

# **Documenting the Journey of GG\_1714**

## **1. Initial Approach Initially:**

The project explored the use of pre-trained models such as ResNet50, MobileNetV2, and VGG16 for event detection and monitoring. Challenges were encountered with pre-trained models, including compatibility issues and limitations in customization for the competition requirements.

## **2. Custom Model Development:**

To overcome the limitations of pre-trained models, a custom convolutional neural network (CNN) was developed from scratch. The custom CNN architecture was designed to detect specific events relevant to the competition, such as fires, destroyed buildings, human aid rehabilitation efforts, military vehicle movements, and combat activities.

## **3. Data Preprocessing :**

Data preprocessing techniques were applied to enhance the quality and diversity of the training data. Preprocessing steps included image resizing, normalisation, and augmentation to improve model performance and generalisation.

#### 4 Calibration and Arena Mapping :



**Detection of ArUco Markers:** ArUco markers placed in the corners of the arena were detected, providing reference points for calibration.

**Centerline Calculation:** A centerline was calculated by drawing a line through the centres of the detected ArUco markers, serving as a reference axis.

**Creation of Rectangular Arena:** Using the centerline and other detected markers, a rectangular representation of the competition arena was created.

**Cropping of Arena:** Cropping algorithms were applied to extract the relevant portion of video frames containing the competition arena, enabling focused analysis.

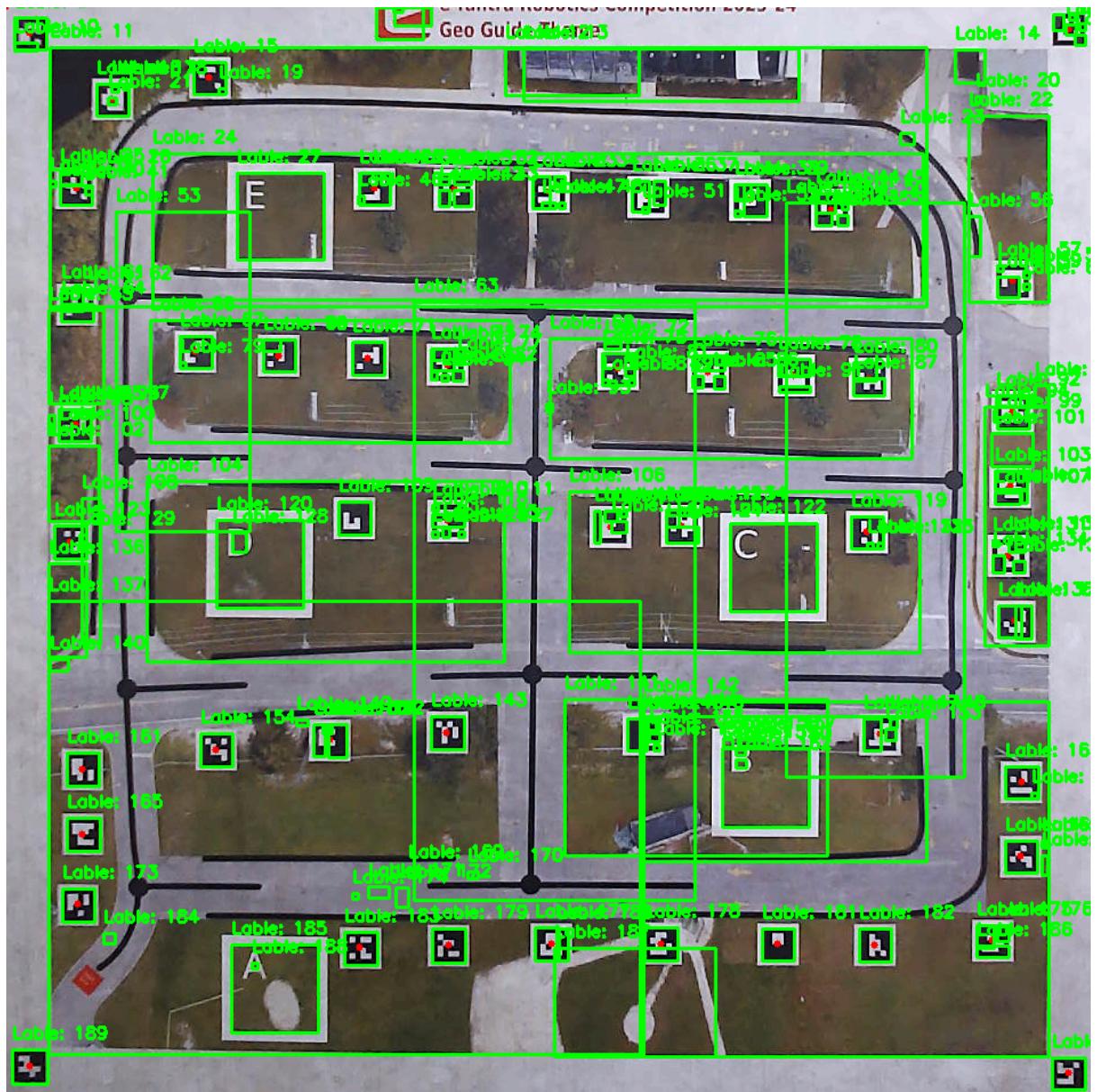
**Accuracy Verification:** The accuracy of calibration and arena mapping was verified through visual inspection and manual validation.

