

# Project proposal

Forat Al-Hellali, Hans-Marthin Granlund

April 2018

## 1 Introduction

The project will be the data-collecting part of an autonomous driving car. The program will analyze a dashcam video and will contain the following:

- Street detection
  - road segmentation
  - lane slope detection
- Object detection
  - other cars
  - signs
  - pedestrians
- Calculate distance
- Calculate relative speed
- 3D mapping of the world

## 2 Plan

### 2.1 Street Detection

#### 2.1.1 Segmentation

First we would down sample and filter the image, by using the appropriate the appropriate filters like: Laplace, Gaussian, or Difference of Gaussian.

Then we would experiment with different segmentation algorithms to highlight the road.

#### 2.1.2 Lane detection

Use the Sobel filter to highlight lines in the picture and then run RANSAC to find the lane lines.

**Image - Image - Square in the middle**

## 2.2 Object Detection

Train a neural network to recognize cars using the training data available from **ya mama**. Then we would train the network to recognize pedestrians and street signs.

## 2.3 Calculate Distance

We can use the width of the lane lines (closest to the car) as a constant to calculate distance since they are mostly parallel.

**fig dat shit**

## 2.4 Calculate Relative Speed

$$relative\_velocity = \frac{new\_estimated\_object\_distance - old\_estimated\_object\_distance}{time}$$

Given time we will experiment with using histogram of gradients to calculate the velocity.

# 3 Questions

Do you have a database for better a trainingset than ours?

Any suggestions of how we would use the histogram of gradients to calculate the relative speed?

## 3.1 3D reconstruction

Use most of the information we gain to reconstruct a very simple 3d figure of the environment. Like the one shown in the picture.

**include telslas model**