SELF DRIVING CARS USING CNN

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Abstract: Look at other drivers on the road, and how many of them drift into other lanes when they are playing with their phone, with the radio, talking with a passenger, falling asleep, etc. If we talking about some past decade the momentum of new research and the world is now at the very advanced stage of technological revolution: "Autonomous-driving" vehicles. The term Self-driving cars, autonomous car, or the driverless cars have different name with common objective. The main focus is to keep the human being out of the vehicle control loop and to relieve them from the task of driving. Now imagine a world where the computers are driving all the cars. The only accidents will be from car failures. In the Self Driving implemented using sensors will more prone to errors. To solve this problem we are implementing self driving car using computer vision and neural network. Through this model there will be very less chances of sensor failure accidents.

I. INTRODUCTION

A self-driving car (also known as a driverless car, auto, self-driving car, robotic car) is a vehicle that is capable of sensing its environment and navigating without human input. The main focus is to keep the human being out of the vehicle control loop and to relieve them from the task of driving. In Proposed System we will use the Convolution Neural Network (CNN) which will be very accurate and fast. As we are using Convolution Neural Network (CNN) it is able to take decisions in emergency situations. As Convolution Neural Network (CNN) is similar to Human neurons we can implement this in real world.

II. EXISTING SYSTEM

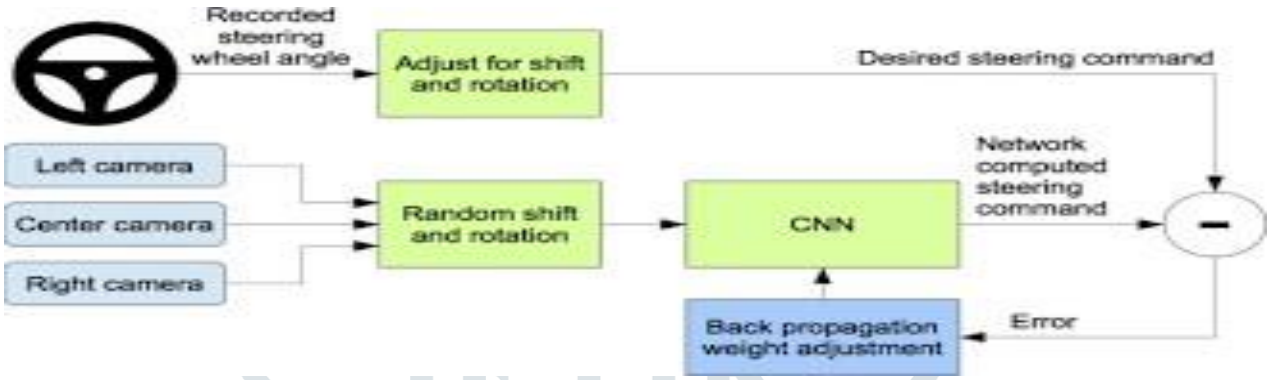
In Existing System we will face a lot of problem when Sensors fail. In the Self Driving implemented using sensors will more prone to errors. In Existing System Reinforcement Learning is used which is not accurate and fast. It does not contain any decision making power so it will not be able to exist in real time only used in researches. In Existing System, it will not be able to take decisions in emergency situations.

III. PROPOSED SYSTEM

In Proposed System we will use the Convolution Neural Network (CNN) which will be very accurate and fast. As we are using Convolution Neural Network (CNN) it is able to take decisions in emergency situations. As Convolution Neural Network (CNN) similar to human neurons we can implement this in real world. Convolution Neural Network is similar to Human Neurons, so it is able to take decisions easily.

IV. CNN ARCHITECTURE

The architecture used is the same as proposed in this NVIDIA paper on End to End Learning for Self-Driving Cars. The network consists of 9 layers, 5 convolutional layers and 4 fully connected layers. The architecture consists of three strided convolutional layers with a kernel size of 5 x 5 with 2 x 2 stride and two non-strided convolutional layers with a kernel size of 3 x 3 with no strides followed by four fully connected layers. The convolutional layers may perform as feature extractions and the fully connected layers may function as a controller for steering.



V. IMPLEMENTATIO

N Data Generation:

