/2022 |
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1. Introduction

A test plan is a detailed software verification document that provides specifics on how the validate will test all aspects of software design. Test plans are test specifications used as guides for writing test case suites for design validation in both the software engineering fields. This test plan document contains a description of product functionality, a description of test cases to be written for each function, and a description of the testing platform to be used.

1.1. Purpose

The purpose of the Test Plan is to define, schedule and monitor the test execution. It supports the following objectives:

- Provide a high-level list of the major target test functions.
- List the Requirements for testing.
- Describe the testing strategies to be employed on each target test functions.
- Identify the required resources and schedule the Test execution.

1.2. Scope

This Test Plan is for release test plan for viBOTour system. The Test Plan defines the unit, integration and system testing approach. The test scope includes the following:

- Testing of all functions.
- Application performance.
- Use cases requirements listed in the Product Backlog and User Stories document.

1.3. Out Of Scope

The following is considered out of scope for Craft Village Pollution Monitor System Test Plan and testing scope: Performance testing for Craft Village Pollution Monitor System.

1.4. Reference

Table 1. Reference documents

| No | Document references | Document Information |
|----|---|---|
| 01 | Proposal document | C1SE.06_CVPMS_Project-Proposal-Document_v1.0.docx |
| 02 | Product Backlog and User Story document | C1SE.06_CVPMS_ProductBacklog-Userstory-SprintBacklog.xlsx |
| 03 | Project Plan Document | C1SE.06_CVPMS_Project-Plan_v1.0.docx |

1.5. Risk List

Table 2. Risk List

| Risk | Mitigation Strategy | Responsibility | Contingency (Risk is realized) |
|--------------------|--|---|--|
| External Risks | Get fewer projects but will definitely succeed or have a high success rate | Not under control of the Project Team or Project Steering Group | Do your part, recognize and eliminate risks as soon as possible |
| Project Management | Agree on all the standards before starting the project | Leader | It is mandatory to revise the whole project to the original standard if it is not correct |
| Tester | Sick, busy or crash cannot do it | Team tester | self-supplementing undo their assigned work, the way other members are supposed to support |
| Technology | Technology analysis before starting each project | Tester | Exchange learning in groups |

| | | | |
|-----------------------|---|-------------------------------------|--|
| Tester Skill | Train, or recruit experienced people | Tester, Team leader | Train technology professionals or invite professors to help with the project |
| Estimate Plan | Calculate carefully and accurately when taking requests and analyzing, apply good models and methods for estimation | Request Collectors, Request Analyst | Enlist the product delivery time or overtime for timely delivery |
| Automation Tool Risks | Choose the right tools and quality, check the tools before starting the project | Tester, Team leader | Exchange in groups, change new tools and remove inconsistent tools |
| Out of system scope | Analyze and find solutions to test all testable areas | Tester | |

2. Test Specification

2.1. Test Items

Table 3. Test Items

* The following list describes the features that will be tested

** Team acronym – F: Function

| ID | Function | A part of | Priority | Type Test case | Note |
|------|---------------------------|---------------|----------|--|------|
| FE01 | Login | PB02 | H | User interface, Functionality, Usability | |
| FE02 | Register | PB01 | H | User interface, Functionality, Usability | |
| FE03 | Forgot Password | PB04 | M | User interface, Functionality, Usability | |
| FE04 | Change Password | PB07 | M | User interface, Functionality, Usability | |
| FE05 | Send Mail | PB01, PB07 | M | User interface, Functionality, Usability | |
| FE06 | Edit User's Information | PB05 | L | User interface, Functionality, Usability | |
| FE07 | Change Language | PB11 | L | User interface, Functionality, Usability | |
| FE08 | Take Pollution Photo | PB08 | H | User interface, Functionality, Usability | |
| FE09 | Detect Location | PB08 | H | User interface, Functionality, Usability | |
| FE10 | Auto Fill Information | PB08 | H | User interface, Functionality, Usability | |
| FE11 | Add New Village | PB08 | H | User interface, Functionality, Usability | |
| FE12 | Detection Pollution Types | PB08 | H | User interface, Functionality, Usability | |

| | | | | | |
|------|--------------------------------|------|---|--|--|
| FE13 | Add Additional Information | PB08 | H | User interface, Functionality, Usability | |
| FE14 | Submit Survey | PB08 | H | User interface, Functionality, Usability | |
| FE15 | View Finished Survey | PB12 | M | User interface, Functionality, Usability | |
| FE16 | View In Progress Survey | PB12 | M | User interface, Functionality, Usability | |
| FE17 | Accept/Decline New Village | PB10 | H | User interface, Functionality, Usability | |
| FE18 | Create Local Authority Account | PB06 | H | User interface, Functionality, Usability | |
| FE19 | Display Dashboard | PB14 | H | User interface, Functionality, Usability | |

2.2. Test Deliverables

- Test Plan Document.
- Test Case Document.
- Test Summary Report.

2.3. Test Strategy

Table 4. Test Strategy

| Test Types | Test Stages | | |
|---|--------------------|--------------------|-------------------|
| | Unit | Integration | Acceptance |
| Functional Tests | X | X | X |
| User Interface | X | X | X |
| Reliability ➤ Integrity ➤ Structure | X | X | |

2.4. Tools

Table 5. Tools

| Purpose | Tool | Vendor | Version |
|--|-----------------|----------------|----------------|
| Microsoft Excel is used to write Test Plan and Test Cases. | Microsoft Excel | Microsoft | 2016 |
| Katalon Platform is an automation testing software tool developed by Katalon, Inc. The software is built on top of the <u>open-source</u> automation frameworks <u>Selenium</u> , <u>Appium</u> with a specialized <u>IDE</u> interface for <u>web</u> , <u>API</u> , <u>mobile</u> and desktop application testing. | Katalon | Katalon Studio | 8.5.2 |

2.5. Resource

Table 6. Resources

| The role | Resource | Specific responsibilities |
|----------------|-------------|--|
| Tester | All members | <p>Executes the tests. Responsibilities include:</p> <ul style="list-style-type: none"> ➤ Execute test suites ➤ Log results ➤ Analyze and recover from test failures ➤ Document incidents |
| Testing System | All members | <p>Ensures test environments are managed and maintained.</p> <p>Responsibilities include:</p> <ul style="list-style-type: none"> ➤ Administer test management system. ➤ Install and support access to, and recovery of, test environment configurations and test labs. |

3. Test Cycle and Exit Criteria

3.1. Entry Criteria

- All test hardware platforms must have been successfully installed, configured, and functioning properly.
- All the necessary documentation, design, and requirements information should be available that will allow testers to operate the system and judge the correct behavior.
- Proper test case is available.
- The test environment such as, lab, hardware, software, and system administration support should be ready.

3.2. Exit Criteria

- All test cases have been run.
- A certain level of requirements coverage has been achieved.

- No high priority or severe bugs are left outstanding.
- All high-risk areas have been fully tested, with only minor residual risks left outstanding.
- The schedule has been achieved.
- Not over the allowed project budget

4. Test Milestones

Table 7. Test milestones

| Milestone Task | Name | Date Start | Date Finish |
|--------------------------------------|--------------------------------------|------------|-------------|
| Test Plan | Test Plan Document | 17/08/2022 | 17/08/2022 |
| Test plan and test case for Sprint 1 | Test plan and test case for Sprint 1 | 01/09/2022 | 01/09/2022 |
| Test plan and test case for Sprint 2 | Test plan and test case for Sprint 2 | 18/09/2022 | 18/09/2022 |
| Test plan and test case for Sprint 3 | Test plan and test case for Sprint 3 | 05/10/2022 | 05/10/2022 |
| Test plan and test case for Sprint 4 | Test plan and test case for Sprint 4 | 22/10/2022 | 22/10/2022 |
| Test plan and test case for Sprint 5 | Test plan and test case for Sprint 5 | 08/11/2022 | 08/11/2022 |



Capstone Project 1

CMU-CS450

Test Case

Craft Village Pollution Monitor System

Submitted by
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Phuc, Hua Hoang
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Proposal Review Panel Representative:

Name Signature Date

Capstone Project 1 - Mentor:

A handwritten signature in blue ink, appearing to read 'Nguyen Thanh Binh'.

Name Signature Date

PROJECT INFORMATION

| Project acronym | CVPMS | | |
|--|---|--|------------|
| Project Title | Craft Village Pollution Monitor System | | |
| Start Date | 22/08/2022 | End Date | 07/12/2022 |
| Lead Institution | International School, Duy Tan University | | |
| Project Mentor | Ph.D. Thanh Binh, Nguyen | | |
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| Partner Organization | | | |
| Project Web URL | https://github.com/Casca113s2/craft-village-pollution-monitor-system | | |
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1. Integration Testing

1.1. Sprint 1

Table 1. Login Mobile

| ID | Test Case Description | Test Case Procedure | Excepted Output | Actual Result | Test Result | Test Date |
|------|--|--|--|--|-------------|------------|
| TC01 | Declare empty password | 1. Enter the correct username 2. Leave the password blank 3. Click the "Đăng nhập" button | Display Error Message "Không tồn tại tài khoản hoặc nhập sai mật khẩu" | Display Error Message "Không tồn tại tài khoản hoặc nhập sai mật khẩu" | Pass | 12/09/2022 |
| TC02 | Declare empty username | 1. Leave the username blank 2. Enter the correct password 3. Click the "Đăng nhập" button | Display Error Message "Không tồn tại tài khoản hoặc nhập sai mật khẩu" | Display Error Message "Không tồn tại tài khoản hoặc nhập sai mật khẩu" | Pass | 12/09/2022 |
| TC03 | Declare empty username and password | 1. Leave username blank 2. Leave password blank 3. Click the "Đăng nhập" button | Display Error Message "Không tồn tại tài khoản hoặc nhập sai mật khẩu" | Display Error Message "Không tồn tại tài khoản hoặc nhập sai mật khẩu" | Pass | 12/09/2022 |
| TC04 | Declare wrong password | 1. Enter the correct username 2. Enter the wrong password 3. Click the "Đăng nhập" button | Display Error Message "Không tồn tại tài khoản hoặc nhập sai mật khẩu" | Display Error Message "Không tồn tại tài khoản hoặc nhập sai mật khẩu" | Pass | 12/09/2022 |
| TC05 | Declare unregistered username and wrong password | 1. Enter the unregistered username 2. Enter the wrong password 3. Click the "Đăng nhập" button | Display Error Message "Không tồn tại tài khoản hoặc nhập sai mật khẩu" | Display Error Message "Không tồn tại tài khoản hoặc nhập sai mật khẩu" | Pass | 12/09/2022 |

| | | | | | | |
|------|--|--|--|--|------|------------|
| TC06 | Declare incorrect username | 1. Enter the incorrect username format 2. Enter the wrong password 3. Click the "Đăng nhập" button | Display Error Message "Không tồn tại tài khoản hoặc nhập sai mật khẩu" | Display Error Message "Không tồn tại tài khoản hoặc nhập sai mật khẩu" | Pass | 12/09/2022 |
| TC07 | Declare a space in username and password | 1. Enter a space in the username 2. Enter a space in the password 3. Click the "Đăng nhập" button | Display Error Message "Không tồn tại tài khoản hoặc nhập sai mật khẩu" | Display Error Message "Không tồn tại tài khoản hoặc nhập sai mật khẩu" | Pass | 12/09/2022 |
| TC08 | Declare incorrect password password | 1. Enter the correct username 2. Enter the password in an incorrect format 3. Click the "Đăng nhập" button | Display Error Message "Không tồn tại tài khoản hoặc nhập sai mật khẩu" | Display Error Message "Không tồn tại tài khoản hoặc nhập sai mật khẩu" | Pass | 12/09/2022 |
| TC09 | Check Login success | 1. Enter the correct username 2. Enter the correct password 3. Click the "Đăng nhập" button | Redirect to homepage | Redirect to homepage | Pass | 12/09/2022 |
| TC10 | Declare username has been deleted | 1. Enter the deleted username 2. Enter the password 3. Click the "Đăng nhập" button | Display Error Message "Không tồn tại tài khoản hoặc nhập sai mật khẩu" | Display Error Message "Không tồn tại tài khoản hoặc nhập sai mật khẩu" | Pass | 12/09/2022 |
| TC11 | Check switch to Forget Password Page | Click on "Quên mật khẩu? " | Redirect to Forget Password Page | Redirect to Forget Password Page | Pass | 12/09/2022 |
| TC12 | Check switch to Sign Up Page | Click on "Đăng ký ngay nào!" | Redirect to Sign Up Page | Redirect to Sign Up Page | Pass | 12/09/2022 |

Table 2. Sign Up Mobile

| ID | Test Case Description | Test Case Procedure | Excepted Output | Actual Result | Test Result | Test Date |
|-----------|------------------------------|--|--|--|--------------------|------------------|
| TC01 | Check sign-up success | 1. Enter the correct username 2. Enter the correct password 3. Enter the correct first & last name 4. Enter the correct phone number 5. Enter the correct email address 6. Click the "Đăng ký" button | Display Error Message "Không được để trống hoặc có kí tự đặc biệt" under "Tên đăng nhập" | Display Error Message "Không được để trống hoặc có kí tự đặc biệt" under "Tên đăng nhập" | Pass | 12/09/2022 |
| TC02 | Declare invalid password | 1. Enter the invalid username 2. Enter the correct password 3. Enter the correct first & last name 4. Enter the correct phone number 5. Enter the correct email address 6. Click the "Đăng ký" button | Display Error Message "Không được để trống hoặc có kí tự đặc biệt" under "Tên đăng nhập" | Display Error Message "Không được để trống hoặc có kí tự đặc biệt" under "Tên đăng nhập" | Pass | 12/09/2022 |
| TC03 | Declare empty password | 1. Enter the correct username 2. Leave the password blank 3. Enter the correct first & last | Display Error Message "Vui lòng nhập password lớn hơn 6 ký tự" under "Mật khẩu" | Display Error Message "Vui lòng nhập password lớn hơn 6 ký tự" under "Mật khẩu" | Pass | 12/09/2022 |

| | | | | | | |
|------|----------------------------|---|--|--|------|------------|
| | | <p>name</p> <p>4. Enter the correct phone number</p> <p>5. Enter the correct email address</p> <p>6. Click the "Đăng ký" button</p> | | | | |
| TC04 | Declare empty username | <p>1. Leave the username blank</p> <p>2. Enter the correct password</p> <p>3. Enter the correct first & last name</p> <p>4. Enter the correct phone number</p> <p>5. Enter the correct email address</p> <p>6. Click the "Đăng ký" button</p> | Display Error Message "Không được để trống hoặc có kí tự đặc biệt" under "Tên đăng nhập" | Display Error Message "Không được để trống hoặc có kí tự đặc biệt" under "Tên đăng nhập" | Pass | 12/09/2022 |
| TC05 | Declare wrong phone number | <p>1. Enter the correct username</p> <p>2. Enter the correct password</p> <p>3. Enter the correct first & last name</p> <p>4. Enter the wrong phone number</p> <p>5. Enter the correct email address</p> <p>6. Click the "Đăng ký" button</p> | Display Error Message "Vui lòng nhập đúng định dạng số điện thoại" under "Số điện thoại" | Display Error Message "Vui lòng nhập đúng định dạng số điện thoại" under "Số điện thoại" | Pass | 12/09/2022 |

| | | | | | | |
|------|--|--|--|--|------|------------|
| TC06 | Declare empty email address, first and last name | 1. Enter the correct username 2. Enter the correct password 3. Leave the correct first & last name blank 4. Leave the phone number blank 5. Enter the correct email address 6. Click the "Đăng ký" button | Display Error Message "Vui lòng nhập đúng định dạng số điện thoại" under "Số điện thoại" | Display Error Message "Vui lòng nhập đúng định dạng số điện thoại" under "Số điện thoại" | Pass | 12/09/2022 |
| TC07 | Declare invalid email address | 1. Enter the correct username 2. Enter the correct password 3. Enter the correct first & last name 4. Enter the correct phone number 5. Enter the invalid email address 6. Click the "Đăng ký" button | Display Error Message "Vui lòng nhập đúng định dạng email" under "Địa chỉ email" | Display Error Message "Vui lòng nhập đúng định dạng email" under "Địa chỉ email" | Pass | 12/09/2022 |
| TC08 | Declare empty email address | 1. Enter the correct username 2. Enter the correct password 3. Enter the correct first & last name 4. Enter the correct phone number | Display Error Message "Vui lòng nhập đúng định dạng email" under "Địa chỉ email" | Display Error Message "Vui lòng nhập đúng định dạng email" under "Địa chỉ email" | Pass | 12/09/2022 |

| | | | | | | |
|------|----------------------------|---|------------------------|------------------------|------|------------|
| | | 5. Leave the email address blank 6. Click the "Đăng ký" button | | | | |
| TC09 | Check switch to Login Page | Click on "Đăng nhập ngay nào!" | Redirect to Login Page | Redirect to Login Page | Pass | 12/09/2022 |

Table 3. Change Language Mobile

| ID | Test Case Description | Test Case Procedure | Excepted Output | Actual Result | Test Result | Test Date |
|------|-----------------------|--------------------------------------|--|--|-------------|------------|
| TC01 | Check Languge Change | 1. Click on "VIE" 2. Select "ENG" | Change application language to English | Change application language to English | Pass | 12/09/2022 |

