

1)Project Reference Number : 46S_BE_4415

2)Title of the Project : **SMART AI BASED TRAFFIC CONTROL SYSTEM**

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Computer Science and Engineering

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5)Keywords : Image Processing, object detection, Machine learning, Artificial
Intelligence, Deepstream, Automated Traffic management system, Intelligent transport
systems, Traffic Congestion,Identification, Classification, YOLOv3.

6) Introduction : Traffic congestion is one of the major concerns at the global level. Ever
increasing population and growing demands for vehicular transport has led to the idea of
developing smart AI-based traffic controller. According to the intensity of traffic congestion,
the ML model performs decisionmaking on which direction vehicles should be given the green
signal earlier.

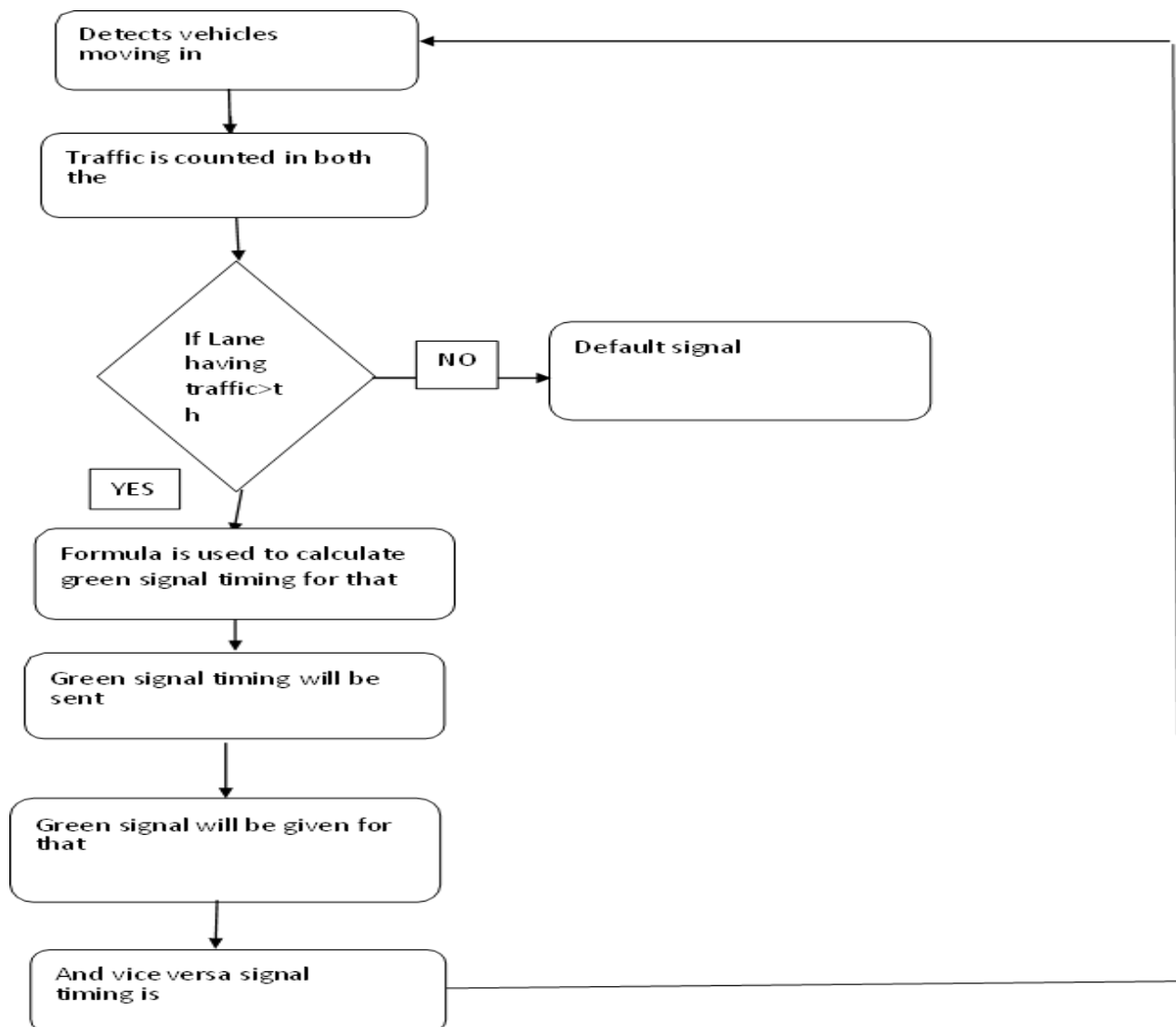
The larger the traffic congestion, the faster will be the clearance rate. Implementation of the
abovementioned can be done using image processing, object detection algorithms, and
machine learning models.

Thus the model focuses to decrease traffic congestion at bottleneck points, peak traffic hours,
etc.