**Benefits:** Calibration provided a standardised reference frame, improving efficiency and accuracy in event detection and monitoring.

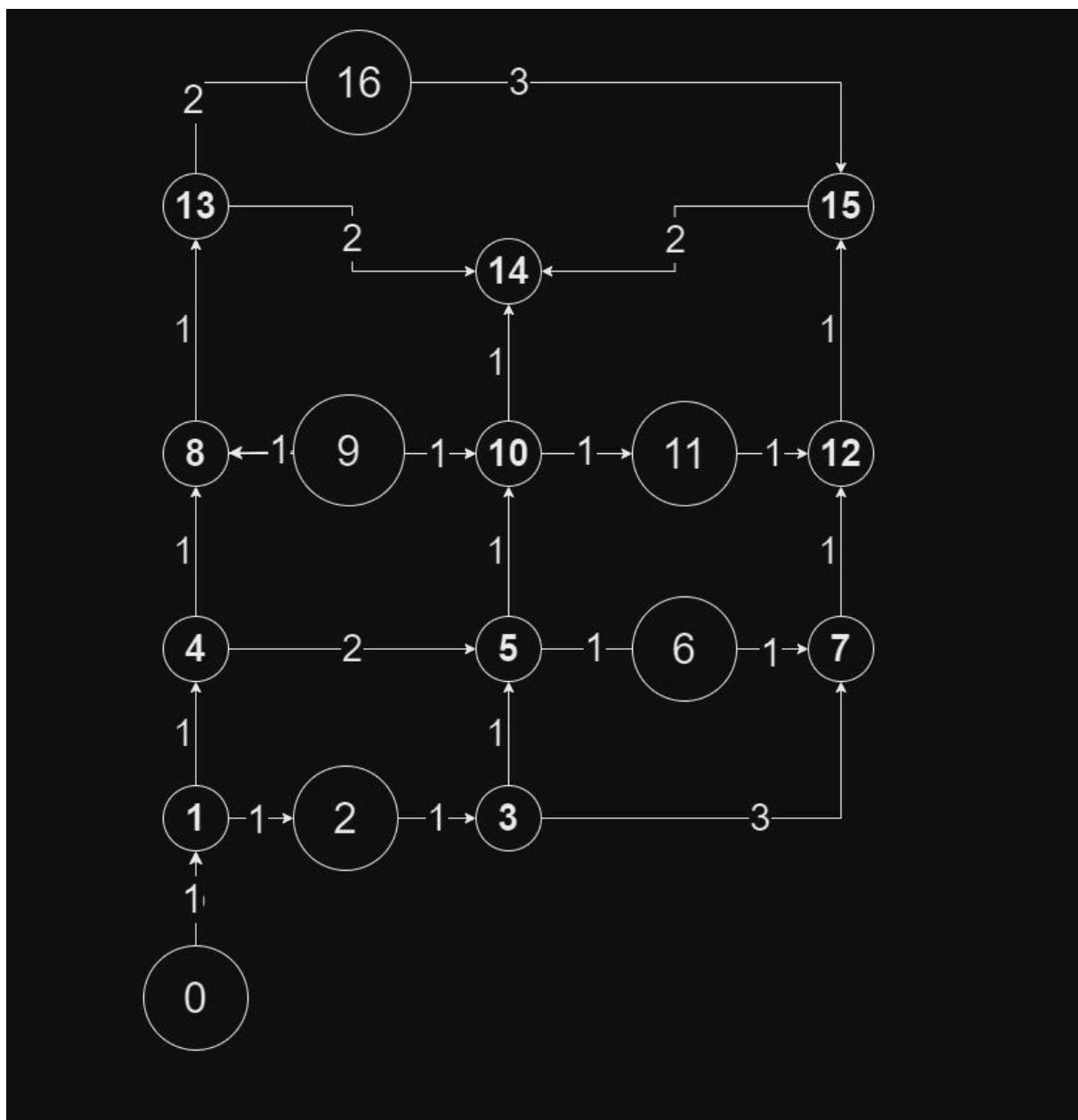
## 5. White Frame Detection :

White frame detection was utilised to identify specific regions of interest (ROIs) within the competition arena.