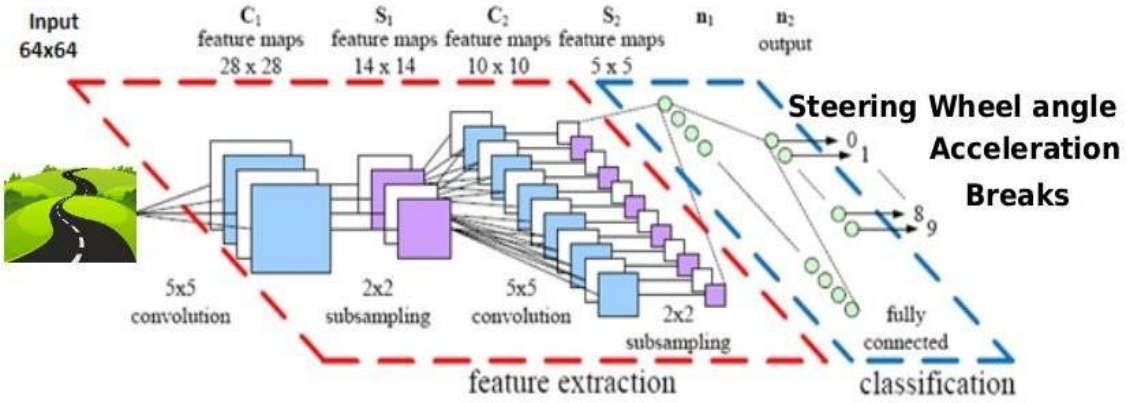
Records images from center, left, and right cameras associated steering angle, speed, throttle and brake. Save to CSV.

Training Mode - Behavioral cloning:

We use a 9 layer convolution network, based off of Nvidia's end-to-end learning for self driving car paper. 72 hours of driving data was collected in all sorts of conditions from human drive. In order to make the system independent of the car geometry, the steering command is 1/r, where r is the turning radius in meters. 1/r was used instead of r to prevent a singularity when driving straight (the turning radius for driving straight is infinity). 1/r smoothly transitions through zero from left turns (negative values) to right turn (positive values).

Testing mode:

We will just run autonomous mode, then run our model and the car will start driving.



In order to design the above-mentioned application, we require the following tools.

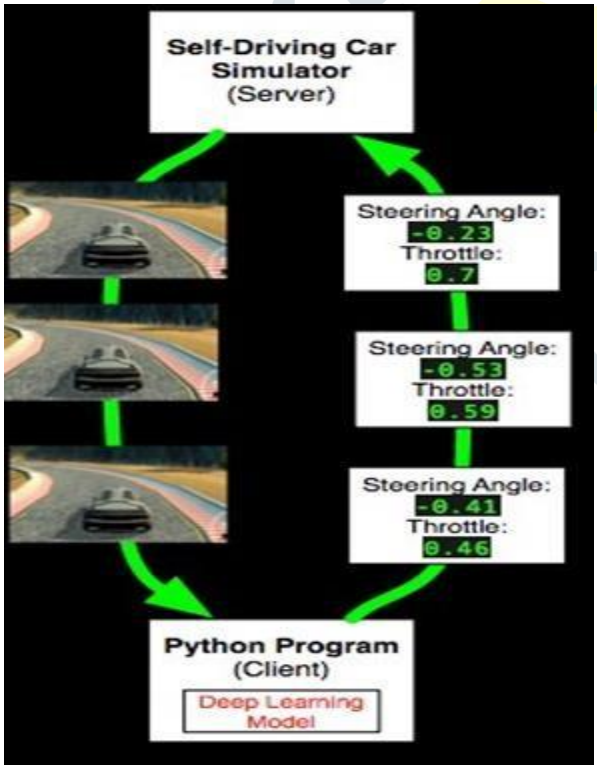
GPU	:	NVIDA 1080GTX
Python Libraries	:	NUMPY, PANDAS, OPENCV
Frame Works	:	PYTORCH, TENSERFLOW
Programming Language	:	Python 3.7
IDE/Workbench	:	ANACONDA NAVIGATOR

VI. ALGORITHM

Convolutional Neural Network Algorithm:

- **Step 1:**
  Break the image into small image tiles-Similar to sling window, we can pass sliding window over the entire large image and each result is saved as separate, as a segment of large image as a tiny picture tile.
- **Step 2:**
  Feeding each tint tile into the smaller size neural network – we rarely initialises the parameters with the same values and if not so, then we mark that tile as interesting.
- **Step 3:**
  Save the results from each small tile into a new array – we would not like to misplace the index of the original file. So we place the results in a grid of the same arrangement as an original image.
- **Step 4:**
  Down sampling –to reduce the size of a new array, down sampling is used by max-pooling.

VII. RESULT



VIII. CONCLUSION

Self-driving cars brings great Convenience for the people. The Driver less car technologies improves vehicles Stability to minimize loss of control. Driverless cars are designed to minimize accidents by addressing the main cause of collisions: Driving Error, Distraction and Drowsiness. Traffic will also be reduced tremendously, saving the average person 52 minutes in a day. This reduction will also increase fuel efficiency by approximately 2.4 billion gallons per year. These are designed to drive closer together, making better use of at least 85% of empty space on roads. Further, the sick, elderly, blind and disabled can easily transport with an emergency response system, voice command and drowsiness alerts at their service. For those capable of driving, the passenger is allowed to conveniently relax and do as he/she pleases during the transport. The car cannot get distracted, sleepy or intoxicated.

IX. REFERENCES

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