Project 1-C: AI Model for Detecting Abnormal Behaviour

Project Plan

Project Group 1-C

Name	Position	Email	Phone No
Tran Quoc Dung	Software Development	dungtqswh00420@fpt.edu.vn	0943910306
Pham Hoang Duong	Data Research	duongphswh00843@fpt.edu.vn	0902162467
Nguyen Thai Son	Data Research	sonntswh00509@fpt.edu.vn	0902950403
Duong Quoc Trung	AI Researcher	trungdqswh00902@fpt.edu.vn	0962579876
Do Tuan Dat	Software Development	datdtswh00592@fpt.edu.vn	0865411803

COS40005 - Computing Technology Projects A - Summer 2024 - 28/05/2024

Document Change Control

Version	Date	Authors	Summary of Changes
1.00	30/05/2024	All	Start with Draft Version.
1.10	04/06/2024	Dung, Son, Duong	Updating after receiving feedback.
1.20	15/06/2024	Dung	Finalizing the document.

Document Sign Off

Name	Position	Signature	Date
Tran Quoc Dung	Software Developer, Writer	Dung	11/06/2024
Pham Hoang Duong	Data Research, Software Dev	Duong	14/06/2024
Nguyen Thai Son	Data Researcher	Son	14/06/2024
Duong Quoc Trung	AI Researcher	Trung	14/06/2024
Do Tuan Dat	Software Developer	Dat	14/06/2024

Client Sign Off

Name	Position	Signature	Date
Le Van Khang	AI Engineer	Khang	15/06/2024
Organisation			
Quy Nhon AI Creative Alley			

Table of Contents

1. INTRODUCTION

The advent of artificial intelligence has opened new frontiers in understanding and interpreting human behaviours. “AI Models for Detecting Abnormal Behaviours” is a project that stands between technology and psychology, aiming to construct a reliable AI system capable of identifying unusual behavioural patterns. The purpose of this Project Plan is to outline the strategic roadmap for the project’s execution, detailing the methodologies, timelines, resources, and milestones necessary to achieve our objectives. It serves as a guiding document that aligns the project team’s efforts with the overarching goals, ensuring a structured and systematic approach to developing a model, which is not only accurate but also ethically and socially responsible.

1.1. Background

Traditional rule-based methods often fall short when dealing with complex and dynamic data. Anomalies can take various forms, from being suffocated to implementing fraudulent behaviours. Machine learning techniques, particularly deep learning, offer promising solutions by learning patterns directly from data.

1.2.Key Project Personnel

The key personnel involved in this project are as follows:
Tran Quoc Dung: Leader of the project team
Bui Tien Anh: Acts as the primary contact between the project team and the client/mentor
Le Anh Ngoc: Provided guidance and direction for the project
Le Khang: Mentor of the project. Articulates the client's needs, expectations, and objectives for the project. Provides feedback on project deliverables from the client's perspective

Client

QAI – Quy Nhon AI Creative Alley

Other Stakeholders

Besides the client, other stakeholders include:
● Surveillance System Integrators: Implementing the new tools to integrate with QAI’s data lake system.
● End Users: Security personnel who will use the tool for data labelling and verification.

Project Supervisor, Team Leader and Key Project Members

- **Project supervisor:** Le Van Khang – Assist the team, guarantee it complies client assumptions and time constraints.
- **Project Members:**

- Tran Quoc Dung - Leader: Responsible for the overall management of the team, creating detailed project plans, including objectives, milestones, and timelines, to guide the project's progress
- Duong Quoc Trung: Algorithm development of the team, job is to research AI algorithms suitable for the project
- Do Tuan Dat: Develop software to interface with the AI model
- Pham Hoang Duong: Gather data sets needed for training the AI model
- Nguyen Thai Son: Identify and fix bugs in the software.

2. TERMS OF REFERENCE

The overall objective of this task is to spearhead a change in perspective in the detection and analysis of behavioural anomalies through artificial intelligence. Envisioned by our client, this AI model aims to transcend traditional boundaries by providing an intuitive, responsive, and reliable system that can be integrated into various operational frameworks.

2.1. Objectives

- Define abnormal behaviours
- Create survey do define what is abnormal behaviours
- To design and train an AI model that can accurately detect abnormal behaviours with a high degree of precision and minimal false positives (based on team 1-B's visualization output)
- Gather a comprehensive dataset that encompasses a wide range of behaviours, ensuring the model's effectiveness across different scenarios and environments.
- Create an interface that is intuitive and user-friendly, allowing for seamless interaction between the AI system and its human operators.
- Provide comprehensive training for end-users, as well as ongoing support to address any operational challenges.
- Build the AI model with scalability in mind, allowing for future enhancements and adaptations as technology evolves and user needs change.

