

COS40006 – Computing Technology Project B

Semester 2, 2024

End of Semester Individual Self-assessment

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Project Name: **Human Fall Detection Using RGB Camera**

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1. Introduction

The purpose of this self-assessment report is to reflect on my learning journey in the COS40006 – Computing Technology Project B course. This report highlights the skills and knowledge I developed, my contributions to both application development and documentation, and my communication within the team, all supported by relevant evidence.

During this capstone project, I gained valuable experience in teamwork, collaborating on a project that closely mirrors industry standards. It has been a rewarding opportunity to apply my skills and grow professionally.

2. Self-Assessment

Throughout this project, I took on several key roles that allowed me to contribute to the development and functionality of our fall detection system. Here is a list of my responsibilities and contributions:

Integration Champion: I ensured the smooth integration of our backend with the UI, ensuring that the fall detection model was effectively incorporated into the video feed component of the system. This role required close attention to how the different components interacted, and I spent time troubleshooting issues to achieve a seamless user experience where the model could perform reliably in real-time.

Tester: I took responsibility for writing and implementing unit tests for all UI components. This role involved creating test cases to verify each UI component's functionality.

UI Developer: As the primary UI developer, I coded the interface for our fall detection system using Python, based on the design in Figma. This role was highly collaborative, requiring me to translate design concepts into an interactive and accessible interface.

Dataset Provider: I prepared and cleaned the dataset according to the format for the training of the fall detection model.

During this project, I accomplished several key objectives and experienced significant personal and professional growth:

Successful Implementation of Fall Detection System: I successfully developed and implemented a functional fall detection system, fulfilling our core objective and our project scope. This achievement required a blend of technical expertise, problem-solving, and collaboration.

Successfully Documentation and Reporting: I successfully prepared and delivered all necessary documents and reports for our fall detection system.

Enhanced Technical and Soft Skills: This project allowed me to refine both my technical skills and soft skills, including communication and time management. Working under project deadlines and coordinating with team members strengthened my ability to work efficiently and communicate effectively.

Valuable Research and Self-Learning: I gained extensive experience in research and self-learning, which were essential to expanding my knowledge and contributing meaningfully to our project. This experience has equipped me with a mindset of continuous improvement and adaptability, which is very crucial for my future career.

3. List of Contributions

Table of Contribution

In this section, I will outline my overall contributions to the project, relative to the team's total work for the semester. It's important to note that each contribution is measured as a percentage of the total effort in that area. For example, my work in unit testing represents 10% of the total testing efforts by our team, which includes usability testing, integration testing, and more. Contributions with more tasks and activities are weighted with a higher percentage to reflect their impact.

Item	Hours Spent	Contribution (Estimated)	Measure of Quality
Documentation	~ 8.5 Hours	10%	Well-structured, high-quality documents were produced in full alignment with the project scope, ensuring accuracy and free from errors.

System Integration	~ 20.5 Hours	90%	The UI and model were seamlessly integrated, enabling real-time fall detection directly within the video feed component of the interface.
UI Development in Python (New Scope) and React (Old Scope)	~ 30.33 Hours	100%	The UI delivers an excellent user experience, refined continuously based on feedback from user usability reports.
Testing	~ 3 Hours	10%	Testing identifies bugs and defects, ensuring the program runs smoothly and functions as intended.
Dataset	~ 6 Hours	33%	The dataset effectively trains the models, achieving high accuracy and reliable performance.
Group	~ 40.33 Hours	Not Applicable	Group activities boost the efficient and performance of the project (Note: in the work sessions, I also spent some time doing my individual tasks in term of coding the UI, conducting the integration, bug fixing

			testing and reporting. However, I did not really fully record these details, so I am going to just include them as group activity for simplicity)
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Table 1: Contribution Table

Contribution Insight and Evidence

In this section, I'll provide insights and evidence of my contributions to the project. I apologize for the naming of some of my GitHub commit messages, but you can find detailed descriptions of each commit in our GitHub repository. For the commit chart, please focus on the number of commits rather than the additions and deletions, as many auto-generated files like `__pycache__` and log files were created during development. These files inflated the addition and deletion counts, leading to an inaccurate representation of actual code changes. My contributions to reports, documentation, and coding are also documented in my work logs, as well as in reports available on [OneDrive](#) and the Trello board.