1.2. Sprint 2

Table 4. Forget Password Mobile

| ID | Test Case Description | Test Case Procedure | Expected Output | Actual Result | Test Result | Test Date |
|------|-------------------------------|--|---|---|-------------|------------|
| TC01 | Check Forget Password success | 1. Enter correct username 2. Enter email address used to register account 3. Click on "Hoàn thành" | Sent new password to registered email | Sent new password to registered email | Pass | 30/09/2022 |
| TC02 | Declare wrong username | 1. Enter wrong username 2. Enter email address used to register account 3. Click on "Hoàn thành" | Display Error Message "Xử lý thất bại, vui lòng kiểm tra lại tên đăng nhập" | Display Error Message "Xử lý thất bại, vui lòng kiểm tra lại tên đăng nhập" | Pass | 30/09/2022 |
| TC03 | Declare invalid username | 1. Enter invalid username 2. Enter email address used to register account 3. Click on "Hoàn thành" | Display Error Message "Xử lý thất bại, vui lòng kiểm tra lại tên đăng nhập" | Display Error Message "Xử lý thất bại, vui lòng kiểm tra lại tên đăng nhập" | Pass | 30/09/2022 |
| TC04 | Declare empty username | 1. Leave username blank 2. Enter email address used to register account 3. Click on "Hoàn thành" | Display Error Message "Xử lý thất bại, vui lòng kiểm tra lại tên đăng nhập" | Display Error Message "Xử lý thất bại, vui lòng kiểm tra lại tên đăng nhập" | Pass | 30/09/2022 |

| | | | | | | |
|------|----------------------------------|---|---|---|------|------------|
| TC05 | Declare invalid email address | 1. Enter correct username 2. Enter invalid email address 3. Click on "Hoàn thành" | Display Error Message "Xử lý thất bại, vui lòng kiểm tra lại email" | Display Error Message "Xử lý thất bại, vui lòng kiểm tra lại email" | Pass | 30/09/2022 |
| TC06 | Declare empty email address | 1. Enter correct username 2. Leave email address blank 3. Click on "Hoàn thành" | Display Error Message "Xử lý thất bại, vui lòng kiểm tra lại tên đăng nhập" | Display Error Message "Xử lý thất bại, vui lòng kiểm tra lại tên đăng nhập" | Pass | 30/09/2022 |
| TC07 | Declare wrong email address | 1. Enter correct username 2. Enter wrong email address 3. Click on "Hoàn thành" | Display Error Message "Xử lý thất bại, vui lòng kiểm tra lại email" | Display Error Message "Xử lý thất bại, vui lòng kiểm tra lại email" | Pass | 30/09/2022 |
| TC08 | Check switch to the Sign Up Page | Click on "Đăng ký nào!" | Switch to the Sign Up Page | Switch to the Sign Up Page | Pass | 30/09/2022 |
| TC09 | Check switch to the Login Page | Click on "Đăng nhập ngay nào!" | Switch to the Login Page | Switch to the Login Page | Pass | 30/09/2022 |

Table 5. Change Password Mobile

| ID | Test Case Description | Test Case Procedure | Excepted Output | Actual Result | Test Result | Test Date |
|-----------|--------------------------------|--|--|--|--------------------|------------------|
| TC01 | Check change password success | 1. Enter current password 2. Enter new password 3. Re-enter the new password 4. Click on "Đổi mật khẩu" | Change password and redirect to homepage | Change password and redirect to homepage | Pass | 30/09/2022 |
| TC02 | Declare wrong current password | 1. Enter wrong current password 2. Enter new password 3. Re-enter new password 4. Click on "Đổi mật khẩu" | Display Error Message "Mật khẩu không đúng, xin vui lòng nhập lại" | Display Error Message "Mật khẩu không đúng, xin vui lòng nhập lại" | Pass | 30/09/2022 |
| TC03 | Declare empty current password | 1. Leave current password blank 2. Enter new password 3. Re-enter new password 4. Click on "Đổi mật khẩu" | Display Error Message "Vui lòng nhập password lớn hơn 6 ký tự" | Display Error Message "Vui lòng nhập password lớn hơn 6 ký tự" | Pass | 30/09/2022 |
| TC04 | Declare invalid new password | 1. Enter current password 2. Enter invalid new password 3. Re-enter new password 4. Click on "Đổi mật khẩu" | Display Error Message "Vui lòng nhập password lớn hơn 6 ký tự" | Display Error Message "Vui lòng nhập password lớn hơn 6 ký tự" | Pass | 30/09/2022 |
| TC05 | Declare empty new password | 1. Enter current password 2. Leave new password blank 3. Re-enter new password 4. Click on "Đổi mật khẩu" | Display Error Message "Mật khẩu không đúng, xin vui lòng nhập lại" | Display Error Message "Mật khẩu không đúng, xin vui lòng nhập lại" | Pass | 30/09/2022 |

| | | | | | | |
|------|-------------------------------------|---|---|---|------|------------|
| TC06 | Declare wrong re-enter new password | 1. Enter current password 2. Enter new password 3. Re-enter the wrong new password 4. Click on "Đổi mật khẩu" | Display Error Message "Vui lòng nhập đúng với password" | Display Error Message "Vui lòng nhập đúng với password" | Pass | 30/09/2022 |
| TC07 | Declare empty re-enter new password | 1. Enter current password 2. Enter new password 3. Leave the box to re-enter the new password blank 4. Click on "Đổi mật khẩu" | Display Error Message "Vui lòng nhập đúng với password" | Display Error Message "Vui lòng nhập đúng với password" | Pass | 30/09/2022 |

Table 6. Register Page Web

| ID | Test Case Description | Test Case Procedure | Excepted Output | Actual Result | Test Result | Test Date |
|-----------|------------------------------|---|---|---|--------------------|------------------|
| TC01 | Check register success | 1. Enter correct username 2. Enter password 3. Re-enter password 4. Enter phone number 5. Enter email address 6. Click on "Gửi mã" button 7. Enter the code received from email 8. Click on "Đăng ký" button | Registered a new account to database | Registered a new account to database | Pass | 30/09/2022 |
| TC02 | Declare invalid username | 1. Enter invalid username 2. Enter password 3. Re-enter password 4. Enter phone number 5. Enter email address 6. Click on "Gửi mã" button 7. Enter the code received from email 8. Click on "Đăng ký" button | Display Error Message "Vui lòng nhập đầy đủ thông tin!" | Display Error Message "Vui lòng nhập đầy đủ thông tin!" | Pass | 30/09/2022 |
| TC03 | Declare empty username | 1. Leave username blank 2. Enter password 3. Re-enter password | Display Error Message "Vui lòng nhập đầy đủ thông tin!" | Display Error Message "Vui lòng nhập đầy đủ thông tin!" | Pass | 30/09/2022 |

| | | | | | | |
|------|------------------------|---|---|---|------|------------|
| | | 4. Enter phone number 5. Enter email address 6. Click on "Gửi mã" button 7. Enter the code received from email 8. Click on "Đăng ký" button | | | | |
| TC04 | Check register | 1. Enter username with a space 2. Enter password 3. Re-enter password 4. Enter phone number 5. Enter email address 6. Click on "Gửi mã" button 7. Enter the code received from email 8. Click on "Đăng ký" button | Display Error Message "Vui lòng nhập đầy đủ thông tin!" | Display Error Message "Vui lòng nhập đầy đủ thông tin!" | Pass | 30/09/2022 |
| TC05 | Declare empty password | 1. Enter correct username 2. Leave password blank 3. Re-enter password 4. Enter phone number 5. Enter email address 6. Click on "Gửi mã" button 7. Enter the code received from email 8. Click on "Đăng ký" button | Display Error Message "Vui lòng nhập đầy đủ thông tin!" | Display Error Message "Vui lòng nhập đầy đủ thông tin!" | Pass | 30/09/2022 |

| | | | | | | |
|------|---|--|---|---|------|------------|
| TC06 | Declare empty re-enter password | 1. Enter correct username 2. Enter password 3. Leave the box to re-enter password blank 4. Enter phone number 5. Enter email address 6. Click on "Gửi mã" button 7. Enter the code received from email 8. Click on "Đăng ký" button | Display Error Message "Vui lòng nhập đầy đủ thông tin!" | Display Error Message "Vui lòng nhập đầy đủ thông tin!" | Pass | 30/09/2022 |
| TC07 | Declare empty re-enter password & invalid email address | 1. Enter correct username 2. Enter password 3. Leave the box to re-enter password blank 4. Enter phone number 5. Enter invalid email address 6. Click on "Gửi mã" button 7. Enter the code received from email 8. Click on "Đăng ký" button | Display Error Message "Vui lòng nhập đầy đủ thông tin!" | Display Error Message "Vui lòng nhập đầy đủ thông tin!" | Pass | 30/09/2022 |
| TC08 | Declare any code | 1. Enter correct username 2. Enter password 3. Re-enter password 4. Enter phone number | Display Error Message "Vui lòng nhập đầy đủ thông tin!" | Display Error Message "Vui lòng nhập đầy đủ thông tin!" | Pass | 30/09/2022 |

| | | | | | | |
|------|----------------------------|--|---|---|------|------------|
| | | 5. Enter email address 6. Enter any code 7. Click on "Đăng ký" button | | | | |
| TC09 | Declare empty code | 1. Enter correct username 2. Enter password 3. Re-enter password 4. Enter phone number 5. Enter email address 6. Click on "Gửi mã" button 7. Leave the box to code blank 8. Click on "Đăng ký" button | Display Error Message "Vui lòng nhập đầy đủ thông tin!" | Display Error Message "Vui lòng nhập đầy đủ thông tin!" | Pass | 30/09/2022 |
| TC10 | Check register | 1. Enter correct username 2. Enter password 3. Re-enter password 4. Enter phone number 5. Leave email address blank 6. Click on "Gửi mã" button 7. Leave the box to code blank 8. Click on "Đăng ký" button | Display Error Message "Vui lòng nhập đầy đủ thông tin!" | Display Error Message "Vui lòng nhập đầy đủ thông tin!" | Pass | 30/09/2022 |
| TC11 | Check switch to Login Page | Click on "Trở lại trang đăng nhập" | Switch to Login Page | Switch to Login Page | Pass | 30/09/2022 |

Table 7. Login Page Web

| ID | Test Case Description | Test Case Procedure | Excepted Output | Actual Result | Test Result | Test Date |
|------|-----------------------------------|--|--|--|-------------|------------|
| TC01 | Declare empty password | 1. Enter the correct username 2. Leave the password blank 3. Click the "Đăng nhập" button | Display Error Message "User không tồn tại" | Display Error Message "User không tồn tại" | Pass | 30/09/2022 |
| TC02 | Declare empty username | 1. Leave the username blank 2. Enter the correct password 3. Click the "Đăng nhập" button | Display Error Message "User không tồn tại" | Display Error Message "User không tồn tại" | Pass | 30/09/2022 |
| TC03 | Declare empty username & password | 1. Leave username blank 2. Leave password blank 3. Click the "Đăng nhập" button | Display Error Message "User không tồn tại" | Display Error Message "User không tồn tại" | Pass | 30/09/2022 |
| TC04 | Declare wrong password | 1. Enter the correct username 2. Enter the wrong password 3. Click the "Đăng nhập" button | Display Error Message "Sai mật khẩu" | Display Error Message "Sai mật khẩu" | Pass | 30/09/2022 |
| TC05 | Declare unregistered username | 1. Enter the unregistered username 2. Enter the password 3. Click the "Đăng nhập" button | Display Error Message "User không tồn tại" | Display Error Message "User không tồn tại" | Pass | 30/09/2022 |
| TC06 | Declare incorrect username | 1. Enter the incorrect username format 2. Enter the password 3. Click the "Đăng nhập" button | Display Error Message "User không tồn tại" | Display Error Message "User không tồn tại" | Pass | 30/09/2022 |

| | | | | | | |
|------|--|--|---|---|------|------------|
| TC07 | Declare username & password with a space | 1. Enter a space in the username 2. Enter a space in the password 3. Click the "Đăng nhập" button | Display Error Message "User không tồn tại" | Display Error Message "User không tồn tại" | Pass | 30/09/2022 |
| TC08 | Declare password in an incorrect format | 1. Enter the correct username 2. Enter the password in an incorrect format 3. Click the "Đăng nhập" button | Display Error Message "Sai mật khẩu" | Display Error Message "Sai mật khẩu" | Pass | 30/09/2022 |
| TC09 | Check login page success | 1. Enter the correct username 2. Enter the correct password 3. Click the "Đăng nhập" button | Redirect to homepage according to user's role | Redirect to homepage according to user's role | Pass | 30/09/2022 |
| TC10 | Declare the deleted username | 1. Enter the deleted username 2. Enter the password 3. Click the "Đăng nhập" button | Display Error Message "User không tồn tại" | Display Error Message "User không tồn tại" | Pass | 30/09/2022 |
| TC11 | Check forget password | Click on "Quên mật khẩu?" | Switch to Forget Password Page | Switch to Forget Password Page | Pass | 30/09/2022 |
| TC12 | Check register page | Click on "Đăng ký tại đây!" | Switch to Register Page | Switch to Register Page | Pass | 30/09/2022 |

Table 8. Edit Profile Mobile

| ID | Test Case Description | Test Case Procedure | Excepted Output | Actual Result | Test Result | Test Date |
|-----------|-----------------------------------|--|--|--|--------------------|------------------|
| TC01 | Check Edit Profile Page success | 1. Enter first & last name 2. Enter phone number 3. Click on "Cập nhật" | Edit information and redirect to homepage | Edit information and redirect to homepage | Pass | 30/09/2022 |
| TC02 | Declare empty first name | 1. Leave first name blank 2. Enter last name 2. Enter phone number 3. Click on "Cập nhật" | Display Error Message "Không được để trống hoặc có kí tự đặc biệt" | Display Error Message "Không được để trống hoặc có kí tự đặc biệt" | Pass | 30/09/2022 |
| TC03 | Declare empty last name | 1. Enter first name 2. Leave last name blank 3. Enter phone number 4. Click on "Cập nhật" | Display Error Message "Không được để trống hoặc có kí tự đặc biệt" | Display Error Message "Không được để trống hoặc có kí tự đặc biệt" | Pass | 30/09/2022 |
| TC04 | Declare empty phone number | 1. Enter first & last name 2. Leave phone number blank 3. Click on "Cập nhật" | Display Error Message "Không được để trống hoặc có kí tự đặc biệt" | Display Error Message "Không được để trống hoặc có kí tự đặc biệt" | Pass | 30/09/2022 |
| TC05 | Declare phone number with a space | 1. Enter first & last name 2. Enter phone number with a space 3. Click on "Cập nhật" | Display Error Message "Không được để trống hoặc có kí tự đặc biệt" | Display Error Message "Không được để trống hoặc có kí tự đặc biệt" | Pass | 30/09/2022 |

| | | | | | | |
|------|------------------------------|---|--|--|------|------------|
| TC06 | Declare invalid phone number | 1. Enter first & last name 2. Enter invalid phone number 3. Click on "Cập nhật" | Display Error Message "Không được để trống hoặc có kí tự đặc biệt" | Display Error Message "Không được để trống hoặc có kí tự đặc biệt" | Pass | 30/09/2022 |
|------|------------------------------|---|--|--|------|------------|

Table 9. Change Password Web

| ID | Test Case Description | Test Case Procedure | Excepted Output | Actual Result | Test Result | Test Date |
|------|------------------------------------|---|--|--|-------------|------------|
| TC01 | Check Change Password Page success | 1. Enter current password 2. Enter new password 3. Enter confirmed password 4. Click on Save button | Change password and redirect to homepage | Change password and redirect to homepage | Pass | 30/09/2022 |
| TC02 | Declare wrong current password | 1. Enter wrong current password 2. Enter new password 3. Enter confirmed password 4. Click on Save button | Display Error Message "Wrong password!" | Display Error Message "Wrong password!" | Pass | 30/09/2022 |
| TC03 | Declare empty current password | 1. Leave the box to current password blank 2. Enter new password 3. Enter confirmed password 4. Click on Save button | Display Error Message "Empty field!" | Display Error Message "Empty field!" | Pass | 30/09/2022 |
| TC04 | Declare empty new password | 1. Enter current password 2. Leave the box to new | Display Error Message "Empty field!" | Display Error Message "Empty field!" | Pass | 30/09/2022 |

| | | | | | | |
|------|----------------------------------|---|---|---|------|------------|
| | | password blank 3. Enter confirmed password 4. Click on Save button | | | | |
| TC05 | Declare empty confirmed password | 1. Enter current password 2. Enter new password 3. Leave the box to confirmed password blank 4. Click on Save button | Display Error Message "Empty field!" | Display Error Message "Empty field!" | Pass | 30/09/2022 |
| TC06 | Declare wrong confirmed password | 1. Enter current password 2. Enter new password 3. Enter wrong confirmed password 4. Click on Save button | Display Error Message "Confirmed password incorrect!" | Display Error Message "Confirmed password incorrect!" | Pass | 30/09/2022 |
| TC07 | Cancel password change | 1. Enter current password 2. Enter new password 3. Enter confirmed password 4. Click on Cancel button | Redirect to homepage | Redirect to homepage | Pass | 30/09/2022 |