2.2. Scope

- Designing and training a machine learning-based AI model capable of identifying abnormal behaviours.
- Collecting, processing, and managing datasets that are relevant to the model's training and operational needs.
- Creating a user interface that facilitates interaction with the AI model, including data input and result interpretation.
- Ensuring that the AI model can be integrated with existing surveillance and monitoring systems used by the intended user groups.
- Providing thorough documentation for the system, including user manuals, technical specifications, and support resources.

The project is scheduled to start on May 7, 2024, and finish by December 31, 2024.

2.3. Critical Success Factors

- Ensure the data collected through the survey is accurate and reliable
- The algorithm must efficiently detect abnormal behaviours with minimal false
- Schedule regular check-ins, feedback sessions to ensure all deliverables are reviewed and approved by the client/mentor and stakeholder
- Perform consistently under various conditions
- Providing effective support and maintenance services

2.4. Acceptance Criteria

- The client/mentor will review the data collection process and validation results to ensure data integrity
- The client/mentor will test the AI model using a separate validation dataset and verify performance metrics
- The client/mentor will conduct performance testing to ensure the algorithm meets the required benchmarks for accuracy and efficiency
- All project deliverables, including the survey results, AI model, and algorithm, must be reviewed and approved by the client/mentor and stakeholder

3. ESTABLISHMENT

3.1.Processes, Procedures and Standards

3.1.1. Methodology:

In this project, our group 1-C decided to use Waterfall Development Methodology as our structured approach. The Waterfall model emphasizes thorough documentation at each phase, which is crucial for our project's complex AI system, ensuring that every aspect is well-defined and traceable. Moreover, our project has well-defined requirements that are unlikely to change drastically, making the Waterfall model's sequential nature a good fit.

3.1.2. Processes

- Versioning System: Git - GitHub, which allows the source code management.
- User-Centred Design (UCD) Process:
  +) Phase 1: Investigate how users will interact with our product
  +) Phase 2: Define user and business requirements
  +) Phase 3: Develop design solutions based on user insights
  +) Phase 4: Consecutively assess how the design satisfies the user's requirements.

3.1.3. Coding Standard

- Consistent Formatting.
- Descriptive naming convention.
- Handling errors properly.
- Always using JSX syntaxes.

3.2. Project Environment

- Workplace: School – In class; Online
- Computers: Personal Laptops
- User accounts: GitHub for Version Control, Jira for observing Project Timeline, Zalo-Messenger-Microsoft Team for team communication
- Server accounts: Database Service account, web server service account
- DMBS: MySQL Server
- Anaconda: Managing Python environments and packages.

3.3. Project Team Skill Development Requirements

- Waterfall Training: Practice on Waterfall standards to guarantee smooth reception of the system.
- Training on Git, Confluence/Jira and other tools used in the project.
- Preparing on Python, JavaScript, and AI/ML structures like PyTorch.
- Self-concentrate on Node.js for backend development and React for frontend improvement to upgrade the group's full-stack advancement abilities.
- Preparing on different AI devices and strategies for abnormal behaviours identification.

4. DELIVERABLES, ACTIVITIES AND CAPITAL RESOURCES

4.1.Deliverables

Submission Package (Date: 29/07/2024) includes:

- AI Model: A fully developed and trained AI model capable of detecting abnormal behaviours with high accuracy.

- Guidance Documents: Comprehensive documentation that includes:
- User Manual: Instructions on how to use the AI system.
- Technical Documentation: Deep dive into the system details.
- Training Guide: A manual for training end-users on system operation and best practices.

- Data Management System: A secure and efficient system for managing the data used by the AI model.

- Testing Reports: Detailed reports from the testing phase, outlining test cases, results, and any issues encountered.

- Deployment Plan: A strategy document outlining the steps for deploying the AI model into a live environment.

- Demo Video: A video demonstrating the AI Model features, functionality with QAI's data lake system.

4.2.Activities

Phase	Tasks	Timeline
Phase 1: Survey on Abnormal Behaviours	Defines the Problem	28/05/2024 - 02/06/2024
	Clears the requirements, outputs of the problem	28/05/2024 - 02/06/2024
	Research papers related to the project	31/05/2024 - 21/06/2024
	Select 3 most suitable solutions	03/06/2024 - 25/06/2024
Phase 2: Outline the Functionality Features	Research open-source, related references	22/06/2024 - 26/06/2024
	Decide which functionality features to be added	22/06/2024 - 26/06/2024
	Visualize the development model of software	27/06/2024 - 09/07/2024
Phase 3: Develop the Product Prototype	Setup work environment of the team	27/06/2024 - 30/06/2024
	Initialize the UI framework	27/06/2024 - 30/06/2024
	Build and develop the functional features	27/06/2024 - 12/07/2024
	Integrating UI components to the features	27/06/2024 - 12/07/2024
	Test the software	09/07/2024 - 21/07/2024
	Improve the product based on testing results	13/07/2024 - 21/07/2024
	Finalize the product prototype; Prepare for presentation	22/07/2024 - 29/07/2024