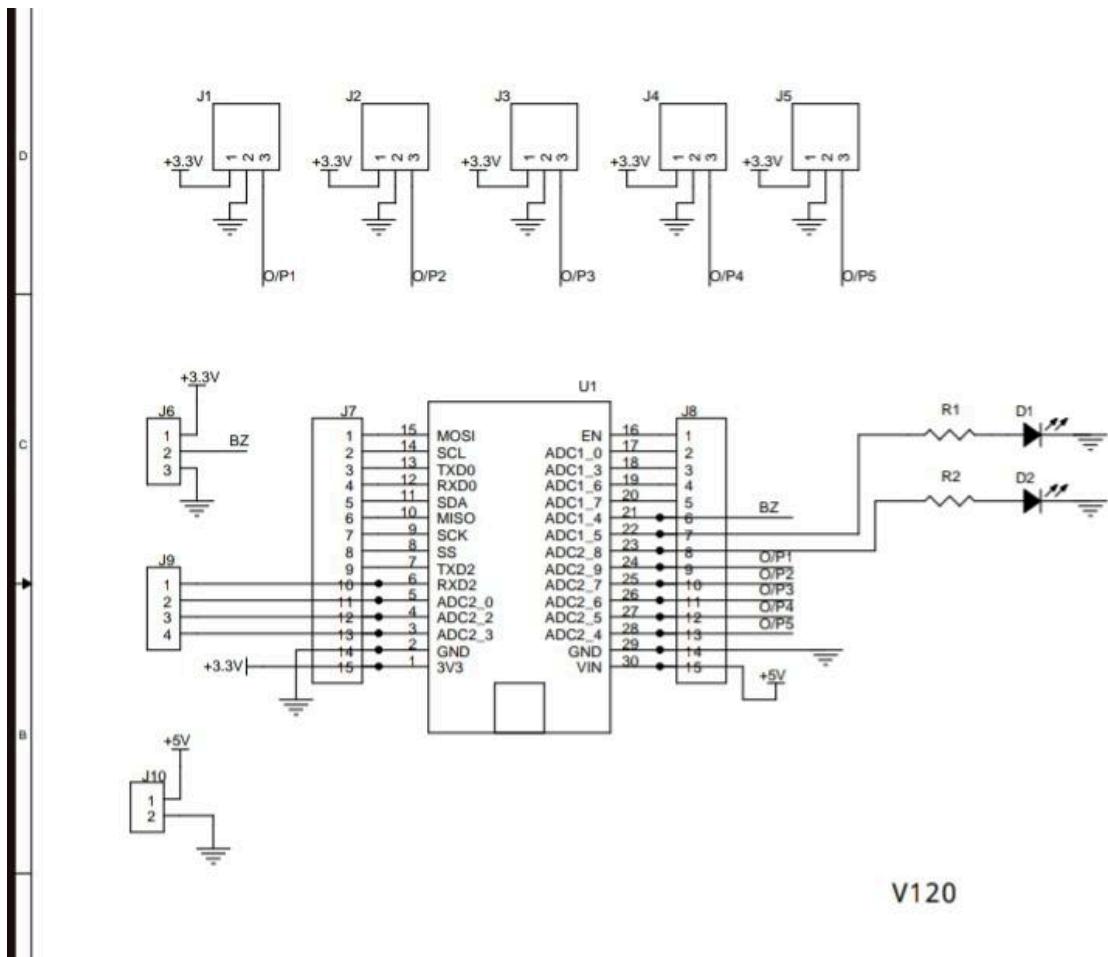
These white frames served as markers for event zones, enabling accurate localization and tracking of events during the competition.