Table 10. Forget Password Web

| ID | Test Case Description | Test Case Procedure | Excepted Output | Actual Result | Test Result | Test Date |
|-----------|---|--|---|---|--------------------|------------------|
| TC01 | Check forget password page success | 1. Enter the registered username 2. Enter the registered email address 3. Click Reset button | Change password and redirect to login page | Change password and redirect to login page | Pass | 30/09/2022 |
| TC02 | Declare wrong registered username | 1. Enter the wrong registered username 2. Enter the registered email address 3. Click Reset button | Display Error Message "Xử lý thất bại, vui lòng kiểm tra lại tên đăng nhập" | Display Error Message "Xử lý thất bại, vui lòng kiểm tra lại tên đăng nhập" | Pass | 30/09/2022 |
| TC03 | Declare wrong registered email address | 1. Enter the registered username 2. Enter the wrong registered email address 3. Click Reset button | Display Error Message "Xử lý thất bại, vui lòng kiểm tra lại email" | Display Error Message "Xử lý thất bại, vui lòng kiểm tra lại email" | Pass | 30/09/2022 |
| TC04 | Declare wrong registered username and email address | 1. Enter the wrong registered username 2. Enter the wrong registered email address 3. Click Reset button | Display Error Message "Xử lý thất bại, vui lòng kiểm tra lại tên đăng nhập" | Display Error Message "Xử lý thất bại, vui lòng kiểm tra lại tên đăng nhập" | Pass | 30/09/2022 |

| | | | | | | |
|------|----------------------------|------------------------------------|-------------------|-------------------|------|------------|
| TC05 | Check switch to Login Page | Click on "Trở lại trang đăng nhập" | Redirect to login | Redirect to login | Pass | 30/09/2022 |
|------|----------------------------|------------------------------------|-------------------|-------------------|------|------------|

Table 11. Add New Authority Web

| ID | Test Case Description | Test Case Procedure | Excepted Output | Actual Result | Test Result | Test Date |
|------|------------------------------------|---|---|---|-------------|------------|
| TC01 | Check create new authority success | 1. Select Province/City 2. Select District 3. Enter name of Organization 4. Enter correct username 5. Enter correct password 6. Enter correct phone number 7. Enter correct email address 8. Click on "Create" button | Create a new user | Create a new user | Pass | 30/09/2022 |
| TC02 | Declare empty Province/City | 1.Unselect Province/City 2. Select District 3. Enter name of Organization 4. Enter correct username 5. Enter correct password 6. Enter correct phone number 7. Enter correct email address 8. Click on "Create" button | Display Error Message "Vui lòng nhập đầy đủ thông tin!" | Display Error Message "Vui lòng nhập đầy đủ thông tin!" | Pass | 30/09/2022 |

| | | | | | | |
|------|--|--|---|---|------|------------|
| TC03 | Declare empty Province/City and District | 1. Unselect Province/City 2. Unselect District 3. Enter name of Organization 4. Enter correct username 5. Enter correct password 6. Enter correct phone number 7. Enter correct email address 8. Click on "Create" button | Display Error Message "Vui lòng nhập đầy đủ thông tin!" | Display Error Message "Vui lòng nhập đầy đủ thông tin!" | Pass | 30/09/2022 |
| TC04 | Declare name of Organization with special characters | 1. Select Province/City 2. Select District 3. Enter the name of Organization with special characters 4. Enter correct username 5. Enter correct password 6. Enter correct phone number 7. Enter correct email address 8. Click on "Create" button | Display Error Message "Vui lòng nhập đầy đủ thông tin!" | Display Error Message "Vui lòng nhập đầy đủ thông tin!" | Pass | 30/09/2022 |
| TC05 | Declare invalid username | 1. Select Province/City 2. Select District 3. Enter name of Organization 4. Enter invalid username 5. Enter correct password 6. Enter correct phone number | Display Error Message "Vui lòng nhập đầy đủ thông tin!" | Display Error Message "Vui lòng nhập đầy đủ thông tin!" | Pass | 30/09/2022 |

| | | | | | | |
|------|-------------------------------|---|---|---|------|------------|
| | | 7. Enter correct email address 8. Click on "Create" button | | | | |
| TC06 | Declare username with a space | 1. Select Province/City 2. Select District 3. Enter name of Organization 4. Enter username with a space 5. Enter correct password 6. Enter correct phone number 7. Enter correct email address 8. Click on "Create" button | Display Error Message "Vui lòng nhập đầy đủ thông tin!" | Display Error Message "Vui lòng nhập đầy đủ thông tin!" | Pass | 30/09/2022 |
| TC07 | Declare empty username | 1. Select Province/City 2. Select District 3. Enter name of Organization 4. Leave username blank 5. Enter correct password 6. Enter correct phone number 7. Enter correct email address 8. Click on "Create" button | Display Error Message "Vui lòng nhập đầy đủ thông tin!" | Display Error Message "Vui lòng nhập đầy đủ thông tin!" | Pass | 30/09/2022 |
| TC08 | Declare empty password | 1. Select Province/City 2. Select District 3. Enter name of Organization 4. Enter correct username | Display Error Message "Vui lòng nhập đầy đủ thông tin!" | Display Error Message "Vui lòng nhập đầy đủ thông tin!" | Pass | 30/09/2022 |

| | | | | | | |
|------|------------------------------|--|---|---|------|------------|
| | | 5. Leave password blank 6. Enter correct phone number 7. Enter correct email address 8. Click on "Create" button | | | | |
| TC09 | Declare empty phone number | 1. Select Province/City 2. Select District 3. Enter name of Organization 4. Enter correct username 5. Enter correct password 6. Leave phone number blank 7. Enter correct email address 8. Click on "Create" button | Display Error Message "Vui lòng nhập đầy đủ thông tin!" | Display Error Message "Vui lòng nhập đầy đủ thông tin!" | Pass | 30/09/2022 |
| TC10 | Declare empty email address | 1. Select Province/City 2. Select District 3. Enter name of Organization 4. Enter correct username 5. Enter correct password 6. Enter correct phone number 7. Leave email address blank 8. Click on "Create" button | Display Error Message "Vui lòng nhập đầy đủ thông tin!" | Display Error Message "Vui lòng nhập đầy đủ thông tin!" | Pass | 30/09/2022 |
| TC11 | Declare invalid phone number | 1. Select Province/City 2. Select District 3. Enter name of Organization 4. Enter correct username | Display Error Message "Vui lòng nhập đầy đủ thông tin!" | Display Error Message "Vui lòng nhập đầy đủ thông tin!" | Pass | 30/09/2022 |

| | | | | | | |
|--|--|---|--|--|--|--|
| | | 5. Enter correct password 6. Enter correct phone number 7. Enter invalid email address 8. Click on "Create" button | | | | |
|--|--|---|--|--|--|--|

1.3. Sprint 3

Table 12. Survey Mobile

| ID | Test Case Description | Test Case Procedure | Excepted Output | Actual Result | Test Result | Test Date |
|------|--|--|---|---|-------------|------------|
| TC01 | Check survey success | 1. Take a photo 2. Enter relevant information 3. Click on "Xác nhận" button | Submit survey to database and redirect to home page | Submit survey to database and redirect to home page | Pass | 17/10/2022 |
| TC02 | Declare empty photo | 1. Take a photo 2. Click on "-" button 3. Enter relevant information 4. Click on "Xác nhận" button | Display Error Message "Không được để trống" | Display Error Message "Không được để trống" | Pass | 17/10/2022 |
| TC03 | Declare empty photo & relevant information | 1. Take a photo 2. Click on "-" button 3. Leave the box to relevant information blank 4. Click on "Xác nhận" button | Display Error Message "Không được để trống" | Display Error Message "Không được để trống" | Pass | 17/10/2022 |
| TC04 | Declare empty relevant information | 1. Take a photo 2. Leave the box to relevant | Submit survey to database and redirect to home page | Submit survey to database and redirect to home page | Pass | 17/10/2022 |

| | | | | | | |
|------|---|--|---|---|------|------------|
| | | information blank 3. Click on "Xác nhận" button | | | | |
| TC05 | Declare a new craft village | 1. Take a photo 2. Click on "Thêm làng nghề" 3. Enter the name of craft village 4. Enter the description about craft village 5. Enter relevant information 6. Click on "Xác nhận" button | Submit survey to database and redirect to home page | Submit survey to database and redirect to home page | Pass | 17/10/2022 |
| TC06 | Declare empty name of craft village | 1. Take a photo 2. Click on "Thêm làng nghề" 3. Leave the box to the name of craft village blank 4. Enter the description about craft village 5. Enter relevant information 6. Click on "Xác nhận" button | Display Error Message "Không được để trống" | Display Error Message "Không được để trống" | Pass | 17/10/2022 |
| TC07 | Declare empty the description about craft village | 1. Take a photo 2. Click on "Thêm làng nghề" 3. Enter the name of craft village 4. Leave the box to the | Display Error Message "Không được để trống" | Display Error Message "Không được để trống" | Pass | 17/10/2022 |

| | | | | | | |
|------|--|--|--|---|------|------------|
| | | description about craft village blank 5. Enter relevant information 6. Click on "Xác nhận" button | | | | |
| TC08 | Check AI detection ability | 1. Take a photo (water pollution + soil pollution) 2. Enter relevant information 3. Click on "Xác nhận" button | Detect 2 types of pollution (water pollution + soil pollution) | Detect 1 types of pollution (water pollution) | Fail | 17/10/2022 |
| TC09 | Check AI detection ability & declare empty photo | 1. Take a photo (water pollution + soil pollution) 2. Click on "-" button 3. Enter relevant information 4. Click on "Xác nhận" button | Detect 2 types of pollution (water pollution + soil pollution) | Detect 1 types of pollution (water pollution) | Fail | 17/10/2022 |
| TC10 | Check AI detection ability, declare empty photo and relevant information | 1. Take a photo (water pollution + soil pollution) 2. Click on "-" button 3. Leave the box to relevant information blank 4. Click on "Xác nhận" button | Display Error Message "Không được để trống" | Detect 1 types of pollution (water pollution) | Fail | 17/10/2022 |
| TC11 | Check AI detection ability & declare empty relevant information | 1. Take a photo (water pollution + soil pollution) 2. Leave the box to relevant information blank 3. Click on "Xác nhận" button | Detect 2 types of pollution (water pollution + soil pollution) | Detect 1 types of pollution (water pollution) | Fail | 17/10/2022 |

| | | | | | | |
|------|---|--|--|---|------|------------|
| TC12 | Check AI detection ability with a new craft village | <ol style="list-style-type: none"> 1. Take a photo (water pollution + soil pollution) 2. Click on "Thêm làng nghề" 3. Enter the name of craft village 4. Enter the description about craft village 5. Enter relevant information 6. Click on "Xác nhận" button | Detect 2 types of pollution (water pollution + soil pollution) | Detect 1 types of pollution (water pollution) | Fail | 17/10/2022 |
| TC13 | Check AI detection ability with a new craft village & declare empty name of craft village | <ol style="list-style-type: none"> 1. Take a photo (water pollution + soil pollution) 2. Click on "Thêm làng nghề" 3. Leave the box to the name of craft village blank 4. Enter the description about craft village 5. Enter relevant information 6. Click on "Xác nhận" button | Display Error Message "Không được để trống" | Detect 1 types of pollution (water pollution) | Fail | 17/10/2022 |
| TC14 | Check AI detection ability with a new craft village & declare empty description about craft village | <ol style="list-style-type: none"> 1. Take a photo (water pollution + soil pollution) 2. Click on "Thêm làng nghề" 3. Enter the name of craft village 4. Leave the box to the | Display Error Message "Không được để trống" | Detect 1 types of pollution (water pollution) | Fail | 17/10/2022 |

| | | | | | |
|--|--|--|--|--|--|
| | | description about craft village blank 5. Enter relevant information 6. Click on "Xác nhận" button | | | |
|--|--|--|--|--|--|

Table 13. Survey Household Web

| ID | Test Case Description | Test Case Procedure | Excepted Output | Actual Result | Test Result | Test Date |
|-----------|--|--|---|---|--------------------|------------------|
| TC01 | Check survey page success | 1.Select Province/City 2. Select District 3. Select Ward 4. Select Village 5. Click on "Khai báo" button | Enter new data to database | Enter new data to database | Pass | 17/10/2022 |
| TC02 | Declare empty Province/City | 1.Unselect Province/City 2. Select District 3. Select Ward 4. Select Village 5. Click on "Khai báo" button | Display Error Message "Vui lòng nhập đầy đủ thông tin!" | Display Error Message "Vui lòng nhập đầy đủ thông tin!" | Pass | 17/10/2022 |
| TC03 | Declare empty Province/City & District | 1.Unselect Province/City 2. Unselect District 3. Select Ward 4. Select Village 5. Click on "Khai báo" button | Display Error Message "Vui lòng nhập đầy đủ thông tin!" | Display Error Message "Vui lòng nhập đầy đủ thông tin!" | Pass | 17/10/2022 |
| TC04 | Declare empty Province/City, District & Ward | 1. Unelect Province/City 2. Unselect District 3. Unselect Ward 4. Select Village 5. Click on "Khai báo" button | Display Error Message "Vui lòng nhập đầy đủ thông tin!" | Display Error Message "Vui lòng nhập đầy đủ thông tin!" | Pass | 17/10/2022 |

| | | | | | | |
|------|---|---|---|---|------|------------|
| TC05 | Declare empty Province/City, District, Ward & Village | 1. Unselect Province/City 2. Unselect District 3. Unselect Ward 4. Unselect Village 5. Click on "Khai báo" button | Display Error Message "Vui lòng nhập đầy đủ thông tin!" | Display Error Message "Vui lòng nhập đầy đủ thông tin!" | Pass | 17/10/2022 |
| TC06 | Declare a new village success | 1. Select Province/City 2. Select District 3. Select Ward 4. Enter the latitude 5. Enter the longitude 6. Enter the name of village 7. Enter the description about craft village 8. Click on "Khai báo" button | Display Error Message "Vui lòng nhập đầy đủ thông tin!" | Display Error Message "Vui lòng nhập đầy đủ thông tin!" | Pass | 17/10/2022 |
| TC07 | Declare invalid latitude | 1. Select Province/City 2. Select District 3. Select Ward 4. Enter the invalid latitude 5. Enter the longitude 6. Enter the name of village 7. Enter the description about craft village 8. Click on "Khai báo" button | Display Error Message "Vui lòng nhập đầy đủ thông tin!" | Display Error Message "Vui lòng nhập đầy đủ thông tin!" | Pass | 17/10/2022 |

| | | | | | | |
|------|---|---|---|---|------|------------|
| TC08 | Declare invalid longitude | 1. Select Province/City 2. Select District 3. Select Ward 4. Enter the latitude 5. Enter the invalid longitude 6. Enter the name of village 7. Enter the description about craft village 8. Click on "Khai báo" button | Display Error Message "Vui lòng nhập đầy đủ thông tin!" | Display Error Message "Vui lòng nhập đầy đủ thông tin!" | Pass | 17/10/2022 |
| TC09 | Declare the name of village with special characters | 1. Select Province/City 2. Select District 3. Select Ward 4. Enter the latitude 5. Enter the longitude 6. Enter the name of village with special characters 7. Enter the description about craft village 8. Click on "Khai báo" button | Display Error Message "Vui lòng nhập đầy đủ thông tin!" | Display Error Message "Vui lòng nhập đầy đủ thông tin!" | Pass | 17/10/2022 |
| TC10 | Declare empty description about craft village | 1. Select Province/City 2. Select District 3. Select Ward 4. Enter the latitude 5. Enter the longitude | Display Error Message "Vui lòng nhập đầy đủ thông tin!" | Display Error Message "Vui lòng nhập đầy đủ thông tin!" | Pass | 17/10/2022 |

| | | | | | |
|--|--|--|--|--|--|
| | | 6. Enter the name of village 7. Leave the box to the description about craft village blank 8. Click on "Khai báo" button | | | |
|--|--|--|--|--|--|

1.4. Sprint 4

Table 14. Accept/Decline New Village Web

| ID | Test Case Description | Test Case Procedure | Excepted Output | Actual Result | Test Result | Test Date |
|------|------------------------------------|---|---|---|-------------|------------|
| TC01 | Check Accept new village success | Click on "√" button | Accept new village | Accept new village | Pass | 03/11/2022 |
| TC02 | Check Decline new village success | Click on "X" button | Decline new village | Decline new village | Pass | 03/11/2022 |
| TC03 | Check Create a new village success | 1. Select Ward 2. Enter the name of craft village 3. Enter the longitude 4. Enter the latitude 5. Enter the description about craft village 6. Click on "Tạo" button | Create a new village to database | Create a new village to database | Pass | 03/11/2022 |
| TC04 | Declare empty ward | 1. Unselect Ward 2. Enter the name of craft village 3. Enter the longitude 4. Enter the latitude 5. Enter the description about | Display Error Message "Vui lòng nhập đầy đủ thông tin!" | Display Error Message "Vui lòng nhập đầy đủ thông tin!" | Pass | 03/11/2022 |

| | | | | | | |
|------|--|---|---|---|------|------------|
| | | craft village 6. Click on "Tạo" button | | | | |
| TC05 | Declare name of craft village with special character | 1. Select Ward 2. Enter the name of craft village with special characters 3. Enter the longitude 4. Enter the latitude 5. Enter the description about craft village 6. Click on "Tạo" button | Create a new village to database | Create a new village to database | Pass | 03/11/2022 |
| TC06 | Declare invalid longitude | 1. Select Ward 2. Enter the name of craft village 3. Enter the invalid longitude 4. Enter the latitude 5. Enter the description about craft village 6. Click on "Tạo" button | Display Error Message "Vui lòng nhập đầy đủ thông tin!" | Display Error Message "Vui lòng nhập đầy đủ thông tin!" | Pass | 03/11/2022 |
| TC07 | Declare invalid latitude | 1. Select Ward 2. Enter the name of craft village 3. Enter the longitude 4. Enter the invalid latitude | Display Error Message "Vui lòng nhập đầy đủ thông tin!" | Display Error Message "Vui lòng nhập đầy đủ thông tin!" | Pass | 03/11/2022 |

| | | | | | | |
|------|---|--|---|---|------|------------|
| | | 5. Enter the description about craft village 6. Click on "Tạo" button | | | | |
| TC08 | Declare empty description about craft village | 1. Select Ward 2. Enter the name of craft village 3. Enter the longitude 4. Enter the latitude 5. Leave the description about craft village blank 6. Click on "Tạo" button | Display Error Message "Vui lòng nhập đầy đủ thông tin!" | Display Error Message "Vui lòng nhập đầy đủ thông tin!" | Pass | 03/11/2022 |
| TC09 | Declare empty name of craft village | 1. Select Ward 2. Leave the box to the name of craft village blank 3. Enter the longitude 4. Enter the latitude 5. Enter the description about craft village 6. Click on "Tạo" button | Display Error Message "Vui lòng nhập đầy đủ thông tin!" | Display Error Message "Vui lòng nhập đầy đủ thông tin!" | Pass | 03/11/2022 |

