



Traffic Sign Images Classification

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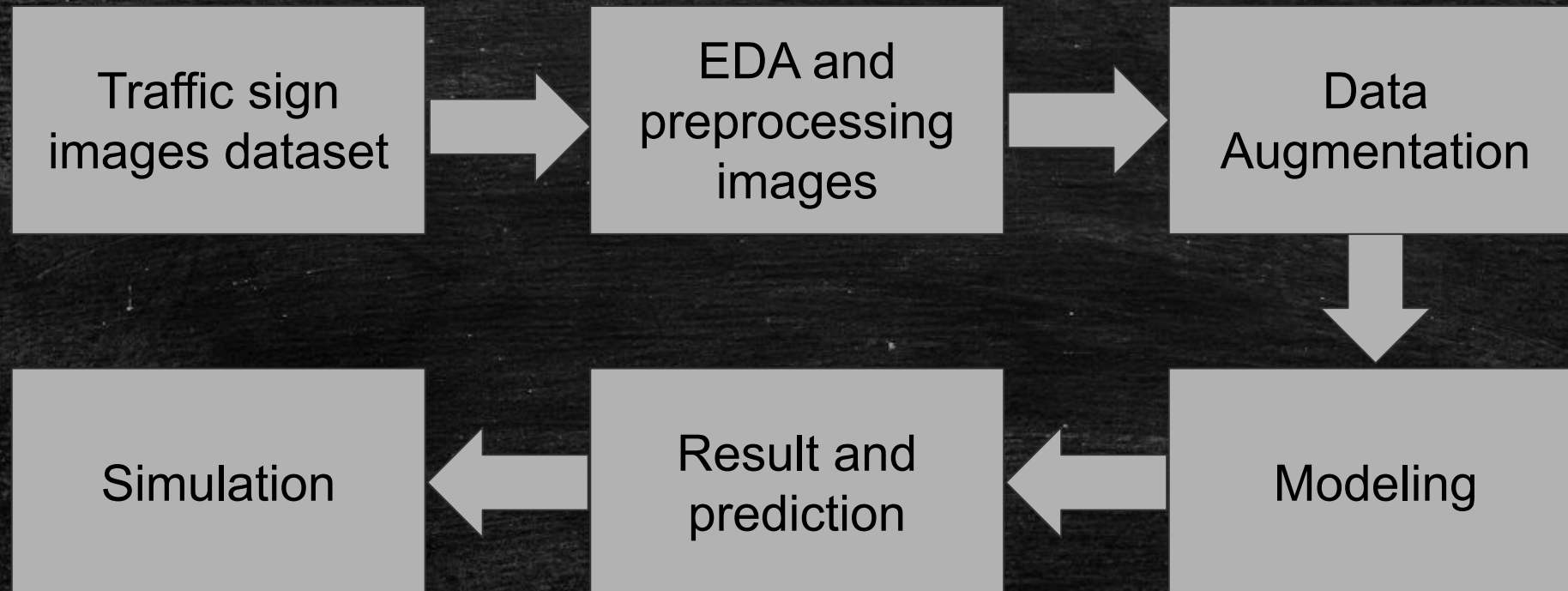
Agenda

- Problem Statement
- Dataset Description
- EDA
- Preprocessing
- Modeling
- Results
- Live Demo
- Challenges
- Future Work

Problem Statement

Helping drivers and autonomous vehicles to follow the traffic rules by sending them notifications, letting the driver, for example, know that there is a stop sign ahead or that the speed limit is 50 km/h on a certain street.

