

A decorative graphic on the left side of the slide consisting of two overlapping parallelograms. The front one is blue and the back one is light green. They are positioned diagonally, with the blue one in front of the green one.

Self-Driving Car

BE Project



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Introduction

Cars today already include many semi-autonomous features like assisted parking and self-braking systems.

Self Driving car (autonomous car) is a vehicle which is capable of driving in various different environments without human intervention.

The goal of self driving car is to reach the destination safely, thereby reducing the fatalities caused by human errors and help the driver to relax.



Abstract

- This project introduces a concept for self driving/ autonomous vehicle by using convolution neural network.
- It maps raw pixels from a single front facing camera directly to steering commands.
- As compared to individual explicit decomposition, CNN based approach will provide better performance.
- Lane detection, path planning, and control will be optimized, simultaneously by our system.



Proposed system

- A RC car interfaced with Raspberry pi.
- Single front facing camera module of pi providing real time video feed.
- Artificial environment for training and testing.



Technology Stack

Softwares -

Python (Programming Language)

Raspbian Lite (OS running on Raspberry pi)

Anaconda (Virtual Environment for Python Libraries)

Jupyter Notebook (For Coding)

Spyder (For Coding)

NVIDIA Digits (GUI based DNN Training System)



Technology Stack

Hardware -

RC Car

Raspberry Pi 3

Powerbank

Camera module for Pi



Dependencies

Keras (TensorFlow backend)(for CNN)

Numpy (Powerful n-Dimensional array object)

Pillow (Python image library)

Scikit-learn (Train,test set)

OpenCV (Image processing)

PiCamera (Interfacing Raspberry Pi with camera)

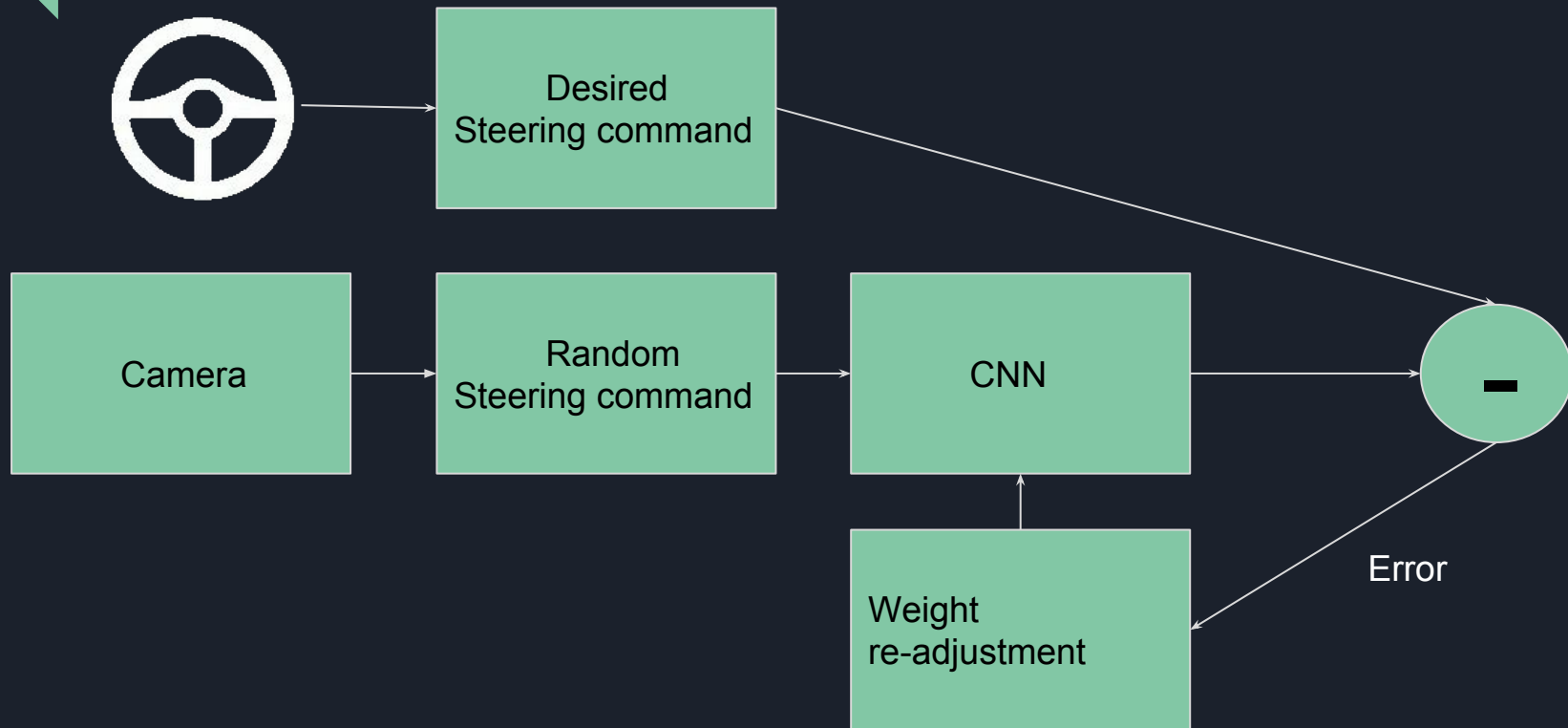
GPIO (Interfacing with car hardware)



Planning

- The initial step will be to collect the required dataset.
- Once the dataset is ready, we will start by creating the CNN.
- Next step will be to train the neural network.
- Initially the CNN model will be trained and optimized in a simulated environment.
- Once the neural network is optimized, we will test it in real environment.
- Further changes will be made to compensate for differences between simulated and real life environment.

Design





Conclusion

The Self Driving car is a promising future technology, which will change the way we commute. It is a lot more safer than conventional approach and helps driver to relax.

Thank You!