

# ROAD TRAFFIC SIGN RECOGNITION

A silver Toyota Prius is shown from the rear, driving on a two-lane road that stretches into the distance. The road is flanked by dry, hilly terrain. In the background, a large mountain range is visible under a warm, orange-hued sky, suggesting a sunset or sunrise. The overall scene is bathed in a reddish-orange light, creating a dramatic and atmospheric effect.

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# Our Topics

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# Road Traffic Sign Recognition

Traffic sign recognition is the process of automatically identifying which of the following class the sign belongs to.

## Purpose

To improve the driver's safety on the road.

## Advantages

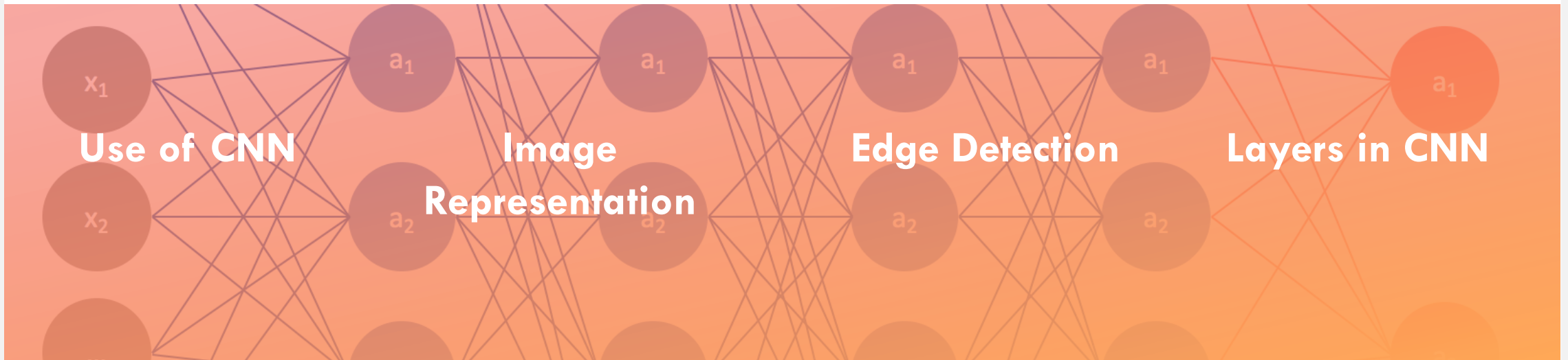
- Informs the condition of roads.
- Helps regulate traffic.
- Reduces accidents.

