

# **Obstacle Detection in Car Racing game**

Submitted in partial fulfilment of the requirements

of the degree of

Bachelor of Engineering in

Artificial Intelligence and Data Science

by

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under the guidance of

Supervisor (s):

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**Department of Artificial Intelligence and Data Science**

**Vivekanand Education Society's Institute of Technology**

**2021-2022**



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### Department of Artificial Intelligence and Data Science

## CERTIFICATE

This is to certify that **Sarthak Bansod, Ashish Gupta, Nimisha Jain, Rohan Singh** of Second Year of Artificial Intelligence and Data Science studying under the University of Mumbai have satisfactorily presented the Mini Project entitled **Obstacle Detection in Car Racing Game** as a part of the MINI- PROJECT for Semester-III under the guidance of **Sangeeta Oswaal** in the year 2021-2022.

Date: 18 December 2021

(Name and sign)  
Head of Department

(Name and sign)  
Supervisor/Guide



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## DECLARATION

We, **Sarthak Bansod, Ashish Gupta, Nimisha Jain, Rohan Singh** from **D6AD**, declare that this project represents our ideas in our own words without plagiarism and wherever others' ideas or words have been included, we have adequately cited and referenced the original sources.

We also declare that we have adhered to all principles of academic honesty and integrity and have not misrepresented or fabricated or falsified any idea/data/fact/source in our project work.

We declare that we have maintained a minimum 75% attendance, as per the University of Mumbai norms.

We understand that any violation of the above will be cause for disciplinary action by the Institute.

Yours Faithfully

1. Sarthak Bansod-04

2. Ashish Gupta-16

3. Nimisha Jain-19

4. Rohan Singh-54

(Name & Signature of Students with Date)



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## 1. INTRODUCTION

### 1.1. Introduction:

- We will be developing a game, i.e. Car racing with Obstacle Detection.
- Through this game, will be implementing an AI algorithm for detecting the obstacles.
- We will be using Computer Vision part of A.I to implement obstacles detection.

### 1.2. Objectives:

This Project will have two main objectives:

- Developing the Game: Game will be developed using Java. All the UI part will be done with Java.
- Integration Object Detection Model: The model will be created using YOLO Algorithm. YOLO (You only look once) is a state-of-the-art algorithm used for Object Detection. We will be exposing this model as REST-API and then call it in the Game.



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## 2. LITERATURE SURVEY

### 2.1. Techniques:

- We will use version-3 of YOLO algorithm.
- YOLO v3 has a tremendous increase in accuracy and speed than the version-2.
- It is trained on Coco-Dataset which has 80 classes. We can know more about Coco dataset through this link "<https://cocodataset.org/#home>".
- Its classes include cats, dogs, trees, cars, etc.

### 2.2. Papers:

- Paper on YOLO v3 came in 2018.
- It was published by Joseph Redmon through Cornell University.
- At 320x320 YOLOv3 runs in 22 ms at 28.2 mAP, as accurate as SSD but three times faster.
- When we look at the old .5 IOU mAP detection metric YOLOv3 is quite good.
- It achieves 57.9 mAP@50 in 51 ms on a Titan X, compared to 57.5 mAP@50 in 198 ms by RetinaNet, similar performance but 3.8x faster.
- We can go through the paper, through this link "<https://pjreddie.com/media/files/papers/YOLOv3.pdf>".



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### 3. DESIGN AND ANALYSIS

#### 3.1. Analysis of the System:

- Simple Car Racing Game with obstacle detection in it.
- User has to avoid the obstacles to proceed to next Level.
- These obstacles will be detected based on the object detection model.
- We will be using YOLO object detection algorithm for the detection of the obstacles.
- Every obstacle will have certain points (example- If user hits a Tree , 5 points will be deducted and if he hits a stone , 3 points will be deducted).
- To qualify to next stage , he has to have certain amount points by avoiding these obstacles.

#### 3.2. Proposed Solutions:

- There are many Car Racing games with obstacles in the market.
- But, it lacks needed accuracy in detecting the correct objects.
- With the YOLO v3 model, our accuracy will be far better than any normal detection game.
- It will also be having a huge variety of Objects as seen in the Coco Dataset to implement in the Game.

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### 3.3. Design of the Proposed System:

- Game UI using Java:

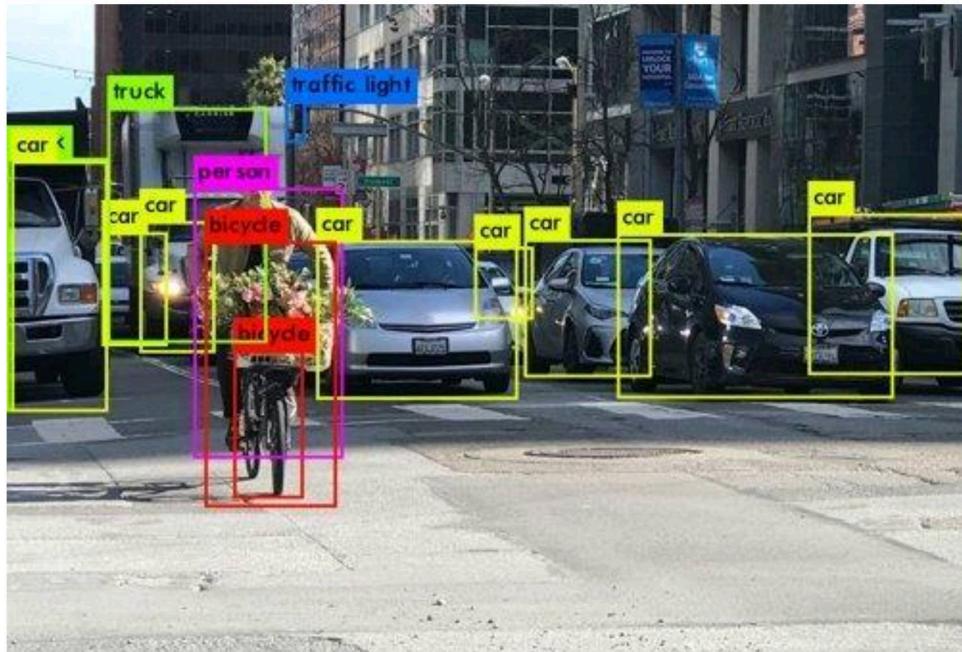


- YOLO v3:

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## 4. RESULTS AND DISCUSSION

- For building the YOLO v3, we will be using Python libraries such as TensorFlow, OpenCV, Numpy , Pandas, etc.
- These are Machine Learning and Deep Learning widely used Frameworks.
- The Reason we are using Python is that it comes with loads of libraries and frameworks which makes the work easier.
- After integration the Game with the Model, user can play it more swiftly and comfortably with minimum bugs and lags.

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## **5. CONCLUSION AND FUTURE SCOPE**

- So, this was a whole description about our Mini Project.
- We will be improving the Game by adding addition Features like more obstacles, improving UI, etc.
- This game can also implemented using hardware like a toy Car avoiding the obstacles in front of it in Real Life.