Solution Structure

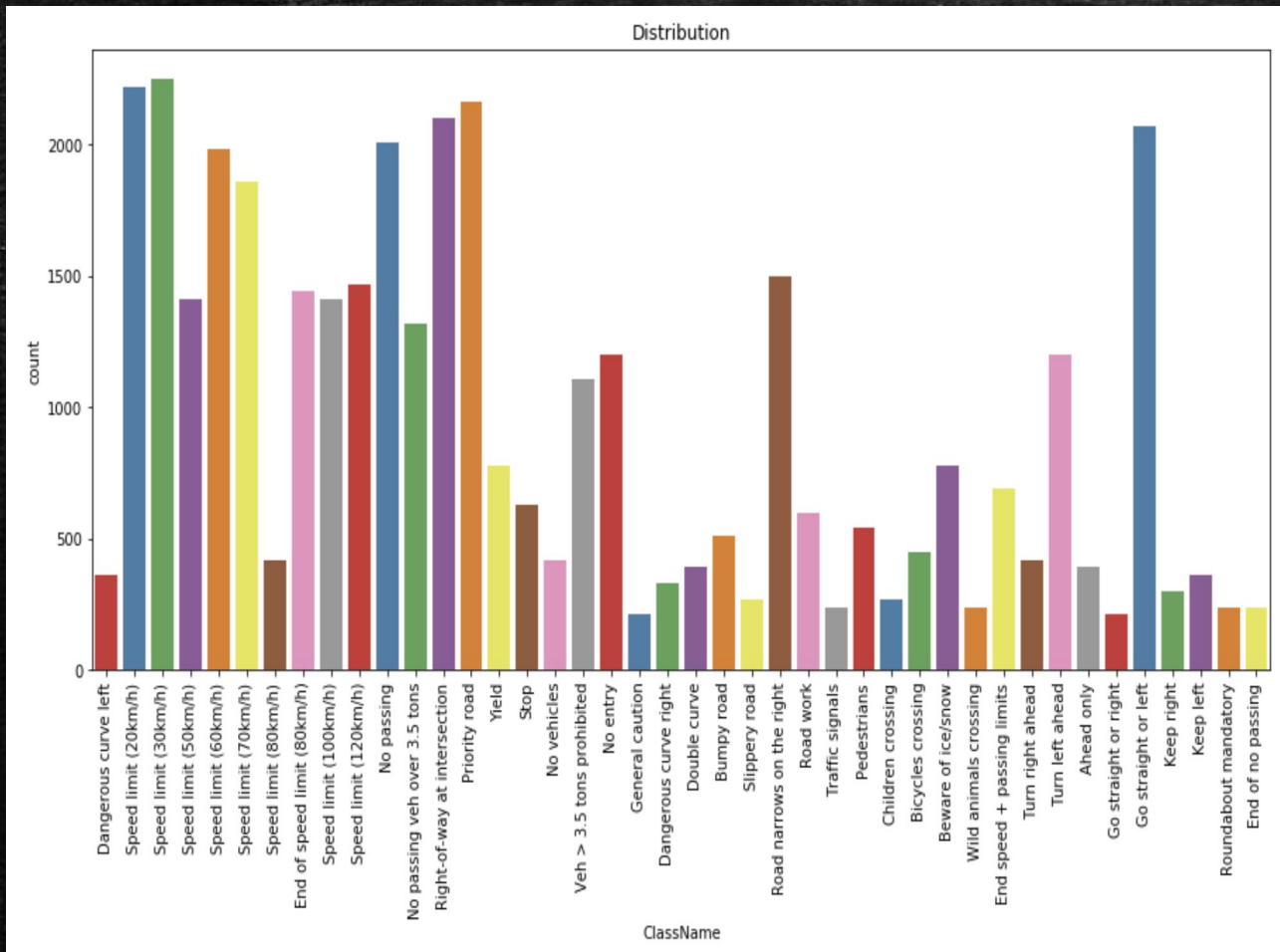


Dataset Description

- **German Traffic Sign**
- Images are 32 (width) x 32 (height) x 3 (RGB color channels)
- More than 50,000 images in total
- There are 43 classes (e.g. Speed Limit 20km/h, No entry, Bumpy road, etc.)

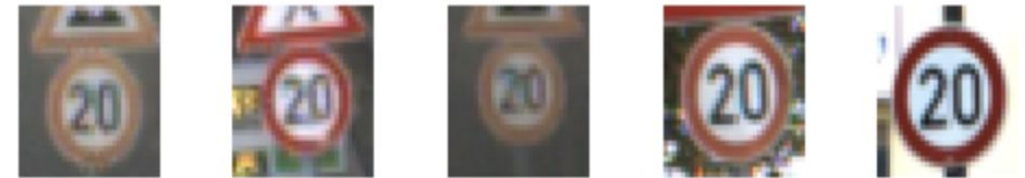
EDA

Classes distribution



Sample of the images

0: Speed limit (20km/h)



1: Speed limit (30km/h)



2: Speed limit (50km/h)



Preprocessing

Data Augmentation

0: Speed limit (20km/h)