## Applications

- Fully automated driving
- Driver assistance systems

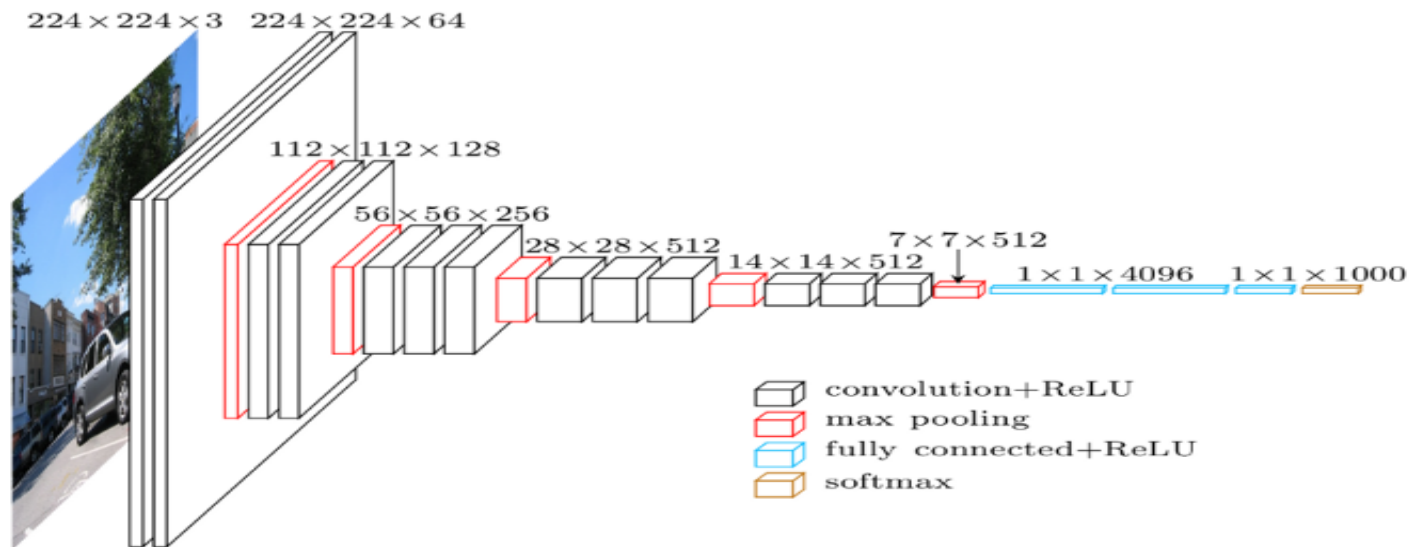
# Convolutional Neural Networks

A **convolutional neural network** (CNN) is a type of artificial **neural network** used in image recognition and processing that is specifically designed to process pixel data.



# Use of CNN

In simple word what CNN does is, it extract the feature of image and convert it into lower dimension without loosing its characteristics.



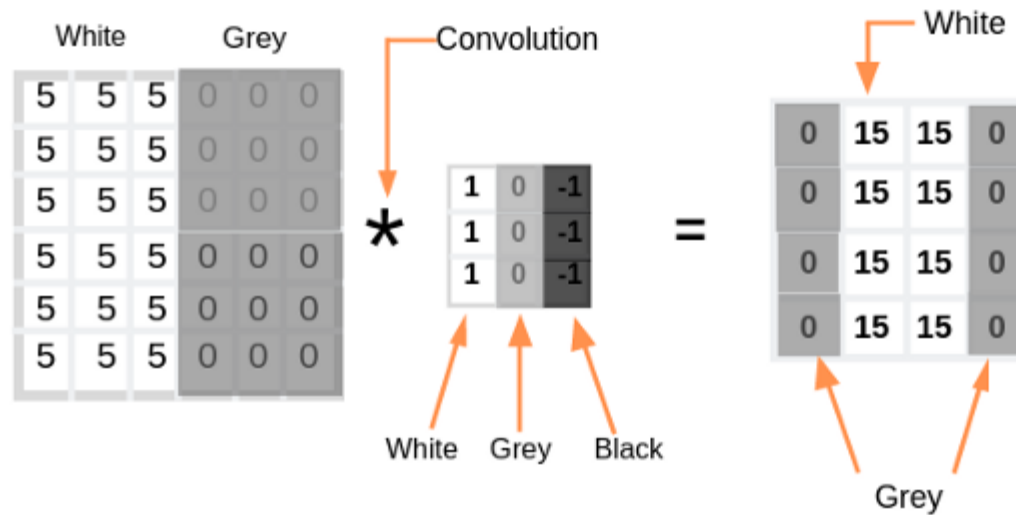
# Image Representation

Images are encoded into color channels, the image data is represented into each color intensity in a color channel at a given point, the most common one being RGB, which means Red, Blue and Green.



