

# Personal Protective Equipment (PPE) Inspection

Created	@July 4, 2023 10:59 PM
Tags	Computer Vision Software Engineering

## About



PPE is equipment that will protect the user against the risk of accidents or of adverse effects on health. It can include items such as safety helmets, gloves, eye protection,

high-visibility clothing, safety footwear, safety harnesses and respiratory protective equipment (RPE).

This application can automatically detect whether a worker is wearing the necessary PPE for a specific task or environment.

There are six inspected equipments:

- helmet
- safety glasses
- mask
- vest
- safety gloves
- safety shoes

The inspection records are stored in the database and can be seen on an online dashboard. The inference engine is deployed on a Nvidia Jetson Nano while the remote server is deployed on Heroku

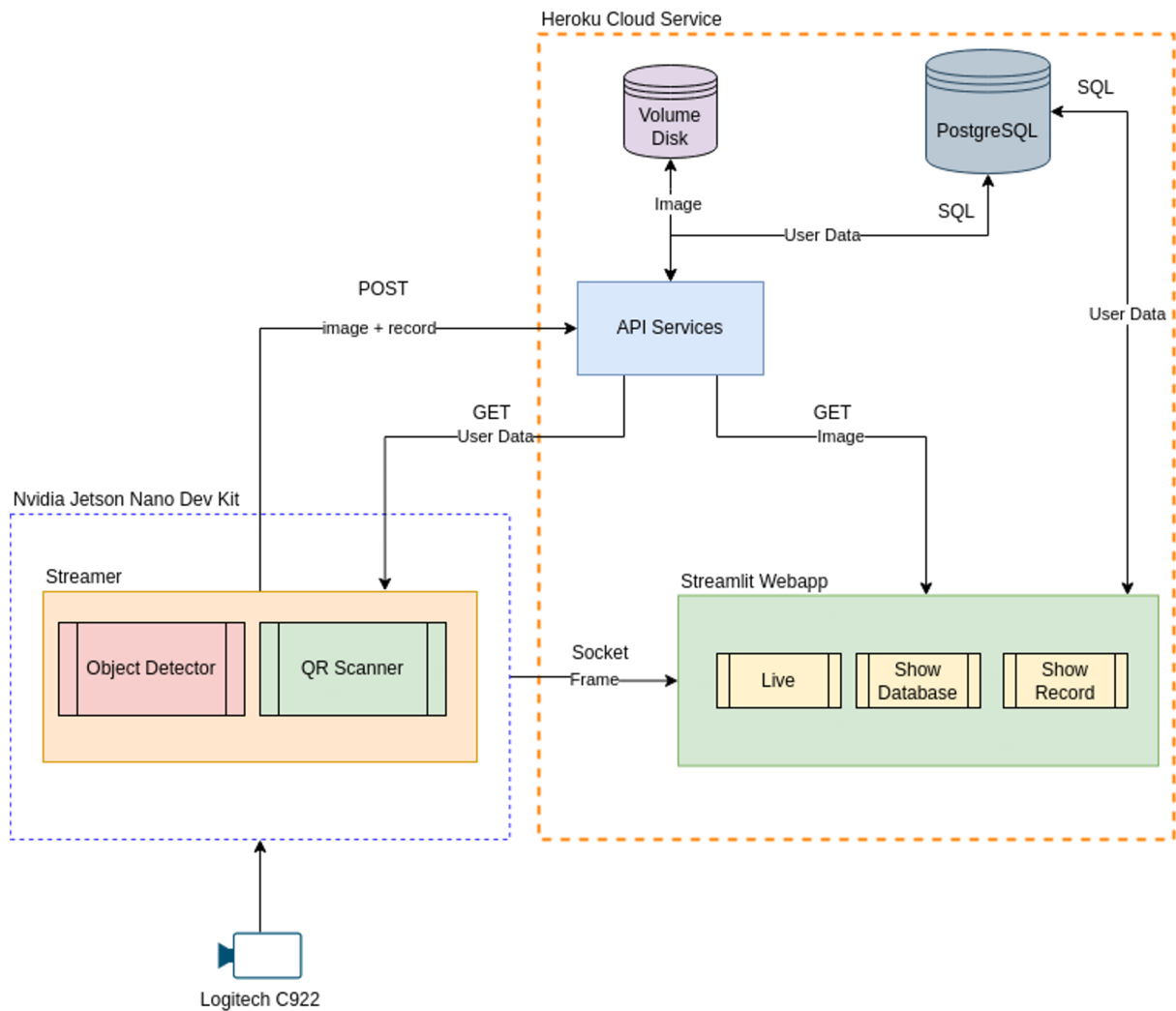
## Features and Functionality

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- PPE Detection — Detect and check the completeness of workers' PPE
- Visualization — Display the result on a simple web-app

## High Level Architecture

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## Dataset

The datasets were taken through manual collection, involving the capture of photographs of individuals wearing the designated equipment. Initially, there were 1045 images. Subsequently, the images were partitioned, and the training set was expanded through augmentation to enhance dataset diversity.