Table 15. Dashboard Page Web

| ID | Test Case Description | Test Case Procedure | Excepted Output | Actual Result | Test Result | Test Date |
|------|--|--|---|---|-------------|------------|
| TC01 | Check dashboard | 1. Click on "Village" button 2. Click on "New Village" 3. Click on "Dashboard" | Switch to Accept/Decline Homepage Page | Switch to Accept/Decline Homepage Page | Pass | 03/11/2022 |
| TC02 | Check switch to Accept/Decline Page | 1. Click on "Village" button 2. Click on "New Village" | Switch to Accept/Decline Page | Switch to Accept/Decline Page | Pass | 03/11/2022 |

1.5. Sprint 5

Table 16. New Survey Mobile

| ID | Test Case Description | Test Case Procedure | Excepted Output | Actual Result | Test Result | Test Date |
|------|--|--|--|--|-------------|------------|
| TC01 | Check AI detection ability | 1. Take a photo (water pollution + soil pollution) 2. Enter relevant information 3. Click on "Xác nhận" button | Detect 2 types of pollution (water pollution + soil pollution) | Detect 2 types of pollution (water pollution + soil pollution) | Pass | 20/11/2022 |
| TC02 | Check AI detection ability & declare empty photo | 1. Take a photo (water pollution + soil pollution) 2. Click on "-" button 3. Enter relevant information 4. Click on "Xác nhận" button | Display Error Message "Không được để trống" | Display Error Message "Không được để trống" | Pass | 20/11/2022 |
| TC03 | Check AI detection ability, declare empty photo and relevant information | 1. Take a photo (water pollution + soil pollution) 2. Click on "-" button 3. Leave the box to relevant information blank 4. Click on "Xác nhận" button | Display Error Message "Không được để trống" | Display Error Message "Không được để trống" | Pass | 20/11/2022 |
| TC04 | Check AI detection ability & declare empty relevant information | 1. Take a photo (water pollution + soil pollution) 2. Leave the box to relevant | Submit survey to database and redirect to homepage | Submit survey to database and redirect to homepage | Pass | 20/11/2022 |

| | | | | | | |
|------|---|--|--|--|------|------------|
| | | information blank 3. Click on "Xác nhận" button | | | | |
| TC05 | Check AI detection ability with a new craft village | 1. Take a photo (water pollution + soil pollution) 2. Click on "Thêm làng nghề" 3. Enter the name of craft village 4. Enter the description about craft village 5. Enter relevant information 6. Click on "Xác nhận" button | Submit survey to database and redirect to homepage | Submit survey to database and redirect to homepage | Pass | 20/11/2022 |
| TC06 | Check AI detection ability with a new craft village & declare empty name of craft village | 1. Take a photo (water pollution + soil pollution) 2. Click on "Thêm làng nghề" 3. Leave the box to the name of craft village blank 4. Enter the description about craft village 5. Enter relevant information 6. Click on "Xác nhận" button | Display Error Message "Không được để trống" | Display Error Message "Không được để trống" | Pass | 20/11/2022 |

| | | | | | | |
|------|---|--|---|---|------|------------|
| TC07 | Check AI detection ability with a new craft village & declare empty description about craft village | 1. Take a photo (water pollution + soil pollution) 2. Click on "Thêm làng nghề" 3. Enter the name of craft village 4. Leave the box to the description about craft village blank 5. Enter relevant information 6. Click on "Xác nhận" button | Display Error Message "Không được để trống" | Display Error Message "Không được để trống" | Pass | 20/11/2022 |
|------|---|--|---|---|------|------------|

1.6. Integration Testing Sumary

Table 17. *Integration Testing Sumary*

| Sprint | Number of Test Case | PASS | FAIL |
|--------------|---------------------|------------|----------|
| 1 | 22 | 22 | 0 |
| 2 | 45 | 45 | 0 |
| 3 | 24 | 17 | 7 |
| 4 | 11 | 11 | 0 |
| 5 | 7 | 7 | 0 |
| Total | 109 | 102 | 7 |

2. Integration Testing

2.1. Sprint 1

Table 18. API Testing Sprint 1

| No | Test case name | Title | Method | URL | Payload | Expected result | Actual result | Status |
|----|----------------|----------------------------|--------|---|--|---|---------------|--------|
| 1 | API Address | Get countries | GET | /craftvillage/api/address/getcountrylist | [{ "countryId": int, "zipcode": String, "countryName": String },] | [{ "countryId": 1, "zipcode": "AF", "countryName": "AFGHANISTAN" }, { "countryId": 2, "zipcode": "AX", "countryName": "ÅLAND ISLANDS" },] | | Pass |
| 2 | | Get provinces by countryid | GET | /craftvillage/api/address/getprovincelist?countryid=234 | [{ "provinceId": int, "provinceCode": String, "provinceName": String },] | [{ "provinceId": 1, "provinceCode": null, "provinceName": "Thành phố Hà Nội" }, { "provinceId": 2, "provinceCode": null, "provinceName": "Tỉnh Hà Giang" },] | | Pass |

| | | | | | | |
|---|-----------------------------|-----|---|---|------|--|
| | | | | | | |
| 3 | Get districts by provinceid | GET | /craftvillage/api/address/getdistrictlist?provinc eid=1 | [{"districtId": int, "districtCode": String, "districtName": String}], [{"districtId": 1, "districtCode": null, "districtName": "Quận Ba Đình"}, {"districtId": 4, "districtCode": null, "districtName": "Quận Long Biên"}], | Pass | |
| 4 | Get wards by districtid | GET | /craftvillage/api/address/getwardlist?districtid=1 | [{"wardId": int, "wardCode": String, "wardName": String}], [{"wardId": 1, "wardCode": null, "wardName": "Phường Phúc Xá"}, {"wardId": 4, "wardCode": null, "wardName": "Phường Trúc Bạch"}], | Pass | |
| 5 | Get villages by wardid | GET | /craftvillage/api/address/getvillage?wardid=20029 | [{"villageId": int, "villageName": String, "coordinate": String, "note": String, "hasAdded": int}, {"villageId": 3, "villageName": "Làng Nghè Bánh Tráng", "coordinate": "16.450702, 107.53066", "note": "Bánh tráng truyền thống ở làng Lụu Bảo đ", "hasAdded": 1}, {"villageId": 13, "villageName": "lн1", "coordinate": "16.46084699999999,107.60372199999", "note": "not)1", "hasAdded": 1}], | Pass | |

| | | | | | | | | |
|---|-------------|---------------------|------|--------------------------------------|---|-----|-----|------|
| | | | | | | | | |
| 6 | API Village | Create new village | POST | /craftvillage/api/village/newvillage | <pre> "wardId": "3226", "longitude": "989", "latitude": "999", "note": "25/10", "hasAdded": "0", "villageName": "lang nghe moi 25/10 lan 1"], },] } </pre> | 205 | 205 | Pass |
| 7 | | Create same village | POST | /craftvillage/api/village/newvillage | <pre> "wardId": "3226", "longitude": "989", "latitude": "999", "note": "25/10", "hasAdded": "0", "villageName": "lang nghe moi 25/10 lan 11"], },] } </pre> | -1 | -1 | Pass |

2.2. Sprint 2

Table 19. API Testing Sprint 2

| No | Test case name | Title | Method | URL | Payload | Expected result | Actual result | Status |
|----|----------------|-----------------------------|--------|--|--|--|---|--------|
| 1 | Send mail | Send activated code | GET | /craftvillage/api/user/sendmail?email=capstone_1@gmail.com | | { "activeCode": String, "activeDate": String } | { "activeCode": "x7Hjx8", "activeDate": "2022-10-1" } | Pass |
| 2 | | Register_success | POST | /craftvillage/api/user/register | { "username": "user01", "password": "user01", "role": "USER", "firstname": "firstname", "lastname": "lastname", "phone": "0905123456", "email": "capstone_1@gmail.com", "activeDate": "2022-10-1", "activeCode": "eDdIang4", "activeCodeSubmit": "x7Hjx8" } | { "key": "11" } | { "key": "11" } | Pass |
| 3 | Register | Register with same username | POST | /craftvillage/api/user/register | { "username": "user01", "password": "user02", "role": "USER", "firstname": "firstname", "lastname": "lastname", "phone": "0905123789", "email": "capstone_11@gmail.com", "activeDate": "2022-10-1", "activeCode": "aTg3Skhr", "activeCodeSubmit": "i87JHk" } | { "key": "12" } | { "key": "12" } | Pass |

| | | | | | | | |
|---|---------------------------------|-------------|---------------------------------|--|--------------------------------|--------------------------------|-------------|
| 4 | Register with same Email | POST | /craftvillage/api/user/register | <pre>{ "username": "user02", "password": "user02", "role": "USER", "firstname": "firstname", "lastname": "lastname", "phone": "0905123789", "email": "capstone_10@gmail.com" "activeDate": "2022-10-1", "activeCode": "aTg3Skhr", "activeCodeSubmit": "i87JHk" }</pre> | <pre>{ "key": "13" }</pre> | <pre>{ "key": "13" }</pre> | Pass |
| 5 | Register with same phone number | POST | /craftvillage/api/user/register | <pre>{ "username": "user02", "password": "user02", "role": "USER", "firstname": "firstname", "lastname": "lastname", "phone": "0905123456", "email": "capstone_11@gmail.com" "activeDate": "2022-10-1", "activeCode": "aTg3Skhr", "activeCodeSubmit": "i87JHk" }</pre> | <pre>{ "key": "14" }</pre> | <pre>{ "key": "14" }</pre> | Pass |
| 6 | Register with wrong code | POST | /craftvillage/api/user/register | <pre>{ "username": "user02", "password": "user02", "role": "USER", "firstname": "firstname", "lastname": "lastname", "phone": "0905123789", "email": "capstone_11@gmail.com" "activeDate": "2022-10-1", "activeCode": "aTg3Skhr", "activeCodeSubmit": "abcxyz" }</pre> | <pre>{ "key": "0" }</pre> | <pre>{ "key": "0" }</pre> | Pass |

| | | | | | | | | |
|----|--------|----------------------------|-------------|-----------------------------------|--|---|---|-------------|
| 7 | | Register with expired code | POST | /craftvillage/api/user/register | <pre>{ "username": "user02", "password": "user02", "role": "USER", "firstname": "firstname", "lastname": "lastname", "phone": "0905123789", "email": "capstone_11@gmail.com", "activeDate": "2022-9-1", "activeCode": "aTg3Skhr", "activeCodeSubmit": "i87JHk" }</pre> | <pre>{ "key": "2" }</pre> | <pre>{ "key": "2" }</pre> | Pass |
| 8 | | Login success | POST | /craftvillage/api/user/loggingapp | <pre>{ "name": "user01", "password": "user01" }</pre> | <pre>{ "error": null, "token": String }</pre> | <pre>{ "error": null, "token": "eyJhbGciOiJIUzI1NiJ9.eyJzdWIiOiJ3eVTAziwiC2VzclvbklEIjoiRUYjM8IxIjy2REUEMDQ1MDM5OTJ3ODg0RTZDRTRCMKfIlC1leHAiOjf2NzE5NTEx00MsJzlhdCI6MTY3MDQ4MDM1NH0.x3V0WftBYWnP1GizK8oAm9qp5tSLNuZE6fMNKHbugc" }</pre> | Pass |
| 9 | Log in | Login with wrong username | POST | /craftvillage/api/user/loggingapp | <pre>{ "name": "user02", "password": "user01" }</pre> | <pre>{ "error": "ERR_USER_NOT_EXIST", "token": null }</pre> | <pre>{ "error": "ERR_USER_NOT_EXIST", "token": null }</pre> | Pass |
| 10 | | Login account on 2 devices | POST | /craftvillage/api/user/loggingapp | <pre>{ "name": "user01", "password": "user01" }</pre> | <pre>{ "error": "ERROR_LOGIN_DOUBLE", "token": null }</pre> | <pre>{ "error": "ERROR_LOGIN_DOUBLE", "token": null }</pre> | Pass |

| | | | | | | | | |
|----|-----------------|---|-------------|-----------------------------------|---|--|--|-------------|
| 11 | | Login with wrong password | POST | /craftvillage/api/user/loggingapp | <pre>{ ... "name": "user01", "password": "user02" }</pre> | <pre>{ "error": "ERR_USER_WRONG_PASS", "token": null }</pre> | <pre>{ ... "error": "ERR_USER_WRONG_PASS", "token": null }</pre> | Pass |
| 12 | Log out | Log out | GET | /craftvillage/api/user/logoutapp | | TRUE | TRUE | Pass |
| 13 | Forget password | Reset password _success | POST | /craftvillage/api/user/forgetpass | <pre>{ ... "username": "user01", "email": "capstone_1@gmail.com" }</pre> | TRUE | TRUE | Pass |
| 14 | | Reset password with wrong username | POST | /craftvillage/api/user/forgetpass | <pre>{ ... "username": "user02", "email": "capstone_1@gmail.com" }</pre> | FALSE | FALSE | Pass |
| 15 | | Reset password with wrong email | POST | /craftvillage/api/user/forgetpass | <pre>{ ... "username": "user01", "email": "capstone_11@gmail.com" }</pre> | FALSE | FALSE | Pass |
| 16 | Change password | Change password _success | POST | /craftvillage/api/user/changepass | <pre>{ ... "oldPass": "user01", "newPass": "newpass" }</pre> | TRUE | TRUE | Pass |
| 17 | | Change password with wrong current password | POST | /craftvillage/api/user/changepass | <pre>{ ... "oldPass": "oldpass", "newPass": "user01" }</pre> | FALSE | FALSE | Pass |

| | | | | | | | | |
|----|-------------|------------------|-------------|-----------------------------------|--|------|------|-------------|
| 18 | Update info | Update user info | POST | /craftvillage/api/user/updateuser | <pre>{ "firstname": "newfirstname", "lastname": "newlastname", "phone": "0905123456" }</pre> | TRUE | TRUE | Pass |
|----|-------------|------------------|-------------|-----------------------------------|--|------|------|-------------|

2.3. Sprint 3

Table 20. API Testing Sprint 3

| No | Test case name | Title | Method | URL | Payload | Expected result | Actual result | Status |
|----|----------------|------------------------------|------------|---|---------|--|--|-------------|
| 1 | Detect village | Detect village by coordinate | GET | /craftvillage/api/village/detectvillage?longitude=123.123&latitude=123.23 | | <pre>{ "hasAdded": "1", "wardName": "Phường Phúc Xá", "villageLongitude": "123.23", "districtId": "1", "districtName": "Quận Ba Đình", "villageNote": "day la mo ta", "villageLatitude": "123.123", "wardId": "1", "provinceName": "Thành phố Hà Nội", "villageName": "7/12 test", "villageId": "241", "provinceId": "1" }</pre> | <pre>{ "hasAdded": "1", "wardName": "Phường Phúc Xá", "villageLongitude": "123.23", "districtId": "1", "districtName": "Quận Ba Bình", "villageNote": "day la mo ta", "villageLatitude": "123.123", "wardId": "1", "provinceName": "Thành phố Hà Nội", "villageName": "7/12 test", "villageId": "241", "provinceId": "1" }</pre> | Pass |

| | | | | | | | | |
|---|---------------|---------------|------|---|---|-------|-------|------|
| | | | | | "241", "provinceId": "1" } | | | |
| 2 | Submit survey | Submit survey | POST | /craftvillage/api/village/submitvillage | <pre>{ "villageId": "1", "longitude": "123", "latitude": "latitude", "image": "imageEncodeBase64String", "result": "111", "note": "" }</pre> | TRUE | TRUE | Pass |
| 3 | | Submit survey | POST | /craftvillage/api/village/submitvillage | <pre>{ "villageId": "-1", "longitude": "123", "latitude": "latitude", "image": "imageEncodeBase64String", "result": "111", "note": "" }</pre> | FALSE | FALSE | Pass |

| | | | | | | | | |
|---|--------------------------------|-----------------------------|-------------|----------------------------|---|--|--|-------------|
| 4 | Declare village | Declare household's village | POST | /web/household/village | <pre>{ "villageId": "1" }</pre> | TRUE | TRUE | Pass |
| 5 | | Declare household's village | POST | /web/household/village | <pre>{ "villageId": "-1" }</pre> | FALSE | FALSE | Pass |
| 6 | Create Local Authority account | Create_success | POST | /web/admin/createauthority | <pre>{ "username": "localauthority1", "password": "localauthority1", "role": "LOCALAUTHORITY", "name": "LOCALAUTHORITY name", "phone": "0905111111", "email": "localauthority1@gmail.com", "district": "1" }</pre> | <pre>{ "key": "1", "message": "Đăng ký thành công!" }</pre> | <pre>{ "key": "1", "message": "Đăng ký thành công!" }</pre> | Pass |
| 7 | | Create with same account | POST | /web/admin/createauthority | <pre>{ "username": "localauthority1", "password": "localauthority1", "role": "LOCALAUTHORITY", "name": "LOCALAUTHORITY name", "phone": "0905111111", "email": "localauthority1@gmail.com", "district": "1" }</pre> | <pre>{ "key": "2", "message": "Người dùng này đã tồn tại!" }</pre> | <pre>{ "key": "2", "message": "Người dùng này đã tồn tại!" }</pre> | Pass |

| | | | | | | | |
|---|-------------------------------|-------------|----------------------------|---|--|--|-------------|
| 8 | Create with same email | POST | /web/admin/createauthority | <pre>{ "username": "localauthority2", "password": "localauthority2", "role": "LOCALAUTHORITY", "name": "LOCALAUTHORITY name", "phone": "0905222222", "email": "localauthority1@gmail.com" "district": "1" }</pre> | <pre>{ "key": "3", "message": "Email này đã được sử dụng!" }</pre> | <pre>{ "key": "3", "message": "Email này đã được sử dụng!" }</pre> | Pass |
| 9 | Create with same phone number | POST | /web/admin/createauthority | <pre>{ "username": "localauthority2", "password": "localauthority2", "role": "LOCALAUTHORITY", "name": "LOCALAUTHORITY name", "phone": "0905111111", "email": "localauthority2@gmail.com" "district": "1" }</pre> | <pre>{ "key": "4", "message": "Số điện thoại này đã được sử dụng!" }</pre> | <pre>{ "key": "4", "message": "Số điện thoại này đã được sử dụng!" }</pre> | Pass |