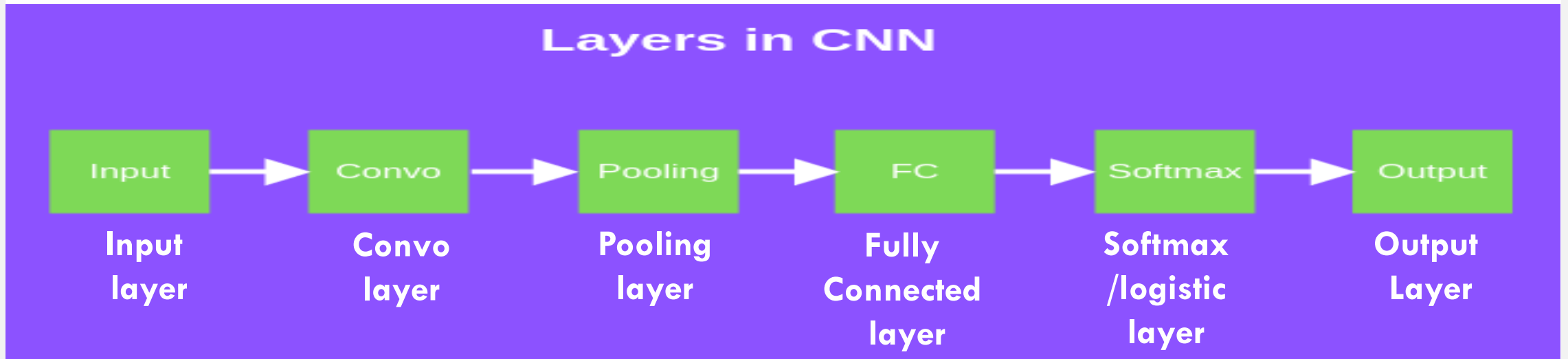
# Edge Detection

Every image has vertical and horizontal edges which actually combining to form a image.  
Convolution operation is used with some filters for detecting edges.



# Layers in CNN

There are six different layers in CNN





# Input Layer

Input layer in CNN should contain image data. Image data is represented by three dimensional matrix as we saw earlier.

# Convo Layer

Convo layer is sometimes called feature extractor layer because features of the image are get extracted within this layer.

# Pooling Layer

Pooling layer is used to reduce the spatial volume of input image after convolution.

# Fully Connected Layer

Fully connected layer involves weights, biases, and neurons. It connects neurons in one layer to neurons in another layer.

# SoftMax / logistic Layer

Convo layer is sometimes called feature extractor layer because features of the image are get extracted within this layer.

# Output Layer

Output layer contains the label which is in the form of one-hot encoded.

# Demo



# Building The Project

The steps to build our project.

## The Setup

Open up the terminal to access the project folder.

To start the jupyter notebook you have to type “Jupyter notebook” in the terminal and it will open up in a browser.

## Importing

First import the os module, numpy, pandas, matplotlib, pil, keras and we will explain the role of each function when we use them.

## Creating the data

An image is made up of pixels and each pixel has 3 values to specify its color. we use the PIL library that can perform many image manipulation tasks.

# Building The Project

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## Making data ready

We are going to use the `sklearn train_test_split()` function that will randomly split the data into training and validation set. One hot encoding is a vector representation where all elements of the vector are 0 except one, which has 1 value.

## The Model

A Convolutional Neural Network(CNN) is made up of convolutional and pooling layers. We have also used the dropout layer which is used to handle the overfitting of the model.

## Training

We use the `model.fit()` function which takes the training set, validation set, batch size and no of epochs.

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## Training

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## Plotting graph

With the help of matplotlib functions, we will plot the graph of training and validation accuracy

## Testing

We have a test folder that contains around 12,000 images. The `test.csv` file contains the path of the image along with the label of the class.

# Building The Project

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## Building the GUI

A graphical user interface will save a lot of time in testing and seeing the results of our model prediction. We used Tkinter, which is an inbuilt library of python to make the GUI.

# Summary

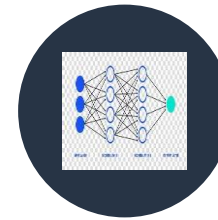
Hope you enjoyed and learned a lot with our project.



**Computer vision**



**Deep Learning  
techniques**



**Convolutional  
neural network**



# Thank You

