In this paper we try to determine the drive-able region of any road. **Autonomous cars** need to know the path ahead of them so that they can appropriately increase and decrease speed.

Navigation systems can be used for early detections but **GIS** and **GPS** are not that accurate and not that regularly updated.

So we map an intersection in real time using **LiDAR** technology which shoots beams of lasers at short durations. We use **Velodyne HDL-64ES2** sensors to gather our data.

We Start of by shooting beams of light and detect the reflection received from that direction. This gives us the distance between our launch point and that obstacle.

This is performed in 360 degrees, creating a birds eye view of the entire path around us.

In the proposed model we make a few changes on the standard model

* We map each ray released to be a little wider that the car this way we can accurately calculate the drive-able regions
* We use a **varied launch point**, i.e in the standard model the launch point would be at a fixed distance however in our model we can change the distance based off of the car's speed

If the car moves fast we can move the launch point towards the front so that we can map the region in front more accurately and faster.

We map out the region by making a graph of **Distance vs Ray Number.**

Data received by the sensors must be processed so as to remove background noise, this includes pedestrians, other vehicles, trees, etc.

Doing this repeatedly at every frame gives us a **birds eye view** of the path being traversed.

To classify this data into different intersections and road segments we used a **SVM( Support Vector Machine)**

A support vector machine is a supervised learning model for classification and regression learning models.

* **Supervised learning** is when we have been given labels on our data and we have to classify them into groups.
* **Unsupervised learning** is when we have been given lobeless data and are tasked with sorting into categories.

This Method was tested against other Models it performed then, however there is still scope for improvement, we are currently getting an accuracy of about **85%** even the slightest error in determining the intersection can lead to catastrophic incidents.