2.4. Sprint 4

Table 21. API Testing Sprint 4

| No | Test case name | Title | Method | URL | Payload | Expected result | Actual result | Status |
|----|----------------|------------|--------|------------------------------------|---|---|---|--------|
| 1 | Get surveys | Get survey | GET | /craftvillage/api/survey/allsurvey | { "completedSurvey": [{ "villageId": "1", "villageName": "Làng gốm Bát Tràng", "date": "2022-11-05" }], "inprogressSurvey": [] } | { "completedSurvey": [{ "villageId": "1", "villageName": "Làng gốm Bát Tràng", "date": "2022-11-05" }], "inprogressSurvey": [] } | { "completedSurvey": [{ "villageId": "1", "villageName": "Làng gốm Bát Tràng", "date": "2022-11-05" }], "inprogressSurvey": [] } | Pass |

| | | | | | | | |
|---|-----------------------------|------|---------------------------------|---|---|---|------|
| | | | | | | | |
| 2 | Register_success | POST | /craftvillage/api/user/register | <pre>{ "username": "user01", "password": "user01", "role": "USER", "firstname": "firstname", "lastname": "lastname", "phone": "0905123456", "email": "capstone_1@gmail.com", "activeDate": "2022-10-1", "activeCode": "e0dIang4", "activeCodeSubmit": "x7Hjx8" }</pre> | <pre>{ "key": "11", "message": "Đăng ký thành công!" }</pre> | <pre>{ "key": "11", "message": "Đăng ký thành công!" }</pre> | Pass |
| 3 | Register with same username | POST | /craftvillage/api/user/register | <pre>{ "username": "user01", "password": "user02", "role": "USER", "firstname": "firstname", "lastname": "lastname", "phone": "0905123789", "email": "capstone_11@gmail.com", "activeDate": "2022-10-1", "activeCode": "aTg3Skhr", "activeCodeSubmit": "i87JHk" }</pre> | <pre>{ "key": "12", "message": "Người dùng này đã tồn tại!" }</pre> | <pre>{ "key": "12", "message": "Người dùng này đã tồn tại!" }</pre> | Pass |
| 4 | Register with same Email | POST | /craftvillage/api/user/register | <pre>{ "username": "user02", "password": "user02", "role": "USER", "firstname": "firstname", "lastname": "lastname", "phone": "0905123789", "email": "capstone_1@gmail.com", "activeDate": "2022-10-1", "activeCode": "aTg3Skhr", "activeCodeSubmit": "i87JHk" }</pre> | <pre>{ "key": "13", "message": "Email này đã được sử dụng!" }</pre> | <pre>{ "key": "13", "message": "Email này đã được sử dụng!" }</pre> | Pass |

| | | | | | | | |
|---|---------------------------------|-------------|---------------------------------|---|---|---|-------------|
| 5 | Register with same phone number | POST | /craftvillage/api/user/register | <pre>{ "username": "user02", "password": "user02", "role": "USER", "firstname": "firstname", "lastname": "lastname", "phone": "0905123456", "email": "capstone_11@gmail.com", "activeDate": "2022-10-1", "activeCode": "aTg3Skhr", "activeCodeSubmit": "i87JHk" }</pre> | <pre>{ "key": "14", "message": "Số điện thoại này đã được sử dụng!" }</pre> | <pre>{ "key": "14", "message": "Số điện thoại này đã được sử dụng!" }</pre> | Pass |
| 6 | Register with wrong code | POST | /craftvillage/api/user/register | <pre>{ "username": "user02", "password": "user02", "role": "USER", "firstname": "firstname", "lastname": "lastname", "phone": "0905123789", "email": "capstone_11@gmail.com", "activeDate": "2022-10-1", "activeCode": "aTg3Skhr", "activeCodeSubmit": "abcxyz" }</pre> | <pre>{ "key": "0", "message": "Sai mã xác nhận!" }</pre> | <pre>{ "key": "0", "message": "Sai mã xác nhận!" }</pre> | Pass |
| 7 | Register with expired code | POST | /craftvillage/api/user/register | <pre>{ "username": "user02", "password": "user02", "role": "USER", "firstname": "firstname", "lastname": "lastname", "phone": "0905123789", "email": "capstone_11@gmail.com", "activeDate": "2022-9-1", "activeCode": "aTg3Skhr", "activeCodeSubmit": "i87JHk" }</pre> | <pre>{ "key": "2", "message": "Mã xác nhận đã hết hạn!" }</pre> | <pre>{ "key": "2", "message": "Mã xác nhận đã hết hạn!" }</pre> | Pass |

| | | | | | | | |
|---|---------------|---------------------|------|-----------------------------------|------|------|------|
| | | | | | | | |
| 8 | Make decision | Accept new village | POST | /web/authority/accept?villageId=4 | TRUE | TRUE | Pass |
| 9 | | Decline new village | POST | /web/authority/accept?villageId=5 | TRUE | TRUE | Pass |

2.5. Sprint 5

Table 22. API Testing Sprint 5

| No | Test case name | Title | Method | URL | Pay load | Expected result | Actual result | Status |
|----|------------------------------|------------------------------|--------|---|--|--|---------------|--------|
| 1 | Detect village by coordinate | Detect village by coordinate | GET | /craftvillage/api/village/detectvillage?longitude=123.123&latitude=123.23 | [{ "hasAdded": "1", "wardName": "Phường Phúc Xá", "villageLongitude": "123.23", "districtName": "Quận Ba Đình", "villageNote": "day la mo ta", "villageLatitude": "123.123", "provinceName": "Thành phố Hà Nội", "villageName": "7/12 test", "villageId": "241" }] | [{ "hasAdded": "1", "wardName": "Phường Phúc Xá", "villageLongitude": "123.23", "districtName": "Quận Ba Đình", "villageNote": "day la mo ta", "villageLatitude": "123.123", "provinceName": "Thành phố Hà Nội", "villageName": "7/12 test", "villageId": "241" }] | Pass | |

2.6. API Testing Summary

Table 23. API Testing Sumary

| SPRINT | Sprint 1 | Sprint 2 | Sprint 3 | Sprint 4 | Sprint 5 | Total |
|--------|----------|----------|----------|----------|----------|-------|
| PASS | 7 | 18 | 9 | 9 | 1 | 44 |
| FAIL | 0 | 0 | 0 | 0 | 0 | 0 |



Capstone Project 1

CMU-CS450

Code Standard Document
Version 1.0
Date: 30/08/2022

Craft Village Pollution Monitor System

Submitted by
Ca, Van Cong Le
Huy, Bui Duc
Phuc, Hua Hoang
Trung, Nguyen Thanh

Approved by
Ph.D. Nguyen Thanh Binh

Proposal Review Panel Representative:

Name Signature Date

Capstone Project 1 - Mentor:

A handwritten signature in blue ink, appearing to read 'Nguyễn Thành Bình'.

Name Signature Date

PROJECT INFORMATION

| Project acronym | CVPMS | | |
|--|---|--|------------|
| Project Title | Craft Village Pollution Monitor System | | |
| Start Date | 22/08/2022 | End Date | 07/12/2022 |
| Lead Institution | International School, Duy Tan University | | |
| Project Mentor | Ph.D. Thanh Binh, Nguyen | | |
| Scrum master / Project Leader & contact details | Ca, Van Cong Le <i>Email:</i> cascabusiness@gmail.com <i>Tel:</i> 0352707895 | | |
| Partner Organization | | | |
| Project Web URL | https://github.com/Casca113s2/craft-village-pollution-monitor-system | | |
| Team members | Name | Email | Tel |
| 25211207666 | Ca, Van Cong Le | cascabusiness@gmail.com | 0352707895 |
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| 25211204084 | Phuc, Hua Hoang | phuchuho0402@gmail.com | 0905639682 |
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DOCUMENT NAME

| | | | |
|-----------------------|----------------------------------|------------------|--|
| Document Title | Code Standard Document | | |
| Author(s) | Van Cong Le Ca Hua Hoang Phuc | | |
| Date | 30/08/2022 | File Name | C1SE.06_CVPMS_Code-Standard-Document_v1.0.docx |

REVISION HISTORY

| Version | Date | Comments | Author | Approval |
|----------------|-------------|-----------------|---------------|---|
| 1.0 | 30/08/2022 | Initial Release | All members |  |

Approve Document: Sign in to approve the document

| | | | |
|---------------------|------------------------|------|---|
| Mentor | Binh, Nguyen Thanh | Date | 30/08/2022 |
| | | Sign |  |
| Scrum Master | Ca, Van Cong Le | Date | 30/08/2022 |
| | | Sign |  |
| Scrum Member | Huy, Bui Duc | Date | 30/08/2022 |
| | | Sign |  |
| Scrum Member | Phuc, Hua Hoang | Date | 30/08/2022 |
| | | Sign |  |
| Scrum Member | Trung, Nguyen Thanh | Date | 30/08/2022 |
| | | Sign |  |

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1. Introduction

1.1. Purpose

This Coding Standard requires certain practices for developing programs in the Java, Dart language. The objective of this coding standard is to have a positive effect on:

- Avoidance of errors/bugs, especially the hard-to-find ones.
- Maintainability, by promoting some proven design principles

1.2. Scope

This standard pertains to the use of the Java, Dart language.

2. Code Standards

2.1. Dart Language Code Standard

2.1.1. Identifiers

- DO name types using UpperCamelCase.
- DO name extensions using UpperCamelCase.
- DO name libraries, packages, directories, and source files using lowercase_with_underscores.
- DO name import prefixes using lowercase_with_underscores.
- DO name other identifiers using lowerCamelCase.
- PREFER using lowerCamelCase for constant names.
- DO capitalize acronyms and abbreviations longer than two letters like words.
- PREFER using __, ___, etc. for unused callback parameters.
- DON'T use a leading underscore for identifiers that aren't private.
- DON'T use prefix letters.

2.1.2. Ordering

- DO place “dart:” imports before other imports.
- DO place “package:” imports before relative imports.
- DO specify exports in a separate section after all imports.
- DO sort sections alphabetically.

2.1.3. Formatting

- DO format your code using dart format.
- CONSIDER changing your code to make it more formatter-friendly.

- AVOID lines longer than 80 characters.
- DO use curly braces for all flow control statements.

2.1.4. Comments

- DO format comments like sentences.
- DON'T use block comments for documentation.

2.1.5. Doc comments

- DO use /// doc comments to document members and types.
- PREFER writing doc comments for public APIs.
- CONSIDER writing a library-level doc comment.
- CONSIDER writing doc comments for private APIs.
- DO start doc comments with a single-sentence summary.
- DO separate the first sentence of a doc comment into its own paragraph.
- AVOID redundancy with the surrounding context.
- PREFER starting function or method comments with third-person verbs.
- PREFER starting a non-boolean variable or property comment with a noun phrase.
- PREFER starting a boolean variable or property comment with “Whether” followed by a noun or gerund phrase.
- DON'T write documentation for both the getter and setter of a property.
- PREFER starting library or type comments with noun phrases.
- CONSIDER including code samples in doc comments.
- DO use square brackets in doc comments to refer to in-scope identifiers.
- DO use prose to explain parameters, return values, and exceptions.
- DO put doc comments before metadata annotations.

2.1.6. Markdown

- AVOID using markdown excessively.
- AVOID using HTML for formatting.
- PREFER backtick fences for code blocks.

2.1.7. Writing

- PREFER brevity.
- AVOID abbreviations and acronyms unless they are obvious.
- PREFER using “this” instead of “the” to refer to a member’s instance.

2.1.8. Libraries

- DO use strings in part of directives.
- DON'T import libraries that are inside the src directory of another package.
- DON'T allow an import path to reach into or out of lib.
- PREFER relative import paths.

2.1.9. Null

- DON'T explicitly initialize variables to null.
- DON'T use an explicit default value of null.
- PREFER using ?? to convert null to a boolean value.
- AVOID late variables if you need to check whether they are initialized.
- CONSIDER assigning a nullable field to a local variable to enable type promotion.

2.1.10. Strings

- DO use adjacent strings to concatenate string literals.
- PREFER using interpolation to compose strings and values.
- AVOID using curly braces in interpolation when not needed.
- Collections
 - DO use collection literals when possible.
 - DON'T use .length to see if a collection is empty.
 - AVOID using Iterable.forEach() with a function literal.
 - DON'T use List.from() unless you intend to change the type of the result.
 - DO use whereType() to filter a collection by type.
 - DON'T use cast() when a nearby operation will do.
 - AVOID using cast().

2.1.11. Functions

- DO use a function declaration to bind a function to a name.
- DON'T create a lambda when a tear-off will do.
- DO use = to separate a named parameter from its default value.
- Variables
 - DO follow a consistent rule for var and final on local variables.
 - AVOID storing what you can calculate.

2.1.12. Members

- DON'T wrap a field in a getter and setter unnecessarily.
- PREFER using a final field to make a read-only property.
- CONSIDER using => for simple members.
- DON'T use this. except to redirect to a named constructor or to avoid shadowing.
- DO initialize fields at their declaration when possible.

2.1.13. Constructors

- DO use initializing formals when possible.
- DON'T use late when a constructor initializer list will do.
- DO use ; instead of {} for empty constructor bodies.
- DON'T use new.
- DON'T use const redundantly.

2.1.14. Error handling

- AVOID catches without on clauses.
- DON'T discard errors from catches without on clauses.
- DO throw objects that implement Error only for programmatic errors.
- DON'T explicitly catch Error or types that implement it.
- DO use rethrow to rethrow a caught exception.

2.1.15. Asynchrony

- PREFER async/await over using raw futures.
- DON'T use async when it has no useful effect.
- CONSIDER using higher-order methods to transform a stream.
- AVOID using Completer directly.
- DO test for Future<T> when disambiguating a FutureOr<T> whose type argument could be Object.

2.1.16. Names

- DO use terms consistently.
- AVOID abbreviations.
- PREFER putting the most descriptive noun last.
- CONSIDER making the code read like a sentence.
- PREFER a noun phrase for a non-boolean property or variable.

- PREFER a non-imperative verb phrase for a boolean property or variable.
- CONSIDER omitting the verb for a named boolean parameter.
- PREFER the “positive” name for a boolean property or variable.
- PREFER an imperative verb phrase for a function or method whose main purpose is a side effect.
- PREFER a noun phrase or non-imperative verb phrase for a function or method if returning a value is its primary purpose.
- CONSIDER an imperative verb phrase for a function or method if you want to draw attention to the work it performs.
- AVOID starting a method name with get.
- PREFER naming a method to `__()` if it copies the object’s state to a new object.
- PREFER naming a method as `__()` if it returns a different representation backed by the original object.
- AVOID describing the parameters in the function’s or method’s name.
- DO follow existing mnemonic conventions when naming type parameters.

2.1.17. Libraries

- PREFER making declarations private.
- CONSIDER declaring multiple classes in the same library.

2.1.18. Classes and mixins

- AVOID defining a one-member abstract class when a simple function will do.
- AVOID defining a class that contains only static members.
- AVOID extending a class that isn’t intended to be subclassed.
- DO document if your class supports being extended.
- AVOID implementing a class that isn’t intended to be an interface.
- DO document if your class supports being used as an interface.
- DO use mixin to define a mixin type.
- AVOID mixing in a type that isn’t intended to be a mixin.

2.1.19. Constructors

- CONSIDER making your constructor const if the class supports it.
- Members
- PREFER making fields and top-level variables final.

- DO use getters for operations that conceptually access properties.
- DO use setters for operations that conceptually change properties.
- DON'T define a setter without a corresponding getter.
- AVOID using runtime type tests to fake overloading.
- AVOID public late final fields without initializers.
- AVOID returning nullable Future, Stream, and collection types.
- AVOID returning this from methods just to enable a fluent interface.

