

### 3D OBJECT DETECTION FOR AUTONOMOUS VEHICLES

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**Abstract** - The dynamic evolution of Machine learning technologies starts the inception of confirmed accuracy of prospects which were hard to imagine few decades ago are now easily executable with various variation of a single field. In today's situation, self-driving cars have gained a lot of traction but there is a huge gap in expectation and the current state. On those lines, our project focuses on 3D Object Detection of autonomous vehicles. In recent years, there has been a significant increase in research interest supporting the development of the autonomous vehicle. The task of environment sensing is known as perception, and often consists of several subtasks such as object classification, detection, 3D position estimation, and simultaneous localization. It features simultaneous object detection and association for stereo images, 3D box estimation using 2D information, alignment for 3D box refinement.

**Key Words:** object detection, CNN

#### 1. INTRODUCTION (Size 11, Times New roman)

In recent years, electric vehicles (EVs) are gaining increasingly more favor and a focus. Eco-friendliness and monetary return are the benefits of electronic vehicles. electronic vehicles are getting famous because they avoid polluting environment. On the opposite hand, the excellent cost of EVs is not up to that of traditional vehicles under a same mileage. because the development of recent tech is growing it's also benefitting Ev's to achieve more integrity and accuracy. within the process, safety, comfort, energy conservation and environmental protection are the direction and eternal theme of vehicles development. the first goal must be to boost the comfort and security of the vehicle. The autonomous driving can reduce the human prone errors and might help to realize automatic running vehicle concept effectively.

#### 2. Body of Paper

The system architecture provides an insight of how the flow of process will be. The entire process of how the system will move forward that will generate the end-result is depicted. There are mainly two parts in system Architecture. the System Architecture of our proposed 3D object detection project. The

frames from the videos are extracted and fed as an input to preprocessing for further process. After preprocessing stage we give those frames to the pre-trained model which will detect and identify the object in 2 dimensional forms. With the help of these 2D coordinates and calculated direction angle, coordinates of 3D box are calculated. After plotting the 3D bounding box, we can finally see the result of detection in the 3 Dimensional bounding box.

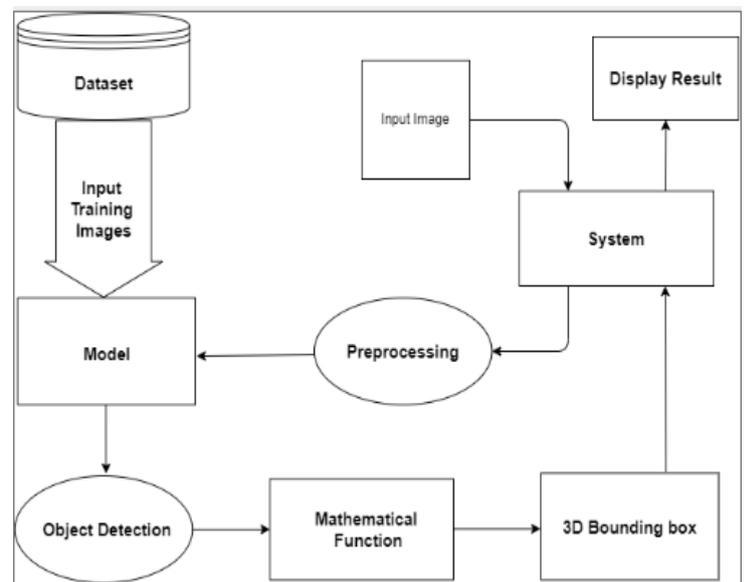
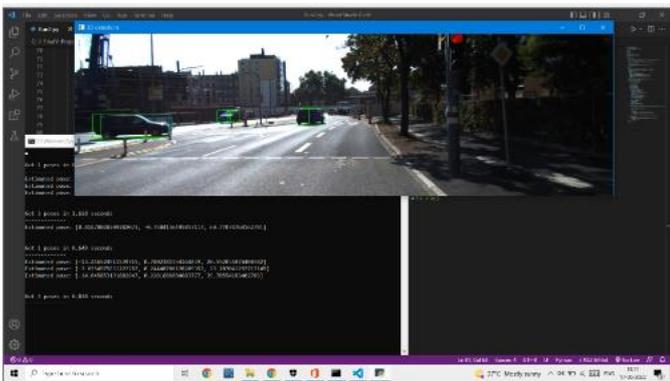
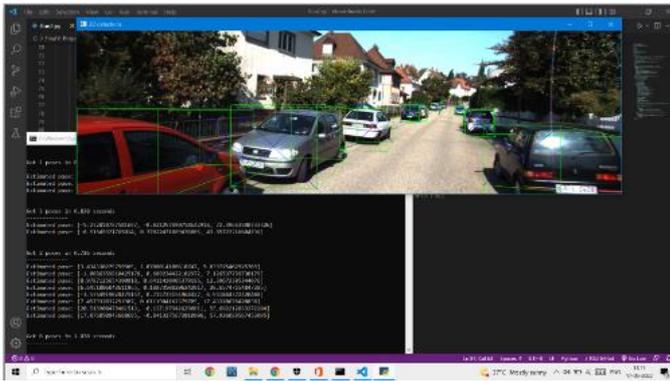


Fig -1: Figure

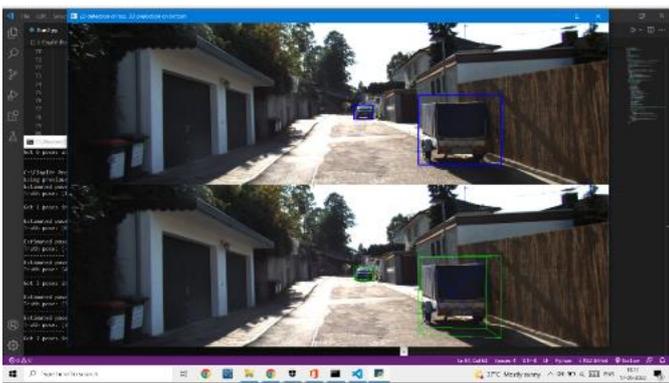
The given below shows two angles of working model generating 3d bounding box to the given input.



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Below image also shows 2d bounding box generation along with 3d bounding box.



**3. CONCLUSIONS**

Even, there is significant research going on in the field of autonomous vehicles, but there is no practical solution yet proposed for localization in the environment. System will be provided with limited data if using 2D object detection system. System will not understand the proper dimensions of nearby vehicles or their orientation. Extracting 3D information from the normal RGB image is a hard task, but it is a cheaper approach, and we can create an enhanced algorithm to achieve the goal.