4.3.Resources

*** Tools & Software:**
- Integrated Development Environment (IDE): Visual Studio Code.
- Source code: GitHub
- Following tasks, project timeline: Confluence/ Jira
- Artificial intelligence/ML Systems: PyTorch for creating irregularity location models.
- Frontend Advancement Libraries: Respond for building UIs.
- Backend Improvement Systems: Node.js/Django for server-side turn of events.

*** Hardware & Equipment:**
- Advancement PCs: Superior execution PCs for programming improvement and testing.
- Servers: For facilitating the application and overseeing information.

*** Human Resources & Workspaces:**
- Development Team: Including project boss, group pioneer, programming designers, simulated intelligence trained professionals and QA engineers.
- Work areas: Physical or virtual work areas for the improvement group.

5. ORGANISATION AND STRUCTURE

5.1. Resources

1. Project Team

- **Project supervisor:** Le Van Khang – Assists the team, guarantees it complies the assumptions and time constraints.
- **Project Members:**

- Tran Quoc Dung - Leader: Responsible for the overall management of the team, creating detailed project plans, including objectives, milestones, and timelines, to guide the project's progress
- Duong Quoc Trung: Algorithm development of the team, job is to research AI algorithms suitable for the project
- Do Tuan Dat: Develop software to interface with the AI model
- Pham Hoang Duong: Gather data sets needed for training the AI model
- Nguyen Thai Son: Identify and fix bugs in the software.

2. Client

QAI – Quy Nhon AI Creative Alley

3. Other Stakeholders

● Surveillance System Integrators: Implementing the new tools to integrate with QAI's data lake system.
● End Users: Security personnel who will use the tool for data labelling and verification.

4. Business Users

● Individuals interviewed during requirements modelling.
● People involved in acceptance testing.

5.2.Organizational Structure

Group	Role	Responsibilities
Project Supervisor	Oversees the project	Ensures the project develops efficiently.
Team Leader	Manages the team	Guarantees the team follow the project phases & processes.
Key Project Members	Various specific roles	Perform specialized tasks
Client	Provides project requirements, feedback, etc.	Reviews progress, provides feedback, ensures the product can satisfy their requirements
Surveillance System Integrators	Integrates, applying AI Model into CCTV systems	Ensures seamless integration and functionality
End Users	Use the AI Model to detect abnormal behaviours	Provide feedback, give suggestions about development
Business Users	Participate in requirements modelling and acceptance testing	Offer insights and feedback to the product

5.3. Activities and Deliverables

Activity	Task	Timeline	Deliverable	Group Involved
Phase 1	Defines the Problem	28/05/2024 - 02/06/2024	Technical Documentation	Project Members
	Clears the requirements, outputs of the problem	28/05/2024 - 02/06/2024	Technical Documentation	Project Members
	Research papers related to the project	31/05/2024 - 21/06/2024	Technical Documentation	Project Members
	Select 3 most suitable solutions	03/06/2024 - 25/06/2024	Technical Documentation	Project Members
Phase 2	Research open-source, related references	22/06/2024 - 26/06/2024	Technical Documentation	Project Members
	Decide which functionality features to be added	22/06/2024 - 26/06/2024	Technical Documentation	Project Members
	Visualize the development model of software	27/06/2024 - 09/07/2024	Technical Documentation	Project Members
Phase 3	Setup work environment of the team	27/06/2024 - 30/06/2024	AI Model	Project Members
	Initialize the UI framework	27/06/2024 - 30/06/2024	AI Model	Project Members
	Build and develop the functional features	27/06/2024 - 12/07/2024	AI Model	Project Members
	Integrating UI components to the features	27/06/2024 - 12/07/2024	AI Model	Project Members
	Test the software	09/07/2024 - 21/07/2024	Testing Reports	Project Members, End Users
	Improve the product based on testing results	13/07/2024 - 21/07/2024	AI Model	Project Members
	Finalize the product prototype; Prepare for presentation	22/07/2024 - 29/07/2024	AI Model, User Manual, Demo Video	Project Members, Client