2.1.20. Types

- DO type annotate variables without initializers.
- DO type annotate fields and top-level variables if the type isn't obvious.
- DON'T redundantly type annotate initialized local variables.
- DO annotate return types on function declarations.
- DO annotate parameter types on function declarations.
- DON'T annotate inferred parameter types on function expressions.
- DON'T type annotate initializing formals.
- DO write type arguments on generic invocations that aren't inferred.
- DON'T write type arguments on generic invocations that are inferred.
- AVOID writing incomplete generic types.
- DO annotate with dynamic instead of letting inference fail.
- PREFER signatures in function type annotations.
- DON'T specify a return type for a setter.
- DON'T use the legacy typedef syntax.
- PREFER inline function types over typedefs.
- PREFER using function type syntax for parameters.
- AVOID using dynamic unless you want to disable static checking.
- DO use Future<void> as the return type of asynchronous members that do not produce values.
- AVOID using FutureOr<T> as a return type.

2.1.21. Parameters

- AVOID positional boolean parameters.
- AVOID optional positional parameters if the user may want to omit earlier parameters.

- AVOID mandatory parameters that accept a special “no argument” value.
- DO use inclusive start and exclusive end parameters to accept a range.
- Equality
 - DO override hashCode if you override ==.
 - DO make your == operator obey the mathematical rules of equality.
 - AVOID defining custom equality for mutable classes.
 - DON’T make the parameter to == nullable.

2.2. Java Language Code Standard

2.2.1. Source file structure

- License or copyright information, if present: If license or copyright information belongs in a file, it belongs here.
- Package statement: The package statement is not line-wrapped. The column limit does not apply to package statements.
- Import statements
 - ❖ No wildcard imports
 - ❖ No line-wrapping
 - ❖ Ordering and spacing
 - ❖ No static import for classes
- Class declaration
 - ❖ Exactly one top-level class declaration
 - ❖ Ordering of class contents

2.2.2. Formatting

- Braces
 - ❖ Use of optional braces
 - ❖ Nonempty blocks: K & R style
 - ❖ Empty blocks: may be concise
- Block indentation: +2 spaces
- One statement per line
- Column limit: 100
- Line-wrapping
 - ❖ Prefer to break at a higher syntactic level
 - ❖ Indent continuation lines at least +4 spaces

- Whitespace
 - ❖ Vertical Whitespace
 - ❖ Horizontal whitespace
 - ❖ Horizontal alignment: never required
- Grouping parentheses: recommended
- Specific constructs
 - ❖ Enum classes
 - ❖ Variable declarations
 - One variable per declaration
 - Declared when needed
 - ❖ Arrays
 - Array initializers: can be "block-like"
 - No C-style array declarations
 - ❖ Switch statements
 - Indentation
 - Fall-through: commented
 - Presence of the *default* label
 - ❖ Annotations
 - Type-use annotations
 - Class annotations
 - Method and constructor annotations
 - Field annotations
 - Parameter and local variable annotations
 - ❖ Comments
 - Block comment style: Block comments are indented at the same level as the surrounding code.
 - ❖ Modifiers: Class and member modifiers, when present, appear in the order recommended by the Java Language Specification
 - ❖ Numeric Literals: long-valued integer literals use an uppercase L suffix, never lowercase (to avoid confusion with the digit 1).

2.2.3. Naming

- Rules common to all identifiers: Identifiers use only ASCII letters and digits, and, in a small number of cases noted below, underscores.
- Rules by identifier type
 - ❖ Package names use only lowercase letters and digits (no underscores). Consecutive words are simply concatenated together.
 - ❖ Class names are written in UpperCamelCase. Class names are typically nouns or noun phrases
 - ❖ Method names are written in lowerCamelCase. Method names are typically verbs or verb phrases.
 - ❖ Constant names use UPPER_SNAKE_CASE: all uppercase letters, with each word separated from the next by a single underscore.
 - ❖ Non-constant field names (static or otherwise) are written in lowerCamelCase. These names are typically nouns or noun phrases.
 - ❖ Parameter names are written in lowerCamelCase. One-character parameter names in public methods should be avoided.
 - ❖ Local variable names are written in lowerCamelCase. Even when final and immutable, local variables are not considered to be constants, and should not be styled as constants.
 - ❖ Each type variable is named in one of two styles:
 - A single capital letter, optionally followed by a single numeral (such as E, T, X, T2)
 - A name in the form used for classes (see Section 5.2.2, Class names), followed by the capital letter T (examples: RequestT, FooBarT).
- Camel case: defined
 - ❖ Convert the phrase to plain ASCII and remove any apostrophes. For example, "Müller's algorithm" might become "Muellers algorithm".
 - ❖ Divide this result into words, splitting on spaces and any remaining punctuation (typically hyphens).
 - Recommended: if any word already has a conventional camel-case appearance in common usage, split this into its constituent

parts (e.g., "AdWords" becomes "ad words"). Note that a word such as "iOS" is not really in camel case per se; it defies any convention, so this recommendation does not apply.

- ❖ Now lowercase everything (including acronyms), then uppercase only the first character of:
 - ... each word, to yield upper camel case, or
 - ... each word except the first, to yield lower camel case
- ❖ Finally, join all the words into a single identifier.

2.2.4. Programming Practices

- @Override: always used
- Caught exceptions: not ignored
- Static members: qualified using class
- Finalizers: not used

3. References

1. *Google team*, [“Effective Dart”](#)
2. *Google team*, [“Google Java Style Guide”](#)



Capstone Project 1

CMU-CS450

Meeting With Mentor Document

Craft Village Pollution Monitor System

Submitted by
Ca, Van Cong Le
Huy, Bui Duc
Phuc, Hua Hoang
Trung, Nguyen Thanh

Approved by
Ph.D. Nguyen Thanh Binh

Proposal Review Panel Representative:

Name Signature Date

Capstone Project 1 - Mentor:

A handwritten signature in blue ink, appearing to read 'Nguyen Thanh Binh'.

Name Signature Date

| Meeting Information | | | | | | | | |
|---|--|--|-----------------|--|--|--|--|--|
| Product | Craft Village Pollution Monitor System | | | | | | | |
| Subject | First meeting with mentor | | | | | | | |
| Location | Online on skype | | | | | | | |
| Date and Time | <i>Date</i> | <i>Start Time</i> | <i>End Time</i> | | | | | |
| | 20/08/2022 | 22:00 | 23:00 | | | | | |
| Attendees |  Nguyen Thanh Binh  Van Cong Le Ca  Bui Duc Huy  Hua Hoang Phuc  Nguyen thanh Trung | Mentor Signature  | | | | | | |
| Related documents | Proposal document | | | | | | | |
| Content | | | | | | | | |
| <ul style="list-style-type: none"> ➤ Introducing members and mentor ➤ Guidelines for writing proposal | | | | | | | | |
| Result Items | | | | | | | | |
| <ul style="list-style-type: none"> ➤ Required documents: <ul style="list-style-type: none"> ❖ Project Proposal ❖ Project Plan ❖ Architecture Document ❖ Test Plan | | | | | | | | |

| Meeting Information | | | | | | | | |
|--|--|--|-----------------|--|--|--|--|--|
| Product | Craft Village Pollution Monitor System | | | | | | | |
| Subject | Review proposal and plan the implementation of sprint 1 | | | | | | | |
| Location | Online on skype | | | | | | | |
| Date and Time | <i>Date</i> | <i>Start Time</i> | <i>End Time</i> | | | | | |
| | 28/08/2022 | 22:00 | 23:00 | | | | | |
| Attendees |  Nguyen Thanh Binh  Van Cong Le Ca  Bui Duc Huy  Hua Hoang Phuc  Nguyen thanh Trung | Mentor Signature  | | | | | | |
| Related documents | Proposal document | | | | | | | |
| Content | | | | | | | | |
| <ul style="list-style-type: none"> ➤ Review proposal ➤ Preparing Project Plan for Sprint 1 ➤ Preparing Product Backlog for Sprint 1 ➤ Preparing Test case for Sprint 1 | | | | | | | | |
| Result Items | | | | | | | | |
| <ul style="list-style-type: none"> ➤ Set work schedule for sprint 1 ➤ Assignment task about each document to member for sprint 1 | | | | | | | | |

| Meeting Information | | | | | | | | |
|--|--|--|-----------------|--|--|--|--|--|
| Product | Craft Village Pollution Monitor System | | | | | | | |
| Subject | Review sprint 1 and plan the implementation of sprint 2 | | | | | | | |
| Location | Online on skype | | | | | | | |
| Date and Time | <i>Date</i> | <i>Start Time</i> | <i>End Time</i> | | | | | |
| | 15/09/2022 | 22:00 | 23:00 | | | | | |
| Attendees |  Nguyen Thanh Binh  Van Cong Le Ca  Bui Duc Huy  Hua Hoang Phuc  Nguyen thanh Trung | Mentor Signature  | | | | | | |
| Related documents | All documents | | | | | | | |
| Content | | | | | | | | |
| <ul style="list-style-type: none"> ➤ Review sprint 1 ➤ Preparing Project Plan for Sprint 2 ➤ Preparing Product Backlog for Sprint 2 ➤ Preparing Test case for Sprint 2 | | | | | | | | |
| Result Items | | | | | | | | |
| <ul style="list-style-type: none"> ➤ Set work schedule for sprint 2 ➤ Assignment task about each document to member for sprint 2 | | | | | | | | |

| Meeting Information | | | | | | | | |
|--|--|--|-----------------|--|--|--|--|--|
| Product | Craft Village Pollution Monitor System | | | | | | | |
| Subject | Review sprint 2 and plan the implementation of sprint 3 | | | | | | | |
| Location | Online on skype | | | | | | | |
| Date and Time | <i>Date</i> | <i>Start Time</i> | <i>End Time</i> | | | | | |
| | 02/10/2022 | 22:00 | 23:00 | | | | | |
| Attendees |  Nguyen Thanh Binh  Van Cong Le Ca  Bui Duc Huy  Hua Hoang Phuc  Nguyen thanh Trung | Mentor Signature  | | | | | | |
| Related documents | All documents | | | | | | | |
| Content | | | | | | | | |
| <ul style="list-style-type: none"> ➤ Review sprint 2 ➤ Preparing Project Plan for Sprint 3 ➤ Preparing Product Backlog for Sprint 3 ➤ Preparing Test case for Sprint 3 | | | | | | | | |
| Result Items | | | | | | | | |
| <ul style="list-style-type: none"> ➤ Set work schedule for sprint 3 ➤ Assignment task about each document to member for sprint 3 | | | | | | | | |

| Meeting Information | | | | | | | | |
|---|--|--|-----------------|--|--|--|--|--|
| Product | Craft Village Pollution Monitor System | | | | | | | |
| Subject | Review sprint 3 and plan the implementation of sprint 4 | | | | | | | |
| Location | Online on skype | | | | | | | |
| Date and Time | <i>Date</i> | <i>Start Time</i> | <i>End Time</i> | | | | | |
| | 19/10/2022 | 22:00 | 23:00 | | | | | |
| Attendees |  Nguyen Thanh Binh  Van Cong Le Ca  Bui Duc Huy  Hua Hoang Phuc  Nguyen thanh Trung | Mentor Signature  | | | | | | |
| Related documents | All documents | | | | | | | |
| Content | | | | | | | | |
| <ul style="list-style-type: none"> ➤ Review sprint 3 ➤ New requirement: Change machine learning model from Multiclass Classification to Multi-Label Classification ➤ Preparing Project Plan for Sprint 4 ➤ Preparing Product Backlog for Sprint 4 ➤ Preparing Test case for Sprint 4 | | | | | | | | |
| Result Items | | | | | | | | |
| <ul style="list-style-type: none"> ➤ Set work schedule for sprint 4 ➤ Assignment task about each document to member for sprint 4 | | | | | | | | |

| Meeting Information | | | | | | | | |
|--|--|--|-----------------|--|--|--|--|--|
| Product | Craft Village Pollution Monitor System | | | | | | | |
| Subject | Report about midterm report | | | | | | | |
| Location | Online on skype | | | | | | | |
| Date and Time | <i>Date</i> | <i>Start Time</i> | <i>End Time</i> | | | | | |
| | 20/10/2022 | 22:00 | 23:00 | | | | | |
| Attendees |  Nguyen Thanh Binh  Van Cong Le Ca  Bui Duc Huy  Hua Hoang Phuc  Nguyen thanh Trung | Mentor Signature  | | | | | | |
| Related documents | All documents | | | | | | | |
| Content | | | | | | | | |
| <ul style="list-style-type: none"> ➤ Report about midterm report ➤ Exchange some problem about documents and new requirement ➤ Show demo to mentor ➤ Get comment from mentor | | | | | | | | |
| Result Items | | | | | | | | |
| <ul style="list-style-type: none"> ➤ Reduce the task for Sprint 4 ➤ Method for Multi-label Classification research ➤ Got some comment from mentor to improve the way team work | | | | | | | | |

| Meeting Information | | | | | | | | |
|--|--|--|-----------------|--|--|--|--|--|
| Product | Craft Village Pollution Monitor System | | | | | | | |
| Subject | Review sprint 4 and plan the implementation of sprint 5 | | | | | | | |
| Location | Online on skype | | | | | | | |
| Date and Time | <i>Date</i> | <i>Start Time</i> | <i>End Time</i> | | | | | |
| | 05/11/2022 | 22:00 | 23:00 | | | | | |
| Attendees |  Nguyen Thanh Binh  Van Cong Le Ca  Bui Duc Huy  Hua Hoang Phuc  Nguyen thanh Trung | Mentor Signature  | | | | | | |
| Related documents | All documents | | | | | | | |
| Content | | | | | | | | |
| <ul style="list-style-type: none"> ➤ Review sprint 4 ➤ Preparing Project Plan for Sprint 5 ➤ Preparing Product Backlog for Sprint 5 ➤ Preparing Test case for Sprint 5 | | | | | | | | |
| Result Items | | | | | | | | |
| <ul style="list-style-type: none"> ➤ Set work schedule for sprint 5 ➤ Assignment task about each document to member for sprint 5 | | | | | | | | |

| Meeting Information | | | | | | | | |
|--|--|--|-----------------|--|--|--|--|--|
| Product | Craft Village Pollution Monitor System | | | | | | | |
| Subject | Review sprint 5 and documents | | | | | | | |
| Location | Online on skype | | | | | | | |
| Date and Time | <i>Date</i> | <i>Start Time</i> | <i>End Time</i> | | | | | |
| | 22/11/2022 | 22:00 | 23:00 | | | | | |
| Attendees |  Nguyen Thanh Binh  Van Cong Le Ca  Bui Duc Huy  Hua Hoang Phuc  Nguyen thanh Trung | Mentor Signature  | | | | | | |
| Related documents | All documents | | | | | | | |
| Content | | | | | | | | |
| <ul style="list-style-type: none"> ➤ Review sprint 5 ➤ Review all documents | | | | | | | | |
| Result Items | | | | | | | | |
| <ul style="list-style-type: none"> ➤ Set work schedule for sprint 5 ➤ Assignment task about each document to member for sprint 5 | | | | | | | | |

| Meeting Information | | | | | | | | |
|--|--|--|-----------------|--|--|--|--|--|
| Product | Craft Village Pollution Monitor System | | | | | | | |
| Subject | Review project | | | | | | | |
| Location | Online on skype | | | | | | | |
| Date and Time | <i>Date</i> | <i>Start Time</i> | <i>End Time</i> | | | | | |
| | 07/12/2022 | 22:00 | 23:00 | | | | | |
| Attendees |  Nguyen Thanh Binh  Van Cong Le Ca  Bui Duc Huy  Hua Hoang Phuc  Nguyen thanh Trung | Mentor Signature  | | | | | | |
| Related documents | All documents | | | | | | | |
| Content | | | | | | | | |
| <ul style="list-style-type: none"> ➤ Review all documents ➤ Show demo to mentor ➤ Get comment from mentor | | | | | | | | |
| Result Items | | | | | | | | |
| <ul style="list-style-type: none"> ➤ All documents | | | | | | | | |



Capstone Project 1

CMU-CS450

Team Meeting Document

Craft Village Pollution Monitor System

Submitted by
Ca, Van Cong Le
Huy, Bui Duc
Phuc, Hua Hoang
Trung, Nguyen Thanh

Approved by
Ph.D. Nguyen Thanh Binh

Proposal Review Panel Representative:

Name Signature Date

Capstone Project 1 - Mentor:

A handwritten signature in blue ink, appearing to read 'Nguyễn Thành Bình'.