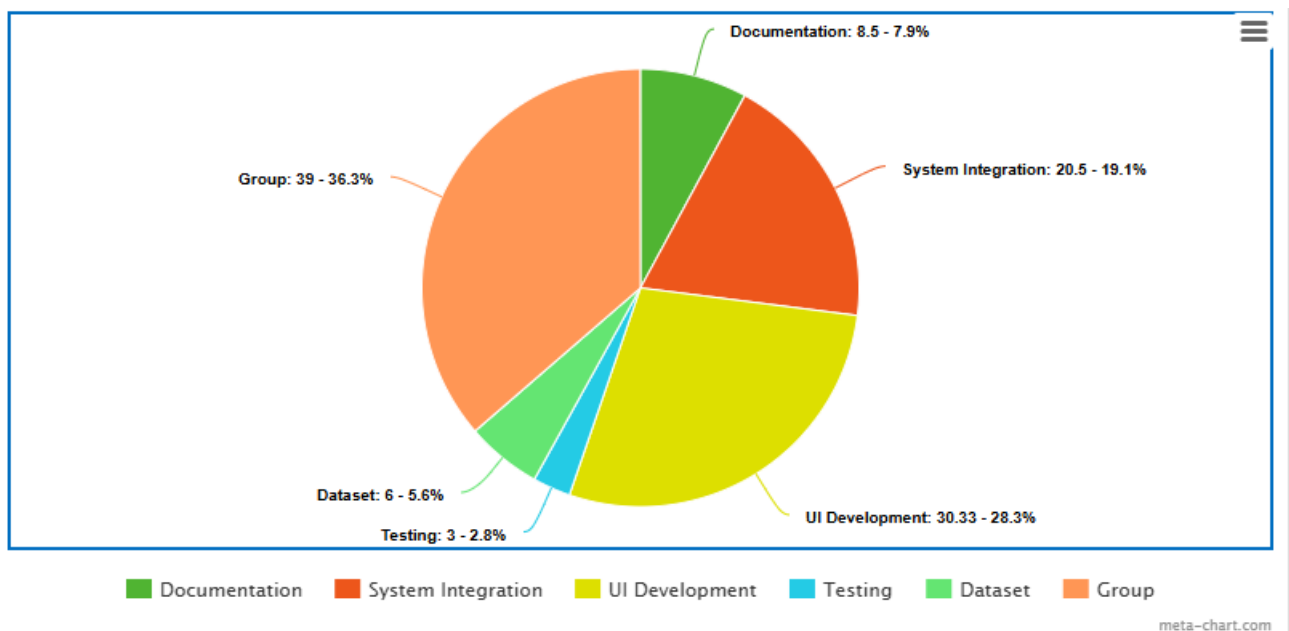


Figure 1: Contribute Percentage Pie Chart



Figure 2: Github Commits Graphs Over Time

Branches

New branch

Overview Yours Active Stale All

Search branches...

Branch	Updated	Check status	Behind / Ahead	Pull request	
integration-finetune	yesterday		5 0	#4	
ui-int-model	2 days ago		20 14		
main-ui	last month		34 0		

Figure 3: List of branches that I committed

Activity

main-ui All activity TungNamNguyen All time

Showing most recent first

add sound alert, add pop up, adjust frame	...
TungNamNguyen pushed 1 commit • 814fb22...e99d9d6 • 26 days ago	
Add pop up and write ct and mc to file	...
TungNamNguyen pushed 1 commit • fa55022...814fb22 • 29 days ago	
add test plans	...
TungNamNguyen pushed 1 commit • f1fd23b...fa55022 • on Sep 30	
Add live switch and debug	...
TungNamNguyen pushed 1 commit • 879d8f3...f1fd23b • on Sep 27	
Add a new file with new functionality	...
TungNamNguyen pushed 1 commit • 71b3e98...879d8f3 • on Sep 19	
Update README.md	...
TungNamNguyen created this branch • 71b3e98 • on Sep 19	

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Figure 4: List of commits for the main-ui branch