**6. Path Planning graph:**

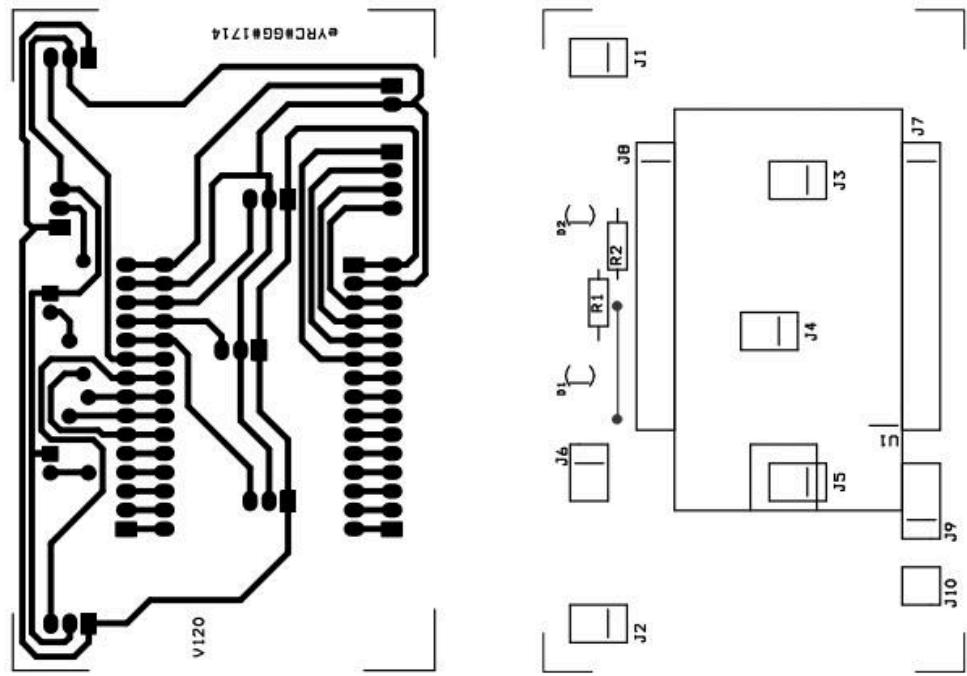


## 7. Schematic Diagram :

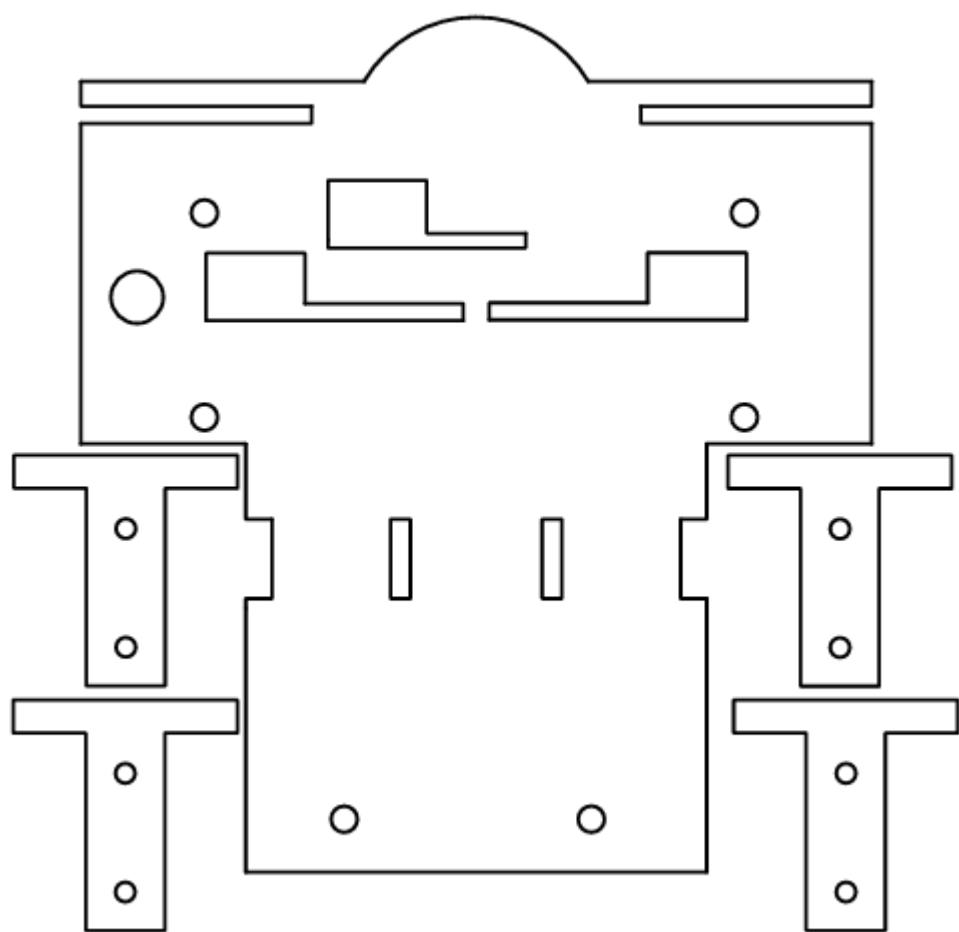