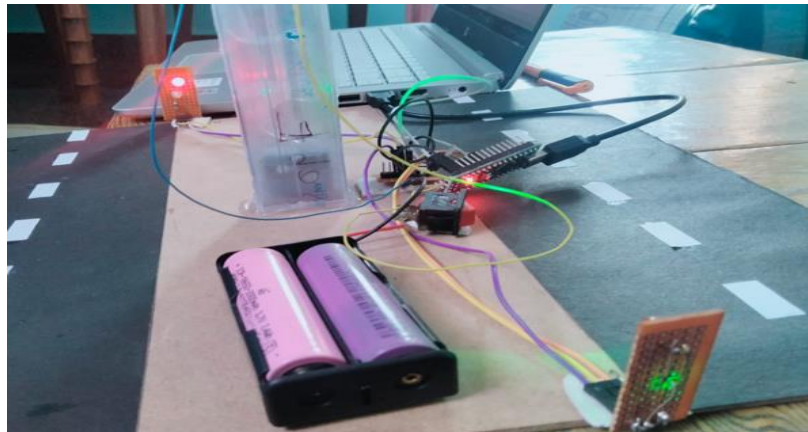
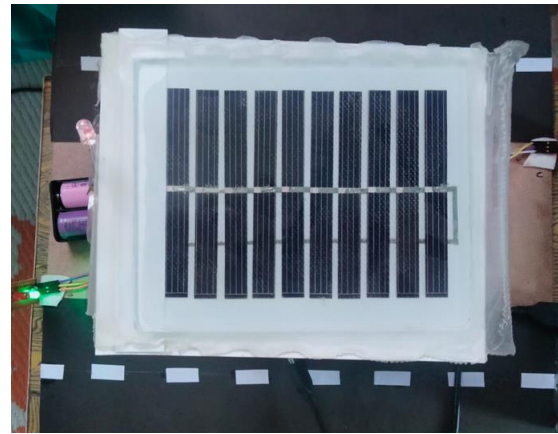
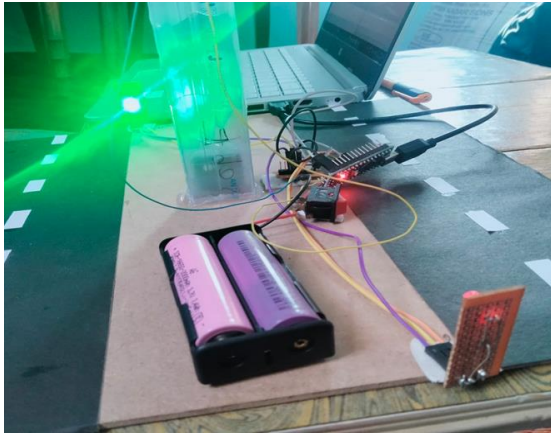
7) Objectives :

- To develop a cost-effective and efficient smart AI-Based traffic control management
system with less human interaction
- To develop a model that processes real-world traffic scenarios such as a traffic signal at
the junction by capturing Video/Images.
- To train various object detection algorithms to count the number of vehicles struck in
the traffic in each direction in the village/rural areas.
- To design an ML model to decide the direction of priority-based vehicle movement,
based on the traffic in each direction.
- To develop an efficient Automated transport management system to minimize air
pollution.

8) Methodology : YOLO Algorithm: YOLO is an abbreviation for the term You Only Look Once. This is an algorithm that detects and recognizes various objects in a picture (in real-time). Object detection in YOLO is done as a regression problem and provides the class probabilities of the detected images. YOLO is a clever convolutional neural network (CNN). It divides the image into many boxes and predicts the probability of finding an object in the bounding boxes. YOLO is used because error occurrence is very minimal in it. A single CNN can detect multiple bounding boxes. The data set required to train the data model was taken from Google. Then the YOLO model was trained by calculating the weights of vehicles. The model was trained for Indian vehicles such as bikes, cars, trucks, etc. The model was trained with minimal errors. A threshold value is kept for object detection. The input is the video file which is divided into set of images/frames given to the model. Then the model calculates the count of vehicles based on the traffic to find out the optimum green signal time to reduce traffic congestion quickly.



9) Results and Conclusions:



This model is basically designed to decongest traffic issues arising around the world. It basically focuses on algorithms that detect objects and classify them. After repeated training of the ML model, It is expected to predict the required solutions to decongest the traffic. Thus, this model helps to solve one of the major issues in the metro Politian cities and make this world a better place to live.

10) Scope for future work :

- Improving the accuracy of the model
- ML model can be trained in different scenarios and situations in order to improve the prediction capability
- Training ML model by including multiple videos for monitoring incoming and outgoing vehicles
- Including cloud services such as Blynk
- Future extension of the project can be extended to emergency services such as ambulances, fire extinguishers, etc. which are given first priority in the traffic.