1: Speed limit (30km/h)



2: Speed limit (50km/h)



Grayscale

0: Speed limit (20km/h)



1: Speed limit (30km/h)



2: Speed limit (50km/h)

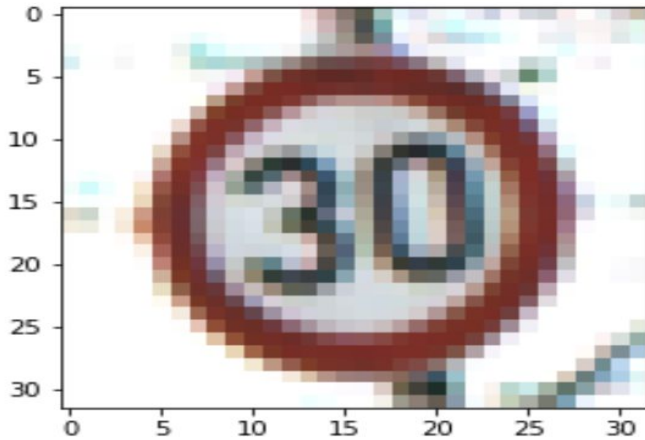


Modeling

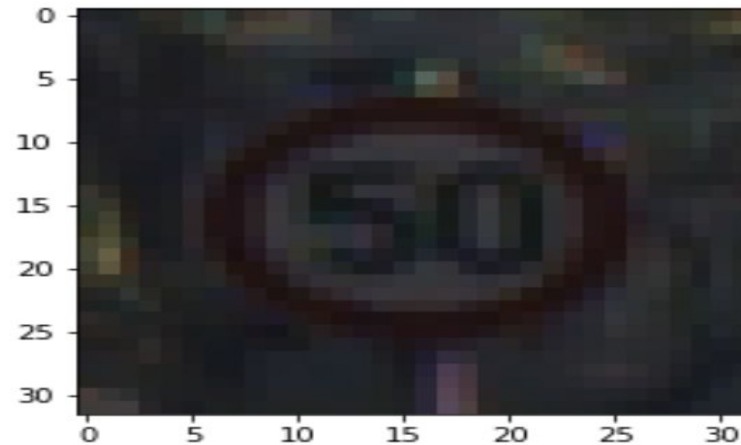
- 1- Neural Network
- 2- Convolutional Neural Network
- 3- CNN with Lasso
- 4- CNN with Dropout
- 5- Data Augmentation
- 6- Object detection

Model Predictions

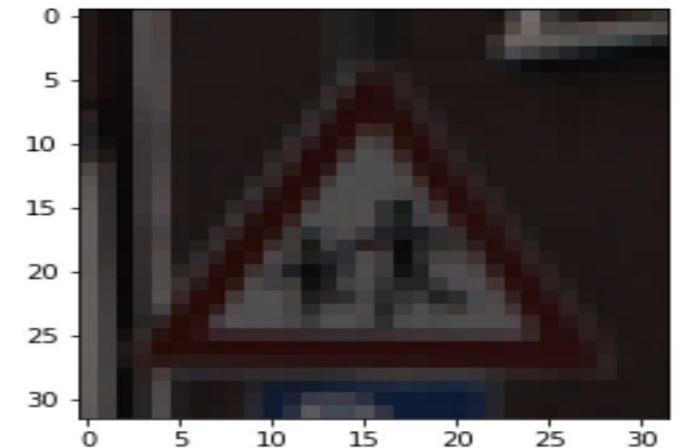
Predicted: Speed Limit 30 km/h
Actual: Speed Limit 30 km/h



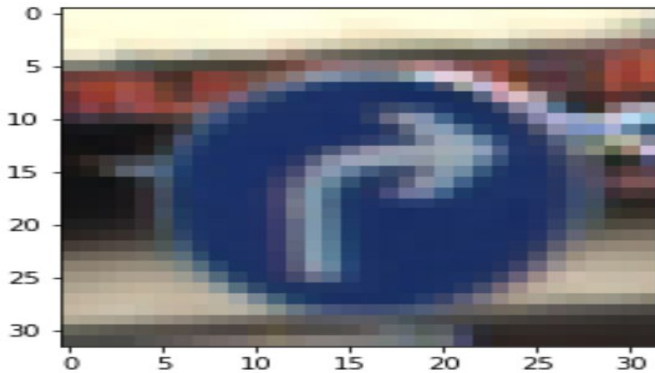
Predicted: Speed Limit 50 km/h
Actual: Speed Limit 50 km/h