Activity

🔍 ui-int-model
All activity
TungNamNguyen
All time

Showing most recent first

changes

TungNamNguyen pushed 1 commit • f0a25b4...c10b833 • 4 days ago

changes

TungNamNguyen pushed 1 commit • 6ce177b...f0a25b4 • 7 days ago

Update requirement file for Window

TungNamNguyen pushed 1 commit • e213f19...d7acb09 • 8 days ago

Changes

TungNamNguyen pushed 1 commit • 27885c7...e213f19 • 8 days ago

new changes to the requirements.txt and 2 new Dockerfile

TungNamNguyen pushed 1 commit • 30eed88...27885c7 • 8 days ago

ffe

TungNamNguyen pushed 1 commit • d8308f9...30eed88 • 12 days ago

add Dockerfile and new requirement.txt

TungNamNguyen pushed 1 commit • f606989...d8308f9 • 12 days ago

file clean up

TungNamNguyen pushed 1 commit • cb6af33...f606989 • 12 days ago

update

TungNamNguyen pushed 1 commit • e63cfa1...6700eb7 • 21 days ago

Integration

TungNamNguyen pushed 1 commit • 5158c1c...e63cfa1 • 21 days ago

update

TungNamNguyen pushed 1 commit • d4a673e...5158c1c • 23 days ago

update

TungNamNguyen pushed 1 commit • 0981344...d4a673e • 24 days ago

update

TungNamNguyen pushed 1 commit • 4c77464...0981344 • 24 days ago

lol

TungNamNguyen created this branch • 4c77464 • 24 days ago

Figure 5: List of commits for the ui-int-model branch

Activity

🔍 integration-finet... ▾

👤 All activity ▾

👤 TungNamNguyen ▾

🕒 All time ▾

Showing most recent first ▾

Update README.md

...

👤 TungNamNguyen pushed 1 commit • 2f115b7...3159b69 • yesterday

resposne time problem fx

...

👤 TungNamNguyen pushed 1 commit • e646951...3ae9d69 • yesterday


resposne time problem fx

...

👤 TungNamNguyen pushed 1 commit • a41c0e3...958da11 • yesterday

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Figure 6: List of commits for the integraton-finetune branch