Name Signature Date

| Meeting Information | | | | | | |
|--|---|-------------------|-----------------|--|--|--|
| Product | Craft Village Pollution Monitor System | | | | | |
| Subject | Introduce, discuss topic & process | | | | | |
| Location | Online on skype | | | | | |
| Date and Time | <i>Date</i> | <i>Start Time</i> | <i>End Time</i> | | | |
| | 20/08/2022 | 21:00 | 22:00 | | | |
| Attendees |  Van Cong Le Ca  Bui Duc Huy  Hua Hoang Phuc  Nguyen Thanh Trung | | | | | |
| Related documents | | | | | | |
| Content | | | | | | |
| <ul style="list-style-type: none"> ➤ Introducing team members ➤ Discussing about topic ➤ Discussing about idea and name of project | | | | | | |
| Result Items | | | | | | |
| <ul style="list-style-type: none"> ➤ The members have all contact information ➤ Process: SCRUM ➤ Project name: Craft Village Pollution Monitor System | | | | | | |

| Meeting Information | | | | | | |
|--|---|-------------------|-----------------|--|--|--|
| Product | Craft Village Pollution Monitor System | | | | | |
| Subject | Discussing the proposal and tools | | | | | |
| Location | Online on skype | | | | | |
| Date and Time | <i>Date</i> | <i>Start Time</i> | <i>End Time</i> | | | |
| | 23/08/2022 | 21:00 | 21:30 | | | |
| Attendees |  Van Cong Le Ca  Bui Duc Huy  Hua Hoang Phuc  Nguyen Thanh Trung | | | | | |
| Related documents | | | | | | |
| Content | | | | | | |
| <ul style="list-style-type: none"> ➤ Discussing Proposal ➤ Source code version control ➤ Task management tool | | | | | | |
| Result Items | | | | | | |
| <ul style="list-style-type: none"> ➤ GitHub ➤ Trello | | | | | | |

| Meeting Information | | | | | | |
|---|---|-------------------|-----------------|--|--|--|
| Product | Craft Village Pollution Monitor System | | | | | |
| Subject | Review proposal and prepare to report to mentor | | | | | |
| Location | Online on skype | | | | | |
| Date and Time | <i>Date</i> | <i>Start Time</i> | <i>End Time</i> | | | |
| | 26/08/2022 | 21:00 | 21:30 | | | |
| Attendees |  Van Cong Le Ca  Bui Duc Huy  Hua Hoang Phuc  Nguyen Thanh Trung | | | | | |
| Related documents | | | | | | |
| Content | | | | | | |
| <ul style="list-style-type: none"> ➤ Summarize the parts of the proposal ➤ Prepare to report to mentor | | | | | | |
| Result Items | | | | | | |
| <ul style="list-style-type: none"> ➤ Review the good parts and edit incomplete parts of proposal ➤ Prepare reports on what has been done and plan for the implementation of the next part of the proposal | | | | | | |

| Meeting Information | | | | | | |
|---|---|-------------------|-----------------|--|--|--|
| Product | Craft Village Pollution Monitor System | | | | | |
| Subject | Review document and Sprint 1 | | | | | |
| Location | Online on skype | | | | | |
| Date and Time | <i>Date</i> | <i>Start Time</i> | <i>End Time</i> | | | |
| | 01/09/2022 | 21:00 | 21:30 | | | |
| Attendees |  Van Cong Le Ca  Bui Duc Huy  Hua Hoang Phuc  Nguyen Thanh Trung | | | | | |
| Related documents | All documents | | | | | |
| Content | | | | | | |
| <ul style="list-style-type: none"> ➤ Review document | | | | | | |
| Result Items | | | | | | |
| <ul style="list-style-type: none"> ➤ Document | | | | | | |

| Meeting Information | | | | | | |
|---|---|-------------------|-----------------|--|--|--|
| Product | Craft Village Pollution Monitor System | | | | | |
| Subject | Report task | | | | | |
| Location | Online on skype | | | | | |
| Date and Time | <i>Date</i> | <i>Start Time</i> | <i>End Time</i> | | | |
| | 05/09/2022 | 21:00 | 21:30 | | | |
| Attendees |  Van Cong Le Ca  Bui Duc Huy  Hua Hoang Phuc  Nguyen Thanh Trung | | | | | |
| Related documents | | | | | | |
| Content | | | | | | |
| <ul style="list-style-type: none"> ➤ Report task | | | | | | |
| Result Items | | | | | | |
| <ul style="list-style-type: none"> ➤ Have no issue | | | | | | |

| Meeting Information | | | | | | |
|--------------------------|---|-------------------|-----------------|--|--|--|
| Product | Craft Village Pollution Monitor System | | | | | |
| Subject | Report task | | | | | |
| Location | Online on skype | | | | | |
| Date and Time | <i>Date</i> | <i>Start Time</i> | <i>End Time</i> | | | |
| | 08/09/2022 | 21:00 | 21:30 | | | |
| Attendees |  Van Cong Le Ca  Bui Duc Huy  Hua Hoang Phuc  Nguyen Thanh Trung | | | | | |
| Related documents | | | | | | |
| Content | | | | | | |
| ➤ Report task | | | | | | |
| Result Items | | | | | | |
| ➤ Have no issue | | | | | | |

| Meeting Information | | | | | | |
|--|---|-------------------|-----------------|--|--|--|
| Product | Craft Village Pollution Monitor System | | | | | |
| Subject | Review document and report task | | | | | |
| Location | Online on skype | | | | | |
| Date and Time | <i>Date</i> | <i>Start Time</i> | <i>End Time</i> | | | |
| | 12/09/2022 | 21:00 | 21:30 | | | |
| Attendees |  Van Cong Le Ca  Bui Duc Huy  Hua Hoang Phuc  Nguyen Thanh Trung | | | | | |
| Related documents | All documents | | | | | |
| Content | | | | | | |
| <ul style="list-style-type: none"> ➤ Report task ➤ Review document | | | | | | |
| Result Items | | | | | | |
| <ul style="list-style-type: none"> ➤ Have no issue ➤ Document | | | | | | |

| Meeting Information | | | | | | |
|--|---|-------------------|-----------------|--|--|--|
| Product | Craft Village Pollution Monitor System | | | | | |
| Subject | Review document and demo released feature | | | | | |
| Location | Online on skype | | | | | |
| Date and Time | <i>Date</i> | <i>Start Time</i> | <i>End Time</i> | | | |
| | 15/09/2022 | 21:00 | 22:00 | | | |
| Attendees |  Van Cong Le Ca  Bui Duc Huy  Hua Hoang Phuc  Nguyen Thanh Trung | | | | | |
| Related documents | All documents | | | | | |
| Content | | | | | | |
| <ul style="list-style-type: none"> ➤ Demo ➤ Review document | | | | | | |
| Result Items | | | | | | |
| <ul style="list-style-type: none"> ➤ Released feature ➤ Document | | | | | | |

| Meeting Information | | | | | | |
|--------------------------|---|-------------------|-----------------|--|--|--|
| Product | Craft Village Pollution Monitor System | | | | | |
| Subject | Retrospective Scrum | | | | | |
| Location | Online on skype | | | | | |
| Date and Time | <i>Date</i> | <i>Start Time</i> | <i>End Time</i> | | | |
| | 16/09/2022 | 12:00 | 13:00 | | | |
| Attendees |  Van Cong Le Ca  Bui Duc Huy  Hua Hoang Phuc  Nguyen Thanh Trung | | | | | |
| Related documents | | | | | | |
| Content | | | | | | |
| ➤ Retrospective Scrum | | | | | | |
| Result Items | | | | | | |
| ➤ Retrospective Scrum | | | | | | |

| Meeting Information | | | | | | |
|---|---|-------------------|-----------------|--|--|--|
| Product | Craft Village Pollution Monitor System | | | | | |
| Subject | Review document and Sprint 2 | | | | | |
| Location | Online on skype | | | | | |
| Date and Time | <i>Date</i> | <i>Start Time</i> | <i>End Time</i> | | | |
| | 18/09/2022 | 21:00 | 21:30 | | | |
| Attendees |  Van Cong Le Ca  Bui Duc Huy  Hua Hoang Phuc  Nguyen Thanh Trung | | | | | |
| Related documents | Product backlog | | | | | |
| Content | | | | | | |
| <ul style="list-style-type: none"> ➤ Review document | | | | | | |
| Result Items | | | | | | |
| <ul style="list-style-type: none"> ➤ Document | | | | | | |

| Meeting Information | | | | | | |
|---|---|-------------------|-----------------|--|--|--|
| Product | Craft Village Pollution Monitor System | | | | | |
| Subject | Report task | | | | | |
| Location | Online on skype | | | | | |
| Date and Time | <i>Date</i> | <i>Start Time</i> | <i>End Time</i> | | | |
| | 22/09/2022 | 21:00 | 21:30 | | | |
| Attendees |  Van Cong Le Ca  Bui Duc Huy  Hua Hoang Phuc  Nguyen Thanh Trung | | | | | |
| Related documents | | | | | | |
| Content | | | | | | |
| <ul style="list-style-type: none"> ➤ Report task | | | | | | |
| Result Items | | | | | | |
| <ul style="list-style-type: none"> ➤ Have no issue | | | | | | |

| Meeting Information | | | | | | |
|--|---|-------------------|-----------------|--|--|--|
| Product | Craft Village Pollution Monitor System | | | | | |
| Subject | Review document and report task | | | | | |
| Location | Online on skype | | | | | |
| Date and Time | <i>Date</i> | <i>Start Time</i> | <i>End Time</i> | | | |
| | 26/09/2022 | 21:00 | 21:30 | | | |
| Attendees |  Van Cong Le Ca  Bui Duc Huy  Hua Hoang Phuc  Nguyen Thanh Trung | | | | | |
| Related documents | All documents | | | | | |
| Content | | | | | | |
| <ul style="list-style-type: none"> ➤ Report task ➤ Review document | | | | | | |
| Result Items | | | | | | |
| <ul style="list-style-type: none"> ➤ Have no issue ➤ Document | | | | | | |

| Meeting Information | | | | | | |
|--|---|-------------------|-----------------|--|--|--|
| Product | Craft Village Pollution Monitor System | | | | | |
| Subject | Review document and report task | | | | | |
| Location | Online on skype | | | | | |
| Date and Time | <i>Date</i> | <i>Start Time</i> | <i>End Time</i> | | | |
| | 29/09/2022 | 21:00 | 21:30 | | | |
| Attendees |  Van Cong Le Ca  Bui Duc Huy  Hua Hoang Phuc  Nguyen Thanh Trung | | | | | |
| Related documents | All documents | | | | | |
| Content | | | | | | |
| <ul style="list-style-type: none"> ➤ Report task ➤ Review document | | | | | | |
| Result Items | | | | | | |
| <ul style="list-style-type: none"> ➤ Have no issue ➤ Document | | | | | | |

| Meeting Information | | | | | | |
|--|---|-------------------|-----------------|--|--|--|
| Product | Craft Village Pollution Monitor System | | | | | |
| Subject | Review document and demo released feature | | | | | |
| Location | Online on skype | | | | | |
| Date and Time | <i>Date</i> | <i>Start Time</i> | <i>End Time</i> | | | |
| | 02/10/2022 | 21:00 | 22:00 | | | |
| Attendees |  Van Cong Le Ca  Bui Duc Huy  Hua Hoang Phuc  Nguyen Thanh Trung | | | | | |
| Related documents | All documents | | | | | |
| Content | | | | | | |
| <ul style="list-style-type: none"> ➤ Demo ➤ Review document | | | | | | |
| Result Items | | | | | | |
| <ul style="list-style-type: none"> ➤ Released feature ➤ Document | | | | | | |

| Meeting Information | | | | | | |
|--------------------------|---|-------------------|-----------------|--|--|--|
| Product | Craft Village Pollution Monitor System | | | | | |
| Subject | Retrospective Scrum | | | | | |
| Location | Online on skype | | | | | |
| Date and Time | <i>Date</i> | <i>Start Time</i> | <i>End Time</i> | | | |
| | 03/10/2022 | 12:00 | 13:00 | | | |
| Attendees |  Van Cong Le Ca  Bui Duc Huy  Hua Hoang Phuc  Nguyen Thanh Trung | | | | | |
| Related documents | | | | | | |
| Content | | | | | | |
| ➤ Retrospective Scrum | | | | | | |
| Result Items | | | | | | |
| ➤ Retrospective Scrum | | | | | | |

| Meeting Information | | | | | | |
|--------------------------|---|-------------------|-----------------|--|--|--|
| Product | Craft Village Pollution Monitor System | | | | | |
| Subject | Review document and Sprint 3 | | | | | |
| Location | Online on skype | | | | | |
| Date and Time | <i>Date</i> | <i>Start Time</i> | <i>End Time</i> | | | |
| | 05/10/2022 | 21:00 | 21:30 | | | |
| Attendees |  Van Cong Le Ca  Bui Duc Huy  Hua Hoang Phuc  Nguyen Thanh Trung | | | | | |
| Related documents | Product backlog | | | | | |
| Content | | | | | | |
| ➤ Review document | | | | | | |
| Result Items | | | | | | |
| ➤ Document | | | | | | |

| Meeting Information | | | | | | |
|--------------------------|---|-------------------|-----------------|--|--|--|
| Product | Craft Village Pollution Monitor System | | | | | |
| Subject | Report task | | | | | |
| Location | Online on skype | | | | | |
| Date and Time | <i>Date</i> | <i>Start Time</i> | <i>End Time</i> | | | |
| | 08/10/2022 | 21:00 | 21:30 | | | |
| Attendees |  Van Cong Le Ca  Bui Duc Huy  Hua Hoang Phuc  Nguyen Thanh Trung | | | | | |
| Related documents | | | | | | |
| Content | | | | | | |
| ➤ Report task | | | | | | |
| Result Items | | | | | | |
| ➤ Have no issue | | | | | | |

| Meeting Information | | | | | | |
|--|---|-------------------|-----------------|--|--|--|
| Product | Craft Village Pollution Monitor System | | | | | |
| Subject | Review document and report task | | | | | |
| Location | Online on skype | | | | | |
| Date and Time | <i>Date</i> | <i>Start Time</i> | <i>End Time</i> | | | |
| | 11/09/2022 | 21:00 | 21:30 | | | |
| Attendees |  Van Cong Le Ca  Bui Duc Huy  Hua Hoang Phuc  Nguyen Thanh Trung | | | | | |
| Related documents | All documents | | | | | |
| Content | | | | | | |
| <ul style="list-style-type: none"> ➤ Report task ➤ Review document | | | | | | |
| Result Items | | | | | | |
| <ul style="list-style-type: none"> ➤ Have no issue ➤ Document | | | | | | |

| Meeting Information | | | | | | |
|--|---|-------------------|-----------------|--|--|--|
| Product | Craft Village Pollution Monitor System | | | | | |
| Subject | Review document and report task | | | | | |
| Location | Online on skype | | | | | |
| Date and Time | <i>Date</i> | <i>Start Time</i> | <i>End Time</i> | | | |
| | 14/09/2022 | 21:00 | 21:30 | | | |
| Attendees |  Van Cong Le Ca  Bui Duc Huy  Hua Hoang Phuc  Nguyen Thanh Trung | | | | | |
| Related documents | All documents | | | | | |
| Content | | | | | | |
| <ul style="list-style-type: none"> ➤ Report task ➤ Review document | | | | | | |
| Result Items | | | | | | |
| <ul style="list-style-type: none"> ➤ Have no issue ➤ Document | | | | | | |

| Meeting Information | | | | | | |
|--|---|-------------------|-----------------|--|--|--|
| Product | Craft Village Pollution Monitor System | | | | | |
| Subject | Review document and demo released feature | | | | | |
| Location | Online on skype | | | | | |
| Date and Time | <i>Date</i> | <i>Start Time</i> | <i>End Time</i> | | | |
| | 19/10/2022 | 21:00 | 22:00 | | | |
| Attendees |  Van Cong Le Ca  Bui Duc Huy  Hua Hoang Phuc  Nguyen Thanh Trung | | | | | |
| Related documents | All documents | | | | | |
| Content | | | | | | |
| <ul style="list-style-type: none"> ➤ Demo ➤ Review document | | | | | | |
| Result Items | | | | | | |
| <ul style="list-style-type: none"> ➤ Released feature ➤ Document | | | | | | |

| Meeting Information | | | | | | |
|---|---|-------------------|-----------------|--|--|--|
| Product | Craft Village Pollution Monitor System | | | | | |
| Subject | Retrospective Scrum | | | | | |
| Location | Online on skype | | | | | |
| Date and Time | <i>Date</i> | <i>Start Time</i> | <i>End Time</i> | | | |
| | 20/10/2022 | 12:00 | 13:00 | | | |
| Attendees |  Van Cong Le Ca  Bui Duc Huy  Hua Hoang Phuc  Nguyen Thanh Trung | | | | | |
| Related documents | | | | | | |
| Content | | | | | | |
| <ul style="list-style-type: none"> ➤ Retrospective Scrum | | | | | | |
| Result Items | | | | | | |
| <ul style="list-style-type: none"> ➤ Retrospective Scrum | | | | | | |

| Meeting Information | | | | | | |
|---|---|-------------------|-----------------|--|--|--|
| Product | Craft Village Pollution Monitor System | | | | | |
| Subject | Review document and Sprint 4 | | | | | |
| Location | Online on skype | | | | | |
| Date and Time | <i>Date</i> | <i>Start Time</i> | <i>End Time</i> | | | |
| | 22/10/2022 | 21:00 | 21:30 | | | |
| Attendees |  Van Cong Le Ca  Bui Duc Huy  Hua Hoang Phuc  Nguyen Thanh Trung | | | | | |
| Related documents | Product backlog | | | | | |
| Content | | | | | | |
| <ul style="list-style-type: none"> ➤ Review document | | | | | | |
| Result Items | | | | | | |
| <ul style="list-style-type: none"> ➤ Document | | | | | | |

| Meeting Information | | | | | | |
|--------------------------|---|-------------------|-----------------|--|--|--|
| Product | Craft Village Pollution Monitor System | | | | | |
| Subject | Report task | | | | | |
| Location | Online on skype | | | | | |
| Date and Time | <i>Date</i> | <i>Start Time</i> | <i>End Time</i> | | | |
| | 25/10/2022 | 21:00 | 21:30 | | | |
| Attendees |  Van Cong Le Ca  Bui Duc Huy  Hua Hoang Phuc  Nguyen Thanh Trung | | | | | |
| Related documents | | | | | | |
| Content | | | | | | |
| ➤ Report task | | | | | | |
| Result Items | | | | | | |
| ➤ Have no issue | | | | | | |

