

CHAPTER VI

CONCLUSION & SUGGESTION

This chapter contains the conclusion, and constructive suggestions formulated from research findings.

6.1 Conclusion

According to the experimentation and analysis conducted, researcher proposed several points that conclude the findings of this research.

1. The procedure for developing the PPE detection model started by defining the target for observation, conducting preliminary study in parallel with literature study, which helps researcher/developer in understanding the context behind the problem that Company X is facing. Next, researcher started defining and formulating the problems and objectives that exist in status quo, which leads to evaluating different approach/method to conduct research, where researcher defines the specifications of tools and materials that will be used in model development (such as source of dataset, model architecture, computing engine type, etc.), further down the process, researcher collects images from various public datasets, and then pre-process them using transformation and augmentation in order to standardize image dimensions and provide variations for a more robust training data, which will then be fed into the model architecture and trained-validated-tested using previously defined specifications, where the output of the development process is then reviewed and then analyzed for its application for existing operational safety system of Company X.
2. PPE detection model is developed by using pre-trained model with YOLOv8 for its architecture, the model is trained on dataset consist of 4.611 images of PPE usage spanning across 7 different classes (helmet, mask, vest, gloves, boots, goggles, and person). Data used in model training-validation-testing went through 20 epochs using T4 GPU provided by

Google Colab in order to produce model weights that will be used for deployment. Development process resulted in a detection model that achieved the mAP50 score of 0,881 and mAP50-95 score of 0,618 with inference time of 4,6ms per image. This indicates the significant performance attained by the model through its training-validation-testing phase. Furthermore, utilization of this model will be able to reduce the workload of supervisors/team managers in handling work report by automating reviewing processes to detection model, which in turn decreases the possibility of error and negligence on supervisor-end and increase their efficiency by around 9,38%. Other than that, utilization of detection model will act as positive feedback loop for the existing parties in the system, that is technicians, supervisors, and the model itself through reinforced learning through feedback, appeal, and revisions by user.

6.2 Suggestion

According to the points that conclude the research findings, researcher proposed several constructive suggestions.

1. It is highly suggested for Company X to utilize PPE detection model in order to increase the effectiveness and efficiency of workplace safety monitoring procedure. Eventually, this will lead to the increase of operational safety, and the automation of repetitive processes allows for the re-allocation of tasks for human resources, enabling more strategic-focused tasks to be handled by supervisors/managers.
2. Utilization of PPE detection model is highly encouraged in order to increase its performance, since allowing the model to directly handling real/actual data will lead to more effective reinforced learning.