dockerhub

Explore

Repositories

Organizations


Usage



Search Docker Hub

tungnamnguyen

▼



Search by repository name

All Content

▼

Create repository

tungnamnguyen / cos40006-2

Contains: Image • Last pushed: 9 days ago

☆ 0

📄 13

🌐 Public

🚫 Scout inactive

tungnamnguyen / cos40006

Contains: Image • Last pushed: 12 days ago

☆ 0

📄 6

🌐 Public

🚫 Scout inactive

Figure 7: Deployment to DockerHub

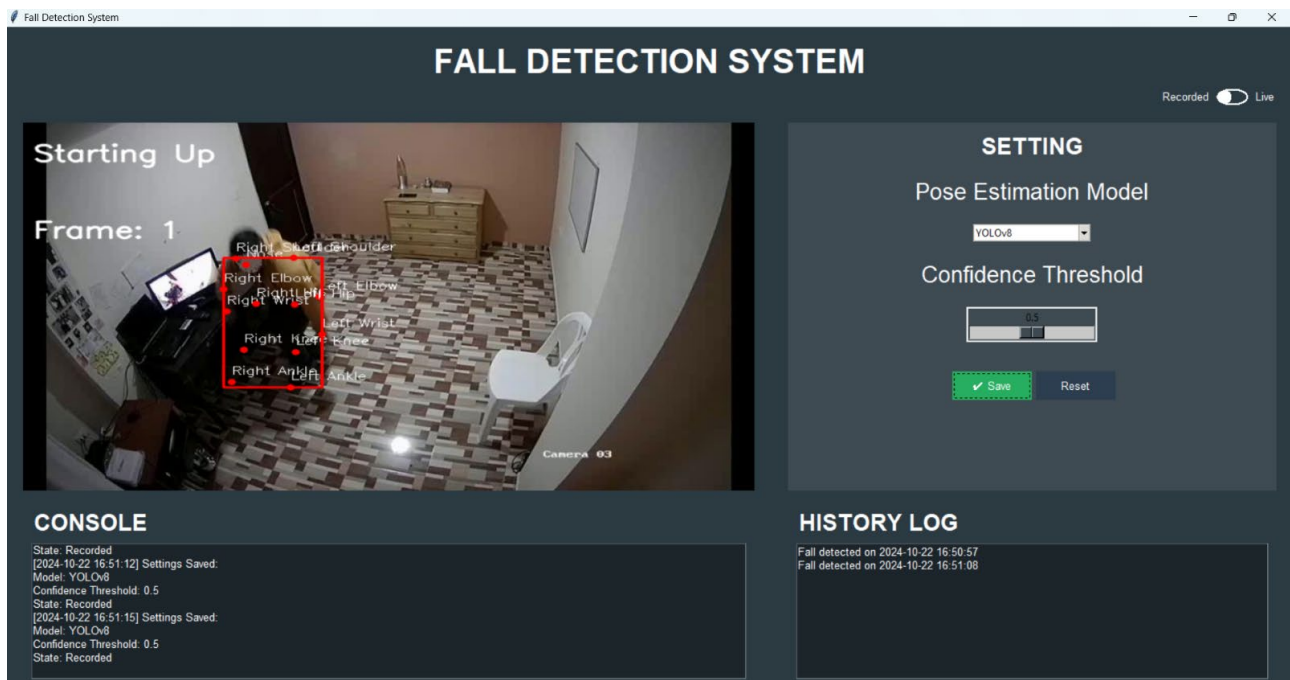


Figure 8: Fall Detection System Implementation

Detail Contribution

Documentation

This semester, I made some contributions to the project's documentation:

- Created an outline for all project documentation in this semester to ensure a clear structure.
- Developed and finalized Sections 1 and 3 of the Test Plan.
- Wrote Section 7.1 of the Test Report.
- Revised the Project Plan, updating sections such as Scope, Objectives, Critical Success Factors, Acceptance Criteria, Essential Skills, Domain Knowledge, Deliverables, and Assumptions to reflect the new UI and testing implementations.
- Created and finalized the User Technical Documentation
- Reviewed all past documentation to verify accuracy.

System Integration

This semester, I was responsible for integrating the frontend and backend:

- Conducted research, development, reviews, and debugging to achieve optimal integration.
- Maintained consistent communication with the model development team to ensure compatibility in integration.
- Applied various techniques to enhance the UI-backend interaction and performance.
- Published the integrated UI to Docker Hub, providing an image for future development (Since this deployment task is an optional addition outside the project scope, I am going to include it under the system integration contribution section for clarity.).
- Conducted performance enhancements for the system.

UI Development

Initially, we planned to use an UI, which is developed in React to demonstrate how the system would function in a healthcare system setting, incorporating sample CCTV video feeds and a login system for staff. However, due to some restrictions on using CCTV in hospitals, the project shifted to focus on general human fall detection. This change led to a new UI design that enables users to interact with the model, adjusting settings like model selection and confidence thresholds for greater flexibility and control.

Old UI

- Reviewed React documentation to guide effective implementation.
- Assessed Figma designs before coding.
- Developed and debugged the application developed with ReactJS, Node, SQL, incorporating login functionality and CCTV video display, all based on Figma's design.

New UI

- Joined a lot of sessions to review and discuss the new design.
- Reviewed Python and Tkinter UI documentation, offering feedback and design recommendations in Figma.
- Examined Figma's new designs before starting development.
- Coded and debugged the UI, creating main components like Main, History Log, Activity Log, and Settings.
- Implemented multiple functionalities, such as pop-ups and audio alerts on fall detection, as well as save and reset features to support the integration.

Testing

- Developed and finalized unit tests for UI components to ensure quality and reliability.

Dataset

- Conducted data extraction and video frame extraction, finalizing the fall and no-fall datasets. Adjusted the dataset to align with the system's requirements.

Group

- Collaborated with Nick for a final review of code and documentation before client handover.
- Actively participated in work sessions and meetings, contributing ideas and discussing progress.
- Attended the product presentation to the client alongside Nick and Garrich, providing support and addressing client questions.
- Participated in work session to continue progress with the project

(Note: in the work sessions, I also spent some time doing my individual tasks in term of coding the UI, conducting the integration, bug fixing and reporting. However, I did not really fully record these details, so I am going to just include them as group activity)

4. Learning Outcome Assessment

For this section, all evidence and detailed descriptions of my contributions can be found in Section 3: Lists of Contribution

a. Product

In the product area, the following are general criteria expected for each grade level.