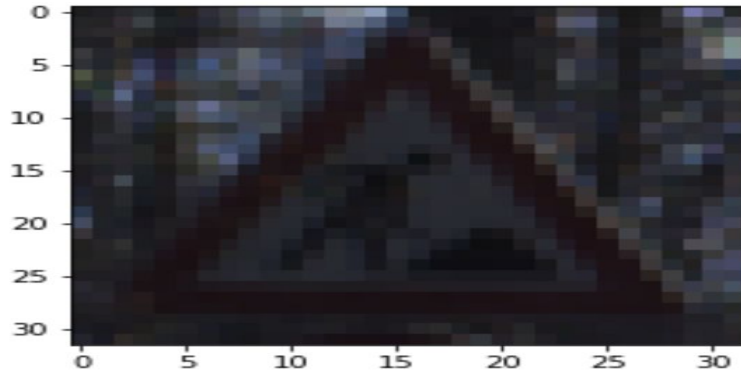
Predicted: Children crossing
Actual: Children crossing



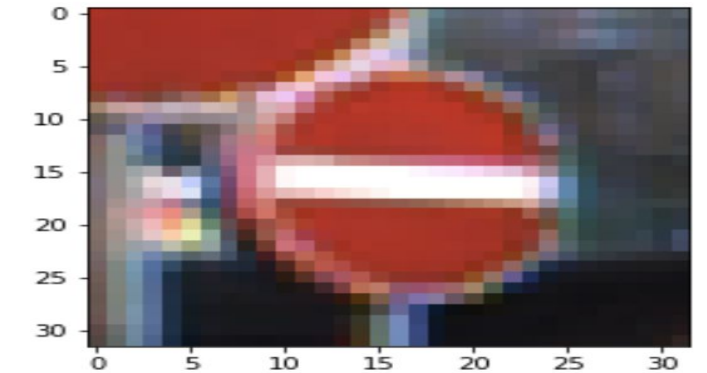
Predicted: Turn right ahead
Actual: Turn right ahead