Table 1: Activities and Deliverables

6. RISKS

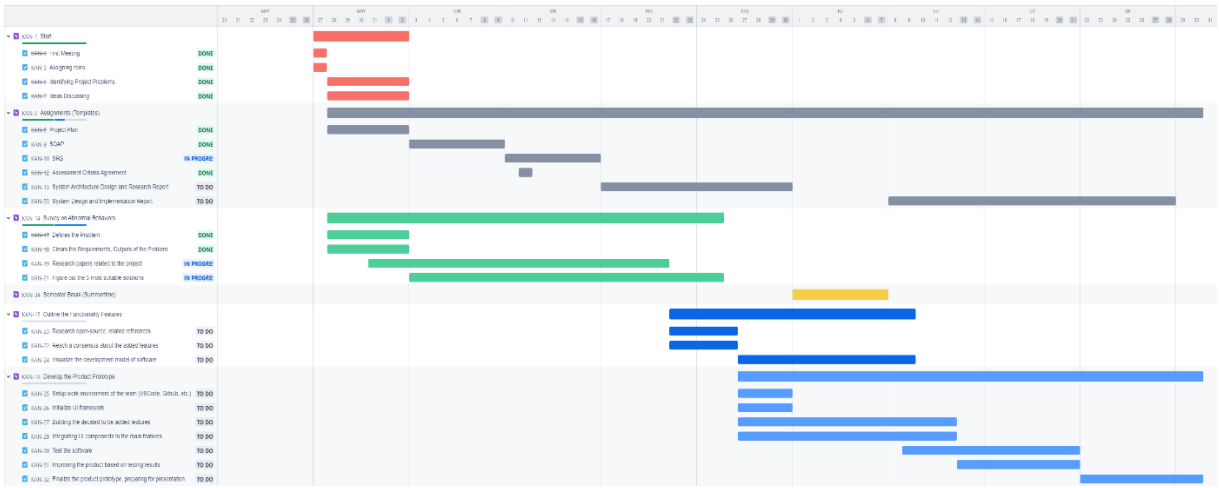
Risks associated with this project.

Rank	Name / Description	Occurrence Probability (H/M/L)	Severity (H/M/L)	Mitigation Strategy Number	Contingency
1	Project plan changes (more tasks, time changes)	M	H	Working on the Project Plan and organise our work as early in the project as possible	Add changes to the Plan and work with the new updated changes
2	Team member can't attend meeting due to schedule conflicts	H	L	Compromise with the client for better meeting time where possible (most amount attended)	Take important notes to review with the missing teammates so they are up to date
3	Client is busy and can't meet up in time or at all	M	M	Just like above, it's important to communicate beforehand so if they can't attend, ask them to relay back so the team knows	Schedule a different day to meet-up with the client if possible, if not, wait till the next meeting and explain any problems from before
4	Teammates can't finish their work due to personal reasons	M	H	It is best practice to not finish the work too close to the deadlines so if this happens, there's time to work it out	Seek out a different member in the team to finish the unfinished business before close to due date when it happens
5	Teammates stop showing up or working with the team	M	H	Same as above, don't finish work too close to deadlines, aside from that, there's really no possible ways to prevent it	Seek out the mentor to inform of the issues to perhaps add more time or get help from someone else outside of the team

Table 2 Risks

7. SCHEDULE

7.1. Project Timeline



7.2. External Dependencies

There are weekly meetings with our project's client, which allow them to check on our progress and offer feedback to improve our work, these meeting aren't added to our due dates as they are mere progression check to see our progress every week, so the main deadline still matters.

7.3. Assumptions

- The plan sticks heavily to the course timeline, therefore, if there's any change (summer vacation date, extended course time), the plan might need to be adjusted
- Majority of the tasks are based on the main course deliverables due date our group plan for the project for certain individual tasks
- More tasks might be added along the way down within the project if we see fit or feedback from mentor
- Break time for activities like eating and break are assumed as it isn't too long

8. BUDGET

Personnel Cost

Name	Rate per Hour
Nguyen Thai Son	430.000 dong
Pham Hoang Duong	430.000 dong
Do Tuan Dat	460.000 dong
Tran Quoc Dung (leader)	460.000 dong
Duong Quoc Trung	500.000 dong

Table 3: Personnel Cost

Time Estimated to Complete Each Task

Activity	Task	Estimated hours needed (hrs)	Total per activity (hrs)
1	Synthesize solution and reports to select the 3 most suitable solutions	*100*	*100*
2	Proposal of the Project Plan	*50*	*50*
	Working on the System Quality Assurance Plan	*170*	*200*
3	Analysing the requirement specifications	*130*	*150*
	Implement the solution proposed by the team	*500*	*500*
4	Completing the AI Model and the final reports	*300*	*300*
		Total	**1300**

Table 4: Task time estimate