### Dataset Split:

Train Set	2178
Valid Set	199
Test Set	120
<b>Total Images</b>	<b>2497</b>

### Augmentation Applied:

Method	Value
Grayscale	Apply to 30% of images
Brightness	Between -25% and +25%
Exposure	Between -25% and +25%
Blur	Up to 10px
Noise	Up to 5% of pixels

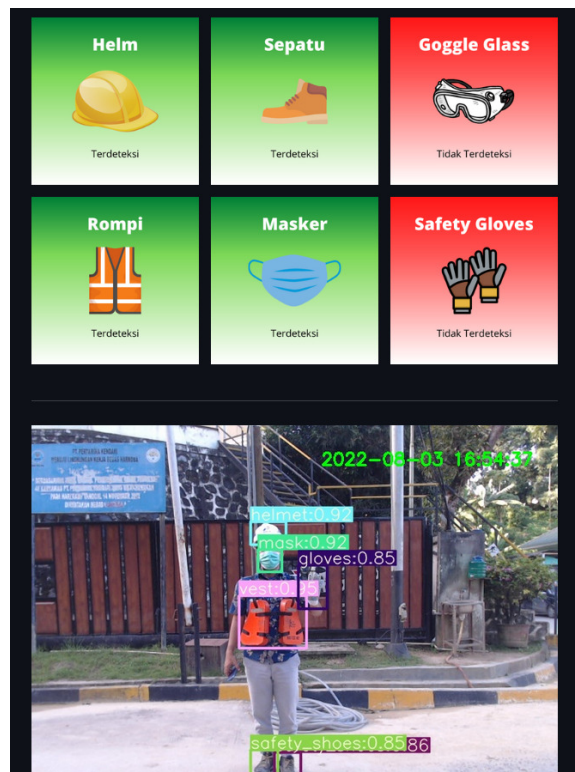
## Model

Base Model : **Yolov5**

## Training Result

Metrics	Value
mAP (0.5)	97.3%
Precision	96.3%
Recall	96.3%

## Sample Screen



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Start Date: 2022/11/01      End Date: 2022/11/29      Download Button: Download data as CSV

date	time	id	name	status
2022-11-21	16:30:25	745532	Novi Prasetyo	Fail
2022-11-21	16:31:26	745532	Novi Prasetyo	Fail
2022-11-21	16:31:56	123	Andi Muhamm...	Fail
2022-11-21	16:33:33	123	Andi Muhamm...	Fail
2022-11-21	16:33:51	123	Andi Muhamm...	Fail
2022-11-21	16:34:27	123	Andi Muhamm...	Fail
2022-11-21	16:35:19	123	Andi Muhamm...	Fail
2022-11-21	16:35:40	123	Andi Muhamm...	Fail
2022-11-21	16:37:35	123	Andi Muhamm...	Fail
2022-11-21	16:37:47	123	Andi Muhamm...	Fail
2022-11-21	16:37:59	123	Andi Muhamm...	Fail

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## Techonologies

- Python
- FastAPI
- TensorRT
- Yolov5
- PostgreSQL
- Streamlit