[P] "Contributed adequately to the product. Overall, the team must have produced at least a semi-functional product that meets part of the client requirements."

[C] "Contributed strongly and consistently to the product over the duration of the project. Overall, the team must have produced a solid functional product that meets significant client requirements, using good design standards and practices."

[D] "Contributed significantly, consistently and of a high standard, to the product over the duration of the project."

In this section, I am going to use the term "product" to refer to the entire capstone project, outlining each contribution made toward its overall development in semester 2. For the "estimated % of the total product," I have only included contributions that directly impacted the final product. Contributions that solely supported documentation or other system components are going to be marked as "Not Applicable".

Contribution	Description	Estimated % of the total product	Which client requirements does each address?
Documentation	Completed all the required reports for the unit to satisfy the project scope and the client requirements.	5%	Ensures comprehensive documentation for user understanding, maintenance, and future scalability.
System Integration	Integrated the model developed by the model team into the frontend.	20%	Provides seamless functionality between the model and the UI, ensuring accurate and responsive detection.
UI Development	Developed the front-end components of the system.	10%	Delivers a user-friendly and accessible interface for users, meeting usability and design standards.
Testing	Conducted unit testing for all the front-end components	Not Applicable	Ensure that all frontend components initialize successfully and that all logical functionalities work correctly.
Dataset Collection and Transformation	Collected and processed data to create an optimized dataset for model training and testing.	Not Applicable	Provides a reliable dataset for accurate model training, enhancing the overall effectiveness of the system.

Table 2: Product Contribution 1: Main contributions

Since the client requires a fully integrated system with both the model and UI running seamlessly, system integration and UI development have become core aspects of this project. These two contributions are essential for achieving real-time functionality and a user-friendly interface, which directly align with the project's key objectives. Given their significance, system integration and UI

development collectively account for an estimated 30% of the overall project effort, reflecting the importance of these areas in delivering a successful and fully operational product.

Contribution	Which software design does each address?	Estimated % completion against the design	Period of activity
Documentation	Project Documentation and Reporting	100%	From week 2 to week 12
System Integration (Including Performance Enhancements)	Frontend and Backend Integration Design	100%	From week 9 to week 12
UI Development	UI/UX Design and Implementation	100%	From week 1 to week 9
Testing	Testing Framework for Frontend Components	100%	From week 6 to week 7
Dataset Collection and Transformation	Data Preprocessing and Transformation Design	100%	Week 0 to Week 2

Table 3: Product Contribution 2: Contribution activities

Contribution beyond what is assigned	What phases of the SDLC where you involved in?	Describe the effect on /output of the software if the component is replaced with a stub?
Documentation	Requirements Gathering, Design, Testing, Maintenance	Without comprehensive documentation, users and developers would struggle to understand and maintain the system,

		leading to increased support needs and confusion.
System Integration (Including Performance Enhancements)	Design, Implementation, Deployment	Replacing integration with a stub would lead to a lack of real-time functionality, causing unreliable performance and potential failures in system operations.
UI Development	Design, Implementation	A stub for UI development would result in an incomplete interface, limiting user interaction and making the system practically unusable.
Testing	Testing	If testing were replaced with a stub, it would allow undetected bugs and issues to persist, resulting in an unstable and unreliable software release.
Dataset Collection and Transformation	Requirements Gathering	Without an optimal dataset, the model's accuracy and effectiveness would be compromised, leading to poor detection capabilities and reduced application performance.

Table 4: Product Contribution 3: SDLC phases of contributions

b. Process

In the process area, the following are general criteria expected for each grade level.

