WEEK 1

How to start your project (I)

Objectives:

1. Meet with your supervisor to discuss a project.
2. Define project goals and objectives.
3. Review and make a list of relevant literature and conduct research. Identify necessary resources.

Summary of weekly activities

Before the semester began, I invested time and effort in finding a supervisor whose research aligned closely with my final year project interests. After exploring potential options, I reached out to Dr. Nurulaqilla binti Khamis, whose expertise in AI and computer vision matched my project direction. I inquired about her availability for student supervision, and we arranged a meeting on 30 April 2024 to discuss potential AI projects in detail. After considering several ideas, I decided to focus on detecting road potholes using AI with a camera and an edge device.

I wrote a detailed list of objectives and targets to ensure a systematic approach to conducting the project. My primary goal was to develop an efficient and accurate model for pothole detection using AI-powered computer vision. To build a strong foundation for the work, I conducted a literature review and studied various research papers to understand existing solutions for pothole detection and edge computing. From this research, I identified the resources needed to carry out the project, including datasets, edge devices, and software libraries. This step was essential to ensure efficient progress during development.

Student's Name/Signature: **Date:**	**Supervisor's Name/Signature:** **Date:**

WEEK 2

How to start your project (II)

Objectives:

1. Attend Research Methodology (RM) Workshop Part 1.
2. Refine project objectives.
3. Select the final project idea.
4. Start drafting the project proposal.

Summary of weekly activities

During the start of semester, we were informed to attend the Research Methodology (RM) Workshop Part 1 on 15 October 2024, 2pm to 5pm. Ir. Dr. Shafishuhaza Sahlan was our facilitator for the workshop. Throughout the workshop, I gained a comprehensive understanding of the systematic literature review (SLR) process, which includes framing research questions, identifying relevant studies, assessing their quality, summarising evidence, and interpreting findings. Additionally, the importance of structuring research objectives and designing effective methodologies was emphasised, providing me with valuable insights for my academic journey.

After attending the RM Workshop Part 1, I refined my project objective and met with my FYP supervisor, Dr Nurulaqilla binti Khamis to confirm my FYP project title which focuses on detecting road potholes using AI with a camera and an edge device. After that, I started to do further research and work on my project proposal which included the proposed topic, goal, objectives and scopes.

Student's Name/Signature: **Date:**	**Supervisor's Name/Signature:** **Date:**

WEEK 3

How to start your project (III)

Objectives:

1. Attend Research Methodology (RM) Workshop Part 2.
2. Define the scope of the project.
3. Begin a comprehensive literature review.
4. Create a project schedule/timeline with milestones.

Summary of weekly activities

The Research Methodology (RM) Workshop Part 2 took place on October 22, 2024, from 2 PM to 5 PM, and was facilitated by Dr. Nurulaqilla binti Khamis. During the workshop, I learned the key parts of research methodology, especially the role of proposals and theses. The workshop also covered the importance of clear structure and presentation in academic writing, including proper formatting for proposals. We also introduced AI tools that can help us with proposal preparation, along with guidelines for responsible use. I also learned how to summarise my findings effectively in the conclusion of a thesis, highlighting broader impacts and future research ideas, which overall helped me gain the skills to conduct and present research clearly.

I defined the scope of my project and worked on the beginning of the literature review after referring to multiple research papers and planning for the project schedule/timeline with milestones. Besides, I focus on the first two steps of object detection, which are data collection and data labelling respectively. I gather a dataset of road potholes from online sources and also capture additional images of potholes using my mobile phone. I also did some research on the R-CNN and Fast R-CNN architecture.

Student's Name/Signature: **Date:**	**Supervisor's Name/Signature:** **Date:**

WEEK 3

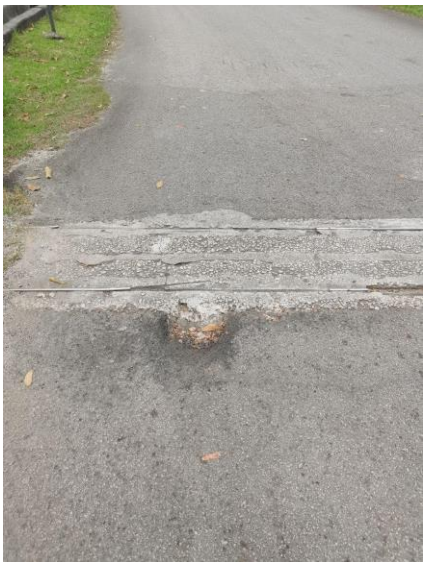

Figure 1: Data Collection from Phone Camera

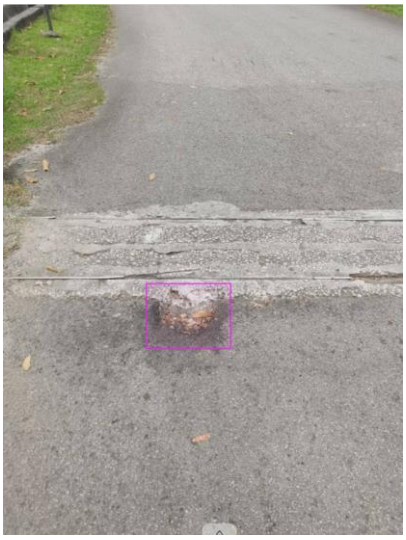

Figure 2: Data Labelling using CVAT

Student's Name/Signature: **Date:**	**Supervisor's Name/Signature:** **Date:**

WEEK 4

Objectives:

1. Review and refine the literature review.
2. Update the project schedule/timeline as needed.
3. Finalize the project proposal and submit it to your supervisor and faculty.