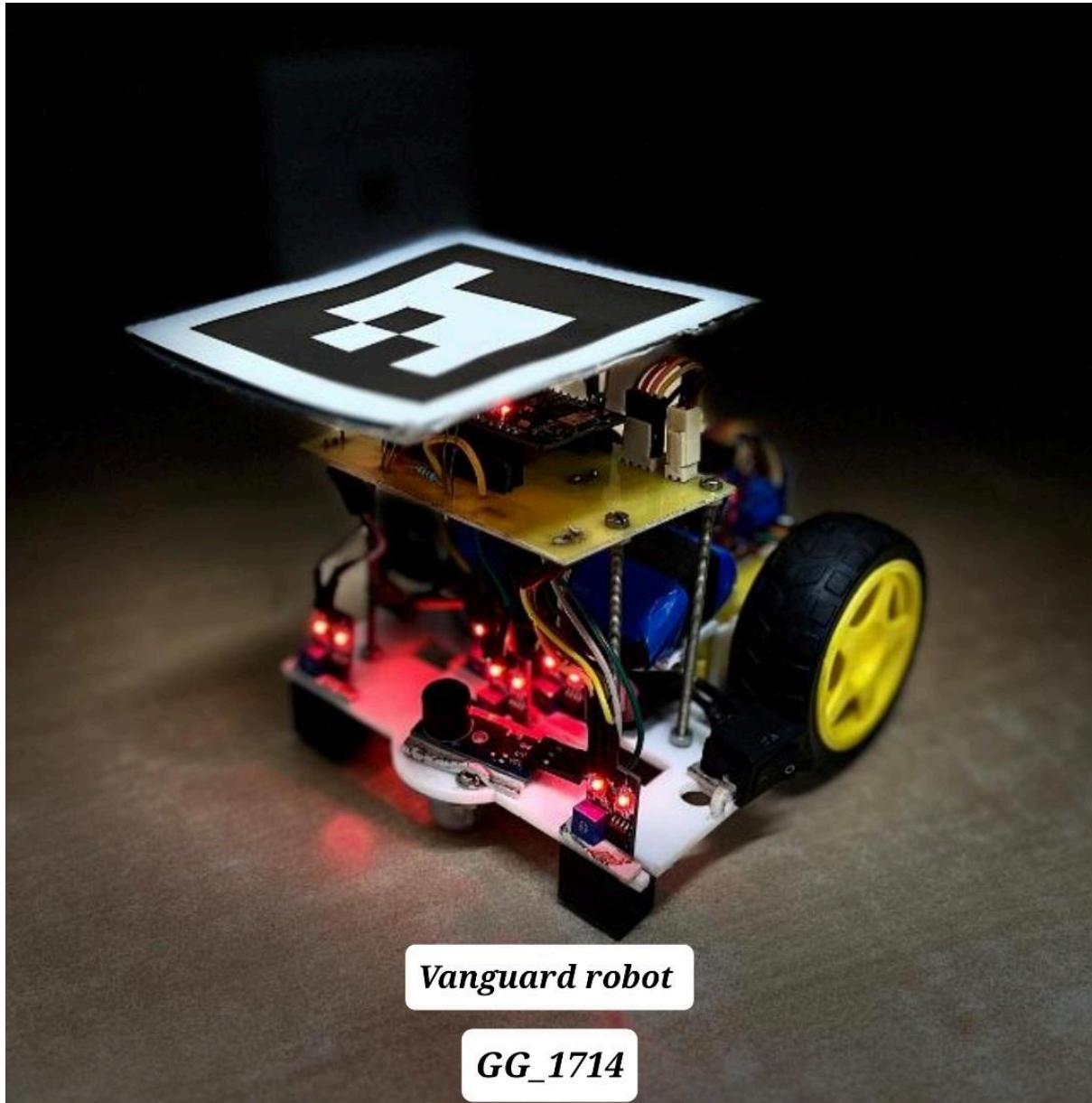
V120

**8. Circuit Diagram :**



**9. Bot Chessy (AutoCAD Design):**





*Vanguard robot*

*GG\_1714*