[P] *“Demonstrated ability to follow (mostly) the process documented by the team.”*

[C] *“Demonstrated ability to accurately follow the process documented by the team.”*

[D] *“Demonstrated contribution to the definition and ongoing improvement of good process used by the team.”*

Demonstration / Task	Description	Estimated % of the total assignment	Which section of SQAP does each address?
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Documentation	Project Documentation and Reporting	100%	<ul style="list-style-type: none"> - 5.2.2. Documentation Formatting Standard - 5.2.5. Documentation Releases - 4. Documentation
System Integration (Including Performance Enhancements)	Frontend and Backend Integration Design	100%	<ul style="list-style-type: none"> - 5.2.1. Coding Standard - 5.2.4. Git
UI Development	UI/UX Design and Implementation	100%	<ul style="list-style-type: none"> - 5.2.1. Coding Standard - 5.2.4. Git
Testing	Testing Framework for Frontend Components	100%	7. Testing
Dataset Collection and Transformation	Data Preprocessing and Transformation Design	100%	5.2.3. Filename/Location Standard

Table 5: Process Contribution 1: Demonstration

Demonstration / Task	deadline as set in meeting	Date started	Date Completed
Documentation	Week 12	Week 2	Week 12
System Integration (Including Performance Enhancements)	Week 12	Week 9	Week 12
UI Development	Week 12	Week 1	Week 9
Testing	Week 12	Week 6	Week 7

Dataset Collection and Transformation	Week 3	Week 0	Week 2
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Table 6: Process Contribution 2: Demonstration timestamp

Section(s) in SQAP/project plan documenting the process improvement against the SQAP/project plan version submitted in Week 4 of Semester 1	Date included (if documented)	Problems addressed by the improvement
Scope, Objectives, Critical Success Factors, Acceptance Criteria,	Week 8	Incorporate the new scope regarding UI development and system integration.
Essential Skills, Domain Knowledge, Deliverables, and Assumptions	Week 8	Incorporate the new scope regarding UI development and system integration.

Table 7: Process Contribution 3: Project Plan / SQAP Improvement

c. Involvement

In the involvement area, the following are general criteria expected for each grade level.

- [P] *“Acceptable level of attendance and engagement with respect to both internal (team) and external (client) related activities.”*
- [C] *“An active level of engagement (internal and external), including organisation and leadership responsibilities.”*
- [D] *“An active level of contribution across multiple areas or responsibilities of the project, including significant input to important decisions (documented).”*
- [HD] *“Active leadership/ownership of key responsibilities resulting in high quality outcomes for the project. Key indicators of this would include personal contribution across multiple areas of the project, as well as providing support and leadership to members of the team.”*

Activities	Description	Type (Internal/External)	What is your role in the activity?
Documentation	Completed and documented all required materials, ensuring each document was of high quality and met project standards.	Internal	Contributor
Unit Testing of the UI components	Completed unit testing for each UI component, verifying functionality, responsiveness, and stability	Internal	Lead Tester
UI Development	Implemented the UI according to the design specifications	Internal	Lead Developer
System Integration	Integrated the model developed by the model team into the frontend	Internal	Lead Developer
Client Meeting	Presented ideas and project progress in the meetings	Internal	Contributor / Presenter
Project Review	Conducted thorough reviews of past and recent documentation, as well as code reviews	Internal	Contributor
Dataset Collection and Transformation	Prepared an optimal dataset optimized for model training	Internal	Contributor
Performance Enhancement	Enhance the performance of the fall detection system (after integration process)	Internal	Lead Developer

Table 8: Involvement Contribution 1: List of Involvement

Activities	Role (Chair/Lead/Contributor)	Type (Internal/External)	What was your contribution?
System Integration	Lead	Internal	Developed and ensured seamless integration between the UI and the model, enabling real-time functionality and smooth interactions that enhance the overall user experience.
UI Development	Lead	Internal	Developed the UI following the Figma design specifications, translating the visual layout into a responsive, interactive interface that maintains design consistency and usability.
Performance Enhancement	Lead	Internal	Improved performance by addressing the busy-waiting issue that occurred when multiple falls were detected at the same time, triggering multiple resources like sound and video.