Summary of weekly activities

This week, I worked on refining my literature review by reading relevant research papers. I looked into different approaches for data collection, comparing the effectiveness of training on a large dataset all at once versus adding data gradually. After some trial runs with YOLOv5, I found that training large datasets at a time led to higher accuracy and reliability compared to training datasets little by little. I also explored ways to improve YOLO model performance on edge devices, learning that converting YOLO model to TensorFlow Lite model can boost FPS by reducing the model's size and computational load.

With these findings, I updated my project timeline to allocate more time for data collection, aiming to build a stronger dataset for training. I also finalized my project proposal and submitted it to my supervisor for review, followed by submission to the FKE faculty.

Student's Name/Signature: **Date:**	**Supervisor's Name/Signature:** **Date:**

WEEK 4

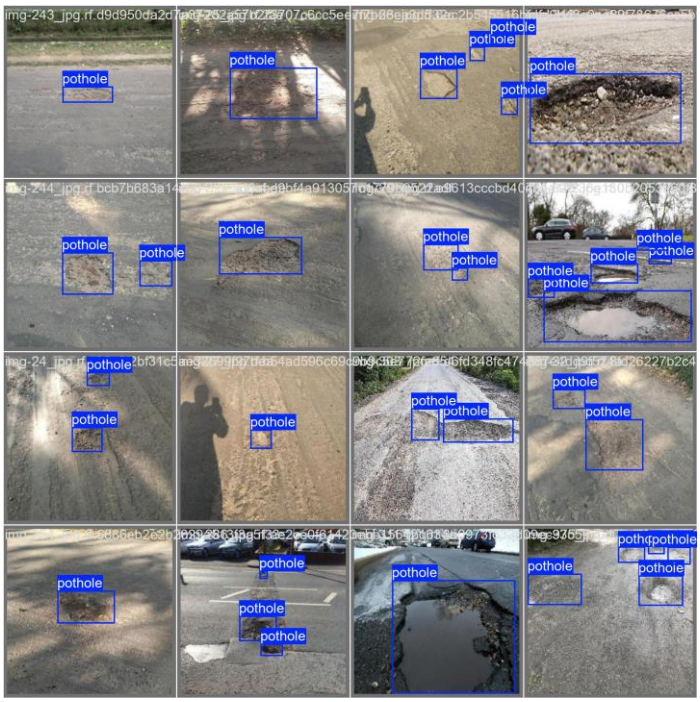

Figure 1: Validation Custom Dataset

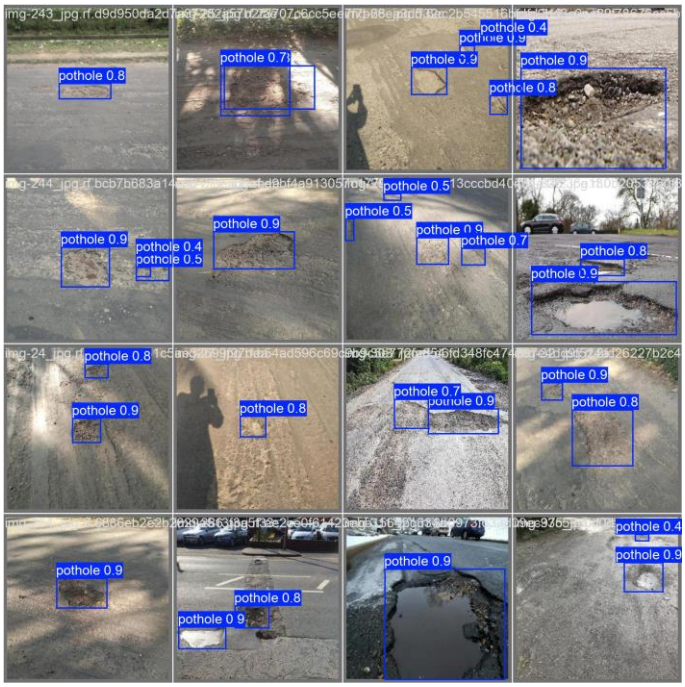

Figure 2: YOLOv5 Prediction Dataset

Student's Name/Signature: **Date:**	**Supervisor's Name/Signature:** **Date:**

WEEK 5

Objectives:

1. Continue the literature review.
2. Identify the problem statement.
3. Develop your research methodology.

Summary of weekly activities

For this week, I continued my research on academic papers and writing literature reviews. Besides, I am also starting to research and work on the introduction of my thesis.This includes a summary of the problem, a statement of the research problem or hypothesis, the questions to be explored, the aims and objectives of the research, and the scope of the study. For the research methodology, I also search on how to develop research methodology.

I also tried model training using YOLOv8 to study its performance and compare it to YOLOv5, focusing on metrics such as accuracy, inference speed, and training time for specific tasks.

Student's Name/Signature: **Date:**	**Supervisor's Name/Signature:** **Date:**