| Meeting Information | | | | | | |
|--|---|-------------------|-----------------|--|--|--|
| Product | Craft Village Pollution Monitor System | | | | | |
| Subject | Review document and report task | | | | | |
| Location | Online on skype | | | | | |
| Date and Time | <i>Date</i> | <i>Start Time</i> | <i>End Time</i> | | | |
| | 28/10/2022 | 21:00 | 21:30 | | | |
| Attendees |  Van Cong Le Ca  Bui Duc Huy  Hua Hoang Phuc  Nguyen Thanh Trung | | | | | |
| Related documents | All documents | | | | | |
| Content | | | | | | |
| <ul style="list-style-type: none"> ➤ Report task ➤ Review document | | | | | | |
| Result Items | | | | | | |
| <ul style="list-style-type: none"> ➤ Have no issue ➤ Document | | | | | | |

| Meeting Information | | | | | | |
|--|---|-------------------|-----------------|--|--|--|
| Product | Craft Village Pollution Monitor System | | | | | |
| Subject | Review document and report task | | | | | |
| Location | Online on skype | | | | | |
| Date and Time | <i>Date</i> | <i>Start Time</i> | <i>End Time</i> | | | |
| | 01/11/2022 | 21:00 | 21:30 | | | |
| Attendees |  Van Cong Le Ca  Bui Duc Huy  Hua Hoang Phuc  Nguyen Thanh Trung | | | | | |
| Related documents | All documents | | | | | |
| Content | | | | | | |
| <ul style="list-style-type: none"> ➤ Report task ➤ Review document | | | | | | |
| Result Items | | | | | | |
| <ul style="list-style-type: none"> ➤ Have no issue ➤ Document | | | | | | |

| Meeting Information | | | | | | |
|--|---|-------------------|-----------------|--|--|--|
| Product | Craft Village Pollution Monitor System | | | | | |
| Subject | Review document and demo released feature | | | | | |
| Location | Online on skype | | | | | |
| Date and Time | <i>Date</i> | <i>Start Time</i> | <i>End Time</i> | | | |
| | 05/11/2022 | 21:00 | 22:00 | | | |
| Attendees |  Van Cong Le Ca  Bui Duc Huy  Hua Hoang Phuc  Nguyen Thanh Trung | | | | | |
| Related documents | All documents | | | | | |
| Content | | | | | | |
| <ul style="list-style-type: none"> ➤ Demo ➤ Review document | | | | | | |
| Result Items | | | | | | |
| <ul style="list-style-type: none"> ➤ Released feature ➤ Document | | | | | | |

| Meeting Information | | | | | | |
|---|---|-------------------|-----------------|--|--|--|
| Product | Craft Village Pollution Monitor System | | | | | |
| Subject | Retrospective Scrum | | | | | |
| Location | Online on skype | | | | | |
| Date and Time | <i>Date</i> | <i>Start Time</i> | <i>End Time</i> | | | |
| | 06/11/2022 | 12:00 | 13:00 | | | |
| Attendees |  Van Cong Le Ca  Bui Duc Huy  Hua Hoang Phuc  Nguyen Thanh Trung | | | | | |
| Related documents | | | | | | |
| Content | | | | | | |
| <ul style="list-style-type: none"> ➤ Retrospective Scrum | | | | | | |
| Result Items | | | | | | |
| <ul style="list-style-type: none"> ➤ Retrospective Scrum | | | | | | |

| Meeting Information | | | | | | |
|---|---|-------------------|-----------------|--|--|--|
| Product | Craft Village Pollution Monitor System | | | | | |
| Subject | Review document and Sprint 5 | | | | | |
| Location | Online on skype | | | | | |
| Date and Time | <i>Date</i> | <i>Start Time</i> | <i>End Time</i> | | | |
| | 08/11/2022 | 21:00 | 21:30 | | | |
| Attendees |  Van Cong Le Ca  Bui Duc Huy  Hua Hoang Phuc  Nguyen Thanh Trung | | | | | |
| Related documents | Product backlog | | | | | |
| Content | | | | | | |
| <ul style="list-style-type: none"> ➤ Review document | | | | | | |
| Result Items | | | | | | |
| <ul style="list-style-type: none"> ➤ Document | | | | | | |

| Meeting Information | | | | | | |
|--------------------------|---|-------------------|-----------------|--|--|--|
| Product | Craft Village Pollution Monitor System | | | | | |
| Subject | Report task | | | | | |
| Location | Online on skype | | | | | |
| Date and Time | <i>Date</i> | <i>Start Time</i> | <i>End Time</i> | | | |
| | 11/11/2022 | 21:00 | 21:30 | | | |
| Attendees |  Van Cong Le Ca  Bui Duc Huy  Hua Hoang Phuc  Nguyen Thanh Trung | | | | | |
| Related documents | | | | | | |
| Content | | | | | | |
| ➤ Report task | | | | | | |
| Result Items | | | | | | |
| ➤ Have no issue | | | | | | |

| Meeting Information | | | | | | |
|--|---|-------------------|-----------------|--|--|--|
| Product | Craft Village Pollution Monitor System | | | | | |
| Subject | Review document and report task | | | | | |
| Location | Online on skype | | | | | |
| Date and Time | <i>Date</i> | <i>Start Time</i> | <i>End Time</i> | | | |
| | 15/11/2022 | 21:00 | 21:30 | | | |
| Attendees |  Van Cong Le Ca  Bui Duc Huy  Hua Hoang Phuc  Nguyen Thanh Trung | | | | | |
| Related documents | All documents | | | | | |
| Content | | | | | | |
| <ul style="list-style-type: none"> ➤ Report task ➤ Review document | | | | | | |
| Result Items | | | | | | |
| <ul style="list-style-type: none"> ➤ Have no issue ➤ Document | | | | | | |

| Meeting Information | | | | | | |
|--|---|-------------------|-----------------|--|--|--|
| Product | Craft Village Pollution Monitor System | | | | | |
| Subject | Review document and report task | | | | | |
| Location | Online on skype | | | | | |
| Date and Time | <i>Date</i> | <i>Start Time</i> | <i>End Time</i> | | | |
| | 18/11/2022 | 21:00 | 21:30 | | | |
| Attendees |  Van Cong Le Ca  Bui Duc Huy  Hua Hoang Phuc  Nguyen Thanh Trung | | | | | |
| Related documents | All documents | | | | | |
| Content | | | | | | |
| <ul style="list-style-type: none"> ➤ Report task ➤ Review document | | | | | | |
| Result Items | | | | | | |
| <ul style="list-style-type: none"> ➤ Have no issue ➤ Document | | | | | | |

| Meeting Information | | | | | | |
|--|---|-------------------|-----------------|--|--|--|
| Product | Craft Village Pollution Monitor System | | | | | |
| Subject | Review document and demo released feature | | | | | |
| Location | Online on skype | | | | | |
| Date and Time | <i>Date</i> | <i>Start Time</i> | <i>End Time</i> | | | |
| | 22/11/2022 | 21:00 | 22:00 | | | |
| Attendees |  Van Cong Le Ca  Bui Duc Huy  Hua Hoang Phuc  Nguyen Thanh Trung | | | | | |
| Related documents | All documents | | | | | |
| Content | | | | | | |
| <ul style="list-style-type: none"> ➤ Demo ➤ Review document | | | | | | |
| Result Items | | | | | | |
| <ul style="list-style-type: none"> ➤ Released feature ➤ Document | | | | | | |

| Meeting Information | | | | | | |
|---|---|-------------------|-----------------|--|--|--|
| Product | Craft Village Pollution Monitor System | | | | | |
| Subject | Retrospective Scrum | | | | | |
| Location | Online on skype | | | | | |
| Date and Time | <i>Date</i> | <i>Start Time</i> | <i>End Time</i> | | | |
| | 23/11/2022 | 12:00 | 13:00 | | | |
| Attendees |  Van Cong Le Ca  Bui Duc Huy  Hua Hoang Phuc  Nguyen Thanh Trung | | | | | |
| Related documents | | | | | | |
| Content | | | | | | |
| <ul style="list-style-type: none"> ➤ Retrospective Scrum | | | | | | |
| Result Items | | | | | | |
| <ul style="list-style-type: none"> ➤ Retrospective Scrum | | | | | | |

| Meeting Information | | | | | | |
|---|---|-------------------|-----------------|--|--|--|
| Product | Craft Village Pollution Monitor System | | | | | |
| Subject | Review document. | | | | | |
| Location | Online on skype | | | | | |
| Date and Time | <i>Date</i> | <i>Start Time</i> | <i>End Time</i> | | | |
| | 27/11/2022 | 21:00 | 21:30 | | | |
| Attendees |  Van Cong Le Ca  Bui Duc Huy  Hua Hoang Phuc  Nguyen Thanh Trung | | | | | |
| Related documents | All documents | | | | | |
| Content | | | | | | |
| <ul style="list-style-type: none"> ➤ Review document | | | | | | |
| Result Items | | | | | | |
| <ul style="list-style-type: none"> ➤ Document | | | | | | |

| Meeting Information | | | | | | |
|---|---|-------------------|-----------------|--|--|--|
| Product | Craft Village Pollution Monitor System | | | | | |
| Subject | Review document. | | | | | |
| Location | Online on skype | | | | | |
| Date and Time | <i>Date</i> | <i>Start Time</i> | <i>End Time</i> | | | |
| | 01/12/2022 | 21:00 | 21:30 | | | |
| Attendees |  Van Cong Le Ca  Bui Duc Huy  Hua Hoang Phuc  Nguyen Thanh Trung | | | | | |
| Related documents | All documents | | | | | |
| Content | | | | | | |
| <ul style="list-style-type: none"> ➤ Review document | | | | | | |
| Result Items | | | | | | |
| <ul style="list-style-type: none"> ➤ Document | | | | | | |

| Meeting Information | | | | | | |
|---|---|-------------------|-----------------|--|--|--|
| Product | Craft Village Pollution Monitor System | | | | | |
| Subject | Review document. | | | | | |
| Location | Online on skype | | | | | |
| Date and Time | <i>Date</i> | <i>Start Time</i> | <i>End Time</i> | | | |
| | 05/12/2022 | 21:00 | 21:30 | | | |
| Attendees |  Van Cong Le Ca  Bui Duc Huy  Hua Hoang Phuc  Nguyen Thanh Trung | | | | | |
| Related documents | All documents | | | | | |
| Content | | | | | | |
| <ul style="list-style-type: none"> ➤ Review document | | | | | | |
| Result Items | | | | | | |
| <ul style="list-style-type: none"> ➤ Document | | | | | | |

| Meeting Information | | | | | | |
|---|---|-------------------|-----------------|--|--|--|
| Product | Craft Village Pollution Monitor System | | | | | |
| Subject | Review document. | | | | | |
| Location | Online on skype | | | | | |
| Date and Time | <i>Date</i> | <i>Start Time</i> | <i>End Time</i> | | | |
| | 09/12/2022 | 21:00 | 21:30 | | | |
| Attendees |  Van Cong Le Ca  Bui Duc Huy  Hua Hoang Phuc  Nguyen Thanh Trung | | | | | |
| Related documents | All documents | | | | | |
| Content | | | | | | |
| <ul style="list-style-type: none"> ➤ Review document | | | | | | |
| Result Items | | | | | | |
| <ul style="list-style-type: none"> ➤ Document | | | | | | |

| Meeting Information | | | | | | |
|---|---|-------------------|-----------------|--|--|--|
| Product | Craft Village Pollution Monitor System | | | | | |
| Subject | Review document. | | | | | |
| Location | Online on skype | | | | | |
| Date and Time | <i>Date</i> | <i>Start Time</i> | <i>End Time</i> | | | |
| | 13/12/2022 | 21:00 | 21:30 | | | |
| Attendees |  Van Cong Le Ca  Bui Duc Huy  Hua Hoang Phuc  Nguyen Thanh Trung | | | | | |
| Related documents | All documents | | | | | |
| Content | | | | | | |
| <ul style="list-style-type: none"> ➤ Review document | | | | | | |
| Result Items | | | | | | |
| <ul style="list-style-type: none"> ➤ Document | | | | | | |

| Meeting Information | | | | | | |
|---|---|-------------------|-----------------|--|--|--|
| Product | Craft Village Pollution Monitor System | | | | | |
| Subject | Review document. | | | | | |
| Location | Online on skype | | | | | |
| Date and Time | <i>Date</i> | <i>Start Time</i> | <i>End Time</i> | | | |
| | 17/12/2022 | 21:00 | 21:30 | | | |
| Attendees |  Van Cong Le Ca  Bui Duc Huy  Hua Hoang Phuc  Nguyen Thanh Trung | | | | | |
| Related documents | All documents | | | | | |
| Content | | | | | | |
| <ul style="list-style-type: none"> ➤ Review document | | | | | | |
| Result Items | | | | | | |
| <ul style="list-style-type: none"> ➤ Document | | | | | | |



Capstone Project 1

CMU-CS450

Reflection

Date: 09/12/2022

Craft Village Pollution Monitor System

Submitted by
Ca, Van Cong Le
Huy, Bui Duc
Phuc, Hua Hoang
Trung, Nguyen Thanh

Approved by
Ph.D. Nguyen Thanh Binh

Proposal Review Panel Representative:

Name Signature Date

Capstone Project 1 - Mentor:

A handwritten signature in blue ink, appearing to read 'Nguyen Thanh Binh'.

Name Signature Date

| | |
|--|---|
| Team Number/ Team Name | C1SE.06 |
| Project title | CVPMS – Craft Village Pollution Monitor System |
| How many students are on your team? | 4 |
| List the team member's name | Ca, Van Cong Le Huy, Bui Duc Phuc, Hua Hoang Trung, Nguyen Thanh |

Reflection (Required)

What challenges did you face while completing this project?

- A common difficulty of the group in completing the project is new knowledge and technology. Our group has to get in touch with new knowledge and technology such as machine learning, location base, image processing, ...etc.
- Lack of communication is also a barrier for my team.
- Lack of practical experience. Estimating workload depends heavily on the feelings and experiences of each individual.
- Appropriately matching skills to project tasks requires the experience to know what skills are required for what tasks.

What were the highlights for you/your team during this project?

- New technology:
 - ✧ Image Classification is used to predict pollution types from the input image.
 - ✧ Location-based service is used to get user's location automatically.
- The main point is that we apply these technologies to monitor pollution from craft villages. Currently, most of Vietnam's craft villages were and are now being polluted. Therefore, we hope that our system can encourage people of all ages to take part in protecting the environment.
- After working together for four months, individuals had positive changes in their opinions, ways of thinking and acting, and attitudes toward other people. We also felt more responsible for the work.
- We have successfully used machine learning technology to build a model that can predict the types of pollution from the input image.

What is the most important thing you learned in this project?

- Teamwork and communication, this always is an important thing when working with others. Although we already have time to work together but when starting doing something new, this job requires different skills and the ability to manage team members.
- We learned that it is very simple to develop features and modules when we understand the requirements.
- We gained experience in how to research previously unknown topics.
- Process and framework, estimating is also important. After going through this project, we have a better understanding and more accurate estimation of the time to complete the task, function scores, ...
- Problem solving and accountability, in order to keep up with project progress, each team member always has the responsibility for the assigned work and instead of dealing with a big problem, we know how to divide small problems to handle them effectively.

What part of the project did you do your best work on?

Each team member will have strengths and they will do well in the following parts:

- Ca: Interface design, beautify the User Interface for the mobile application, participate in location-based service and AI technology research, collect data and integrate AI.
- Huy: Research on applying machine learning to classify environmental pollution from images, crawl and prepare data for training, train machine learning model, create API to predict and return the pollution types from the input image.
- Phuc: Interact with databases, develop Backend API services, research and deploy location-based service technology, collect data and integrate AI.
- Trung: Interface design, beautify the User Interface for the web application, participate in pollution AI technology research, collect data and integrate AI.

What was the most enjoyable part of this project?

- Planning Poker activities. This is an activity that happens every Sprint starts. After the Product owner read each backlog, the team members asked to analyze and clarify this backlog. This is when the members give their opinions,

evaluate the complexity of the backlog, give the score of the backlogs (corresponding to the execution time) and agree on their views.

- All members respect the opinions of others.
- Offline working with members: This is the time when everyone in the team exchange knowledge, talk best, consolidate the solidarity in the team.
- Sprint Retrospective. This is the activity that takes place at the end of a Sprint. Team members reviewed what was good and bad and what needed to be improved during the sprint. From there, the members are clear about each other and comfortably communicate and implement projects.

What is the least interesting part of this project?

- Making a professional and detailed document takes time and researches many aspects.
- It is possible for requirements to change at any time.
- Detailed planning for each task requires experience in project work and accurate time measurement for that task.

What needs to be improved to make the project team work best?

- The schedule should be more accurate and relevant.
- Improving risk management
- Participate more actively in working together, especially face-to-face meetings and daily meetings.
- There is a clear purpose.
- Set and follow the rules in the group.
- Accept differences.

How could you/your mentor(s) change this project to make it better next time?

- We should keep in touch with our mentors and report the difficulties that we are facing.
- More focus and discussion on the project.
- Start preparing to deploy the system for online use.
- Try to understand the problems faced by market applications and from that improve, apply and our application.