Table 9: Involvement Contribution 2: Top involvement

Total and summarise your involvement in the table below:

Total number of presentation feedback provided	8
Total number of activities	8
Total number of internal and external related activities	8 Internal activities
Percentage of contribution	25% of the total project

Table 10: Involvement Contribution 3: Involvement summarisation

Areas of involvement	Activities (from above) associated with the area
System Development and Enhancement	System Integration, UI Development, Performance Enhancement, Dataset Collection and Transformation
Quality Assurance	Project Review, Documentation
Communication	Client Meeting

Table 11: Involvement Contribution 4: Area of involvement

5. Reflection

The most important things I learnt:

I believe the most valuable lessons I've learned include:

- **Teamwork and Collaboration:** Throughout the semester and entire capstone project, I worked closely with my team on both documentation and coding tasks. This experience taught me to navigate and resolve the many issues that naturally arise in teamwork, providing insight into identifying and addressing challenges. These skills will be invaluable in my career, where I'll need to collaborate on diverse projects with different teams.
- **Communication:** I've learned how to maintain consistent and effective communication with team members to ensure that tasks are completed on time and meet high standards. This skill is essential for keeping projects on track and achieving exceptional results.
- **Technical Skills:** The project has greatly enhanced my skills in UI development and integration, particularly the importance of ensuring seamless compatibility between frontend and backend components.
- **Problem-Solving:** This project has provided experience in problem-solving, helping me develop strategies for tackling complex issues that arise in real-world development.

The things that helped me most were:

One of the most helpful tools has been the Trello board, which allowed me to easily view, create, and update tasks, keeping everything organized and on track. Additionally, my skills in version control with Git were invaluable for tracking both my own and my team's coding progress, making it easy to see what was completed and coordinate our efforts effectively.

I found the following topics particularly challenging:

One of the topics I found particularly challenging was working with UI development frameworks like React and Tkinter. Since I had no prior experience with these frameworks, I spent a significant amount of time learning and understanding the basics before I could begin coding the UI effectively.

I found the following topics particularly interesting:

One of my main contributions, the integration of the UI and backend, was particularly engaging. It was incredibly satisfying to see the model running successfully on the video feed, with customizable settings applied directly to the model. Watching everything come together made the experience both fascinating and rewarding.

I feel I learnt these topics, concepts, and/or tools really well:

Through this project, I gained valuable knowledge across topics, concepts, and tools:

- **Topics:** Documenting the project taught me a great deal about using Python effectively for development, expanding my technical skills and understanding of best practices.
- **Concepts:** Teamwork was a key concept I focused on, helping me learn how to collaborate efficiently with team members and coordinate our efforts for the best outcomes.
- **Tools:** I became proficient in Git, mastering commands, workflows, and the overall version control process, which has been essential for tracking progress and ensuring smooth collaboration.

I still need to work on the following areas:

One area I need to improve is collaborating more closely with all team members, particularly with Rehman, who required extra support in understanding various aspects of the project. Strengthening collaboration will help us all stay aligned and ensure everyone feels confident in their roles. By offering more guidance and fostering open communication, I can contribute to a more cohesive and supportive team environment, ultimately enhancing our project outcomes.

My progress in this unit was ...:

My progress in this unit can be summed up in two words: efficiency and dedication. I approached each task with commitment and worked hard to ensure the project's success - not only for my own growth but also to support my teammates in achieving outstanding results. By staying focused and diligent, I aimed to contribute positively to both the project and the team.

This unit will help me in the future:

This unit greatly enhanced my collaboration skills, allowing me to work effectively with teammates from diverse backgrounds and strengths. It also sharpened my problem-solving abilities and project management skills - both of them are extremely essential for my future career as a data analyst. These experiences have prepared me to handle real-world challenges and work efficiently in a team-oriented environment.

If I did this unit again I would do the following things differently:

If I were to take this unit again, I would take a more proactive approach in taking on additional tasks. At the start, I was fairly passive, only working on the tasks assigned to me, and it wasn't until around week 5 that I became more engaged. With this change in approach from the beginning, I believe I could have contributed even more meaningfully to the project.

6. Conclusion

In conclusion, I believe I made significant contributions to the project in areas like documentation, UI development, system integration, performance enhancement and unit testing. These efforts not only contributed to the project's success but also helped me develop essential skills in project management and time management, which will be valuable in my future career in the data field. I would also like to give special thanks to Mr. Jun Han and Mr. Bao Quoc Vo for guiding us through this journey, providing invaluable insights and lessons that have helped me grow and prepare for the next chapter of my life.