Predicted: Road work
Actual: Road work



Predicted: No entry
Actual: No entry

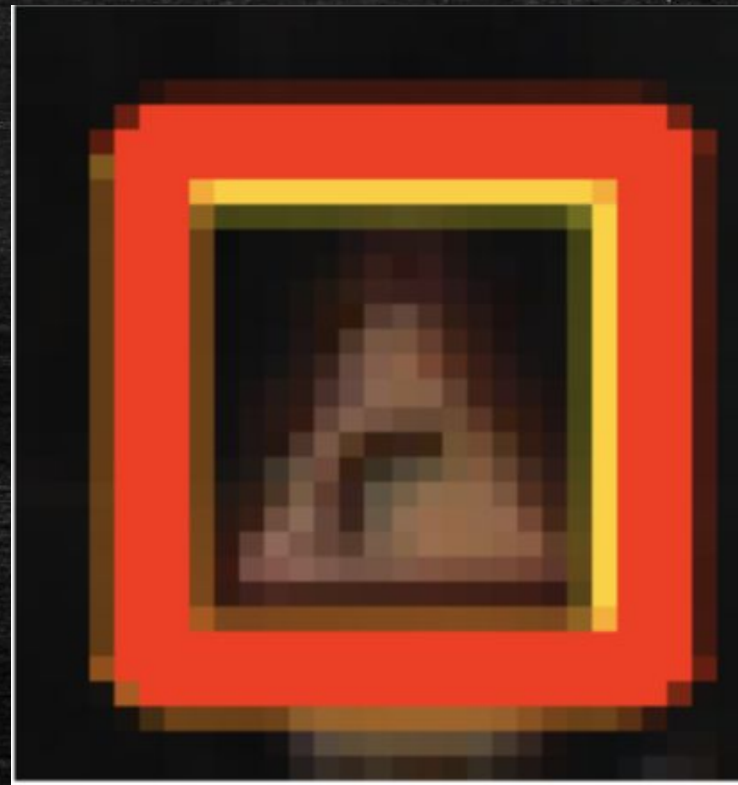


Object Detection

Given

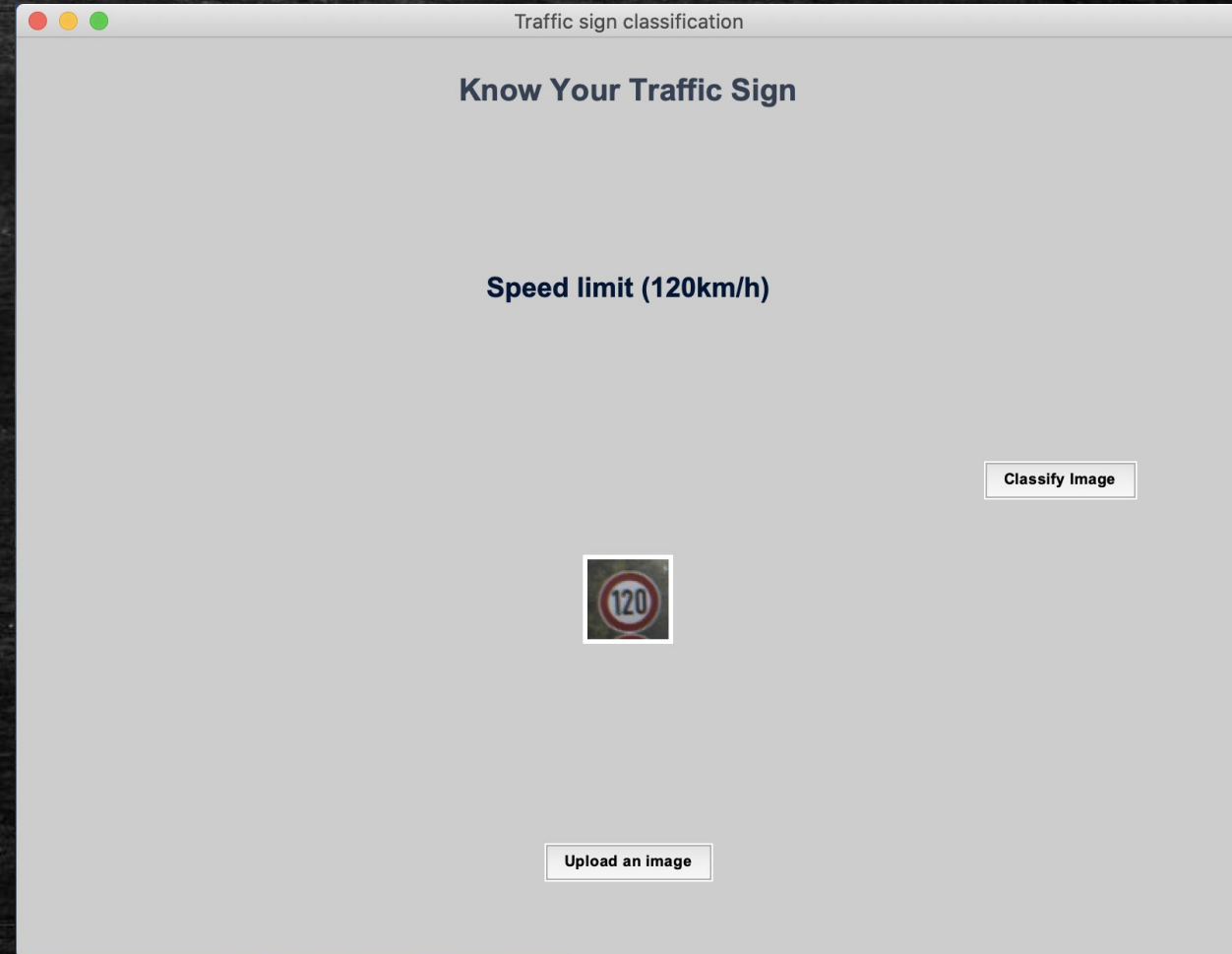


Given vs Predicted



Live Demo 1

Graphical User Interface (GUI) Demo



Live Demo 2

Cam Demo



Challenges

- 1- Low resolution images
- 2- CNN
- 3- Hyperparameter tuning
- 4- Lack Computational power
- 5- Object detection

Future Work

- 1- Build object detection model.
- 2- recognize and classify the traffic sign from video.
- 3- Send a notification to driver.

Any Question?
