KSG Documentation

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# Home

Introducing Kitchen Safety Guide (KSG), an AI-embedded surveillance system for kitchen safety monitoring. By using the RGB MIPI camera, the system detects the existence of unattended fire in real-time.

This project makes use of Raspberry Pi 4 and MIPI camera. It requires network connection only for downloading the application to computer. Please note that wireless connection with WPA-2 is required, while WPA-3 is not supported.

# QuickStart

1. Install Raspberry Pi OS (x64).   
   (Official webpage: <https://www.raspberrypi.com/software/>)
2. Set up the MIPI camera.   
   (Official webpage: <https://projects.raspberrypi.org/en/projects/getting-started-with-picamera>)
3. Install pip and git modules via terminal /command-line interface (CLI).   
   The modules are required for the following installation.
4. Follow the installation guide on <https://github.com/ToastTO/KSG_FYP/blob/main/docs/README.md>.
   1. Install YOLOv5.
   2. Install KSG\_FYP and required modules.
5. Run the program in terminal as instructed in (4).

# Models

The model is custom-made and trained with a unique dataset.

The base architecture of the model is YOLOv5.

# Dataset

Our dataset includes two types of data which are online images and self-taken photos.

For online images, random photos from the internet are selected, and self-taken images are extracted from developers’ provided cooking videos. These contain elements of fire, utensils, humans and/or hands.

The dataset is processed in an online tool Roboflow (<https://app.roboflow.com>). Processes include trimming and labeling.

The dataset can be viewed by: <https://universe.roboflow.com/hkust-ya8dx/fyp-human_hand_fire_pot-online_1>

# Reference

1. YOLOv5:  
   <https://ultralytics.com/yolov5>
2. Hardware – Raspberry Pi:  
   <https://www.raspberrypi.com/>
3. Processing – Roboflow:  
   <https://app.roboflow.com>