Project Proposal

COMP3003

Project title: Enhancing construction site safety through object recognition and computer vision

20219626 Lok Him Lam (efyll1)

Computer Science BSc

October 25, 2023

1 Motivation and Background

In recent years, the prevalence of injuries and fatalities on construction sites continues to be a major concern, with the Health and Safety Executive reporting that they constituted 33.3% of all fatalities between 2022 and 2023 [1]. The most common causes of these fatalities are falling from height (36.4%) and being struck by moving objects (26.4%), which highlights the importance of personal protective equipment (PPE). Therefore, I am convinced that it is important to develop or fine-tune an object recognition model aimed at enhancing worksite safety. It would reliably detect whether individuals are wearing PPE through a camera, the new or fine-tuned object detection model would then provide feedback to worksite managers. This feedback then could be used to enforce PPE compliance among workers, improving workplace safety as a result.

2 Aims and Objectives

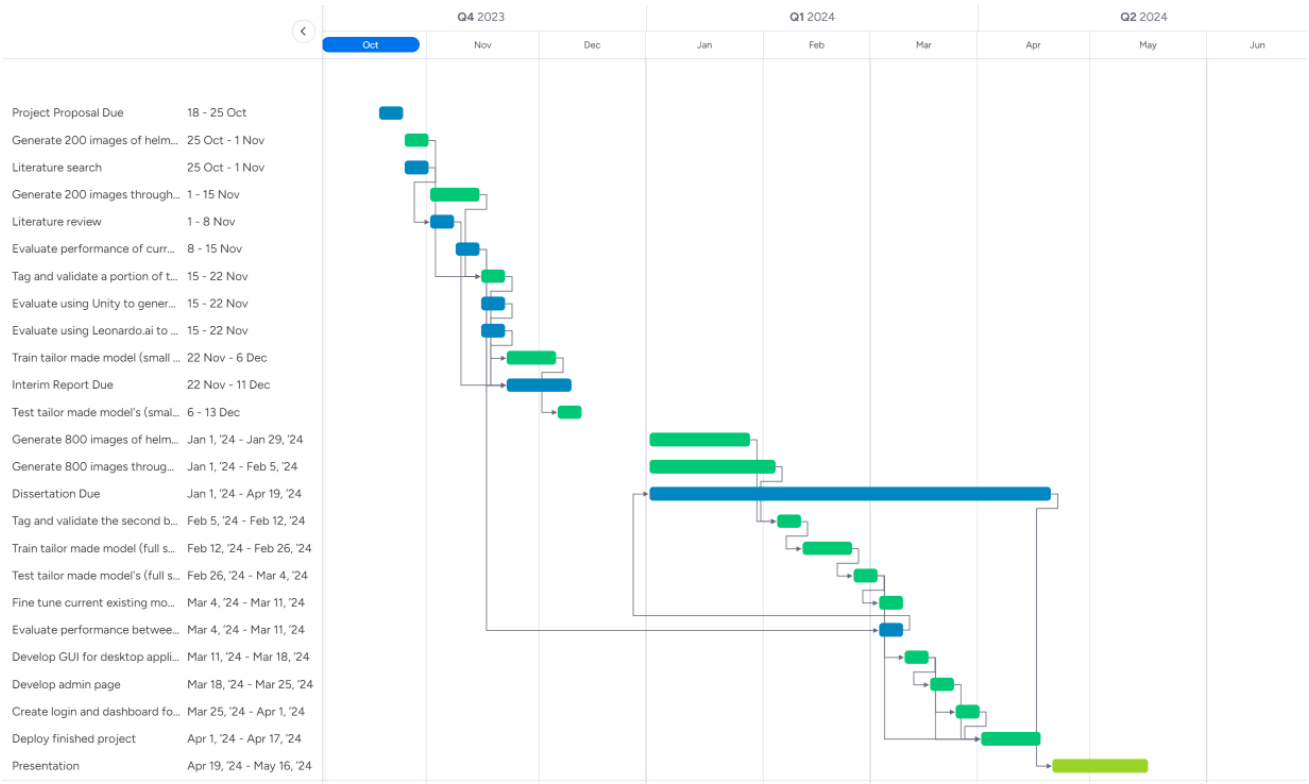
Aim:

The aim of this project is to enhance workplace safety through the development and implementation of an optimized object detection algorithm, using a camera or CCTV.

Objectives:

1. Evaluate the performance and accuracy of existing object detection models.
2. Investigate various methods of synthetic data generation.
3. Label the generated synthetic data generation for training the model.
4. Train a tailor-made object detection model using the generated synthetic data.
5. Compare the performance of the tailor-made object detection model with existing general object detection models, highlighting the improvements achieved.
6. If Objective 5 has failed to improve over general object detection models, improve and fine tune current object detection model for deployment.
7. Develop a user-friendly desktop application with a GUI for worksite manager.

3 Project Workplan



4 References

Health and Safety Executive, "Work-related fatal injuries in Great Britain," Health and Safety Executive, 06-Jul-2023. [Online]. Available: https://www.hse.gov.uk/statistics/fatals.htm. [Accessed: 25- Oct- 2023].