



Road Semantic Segmentation

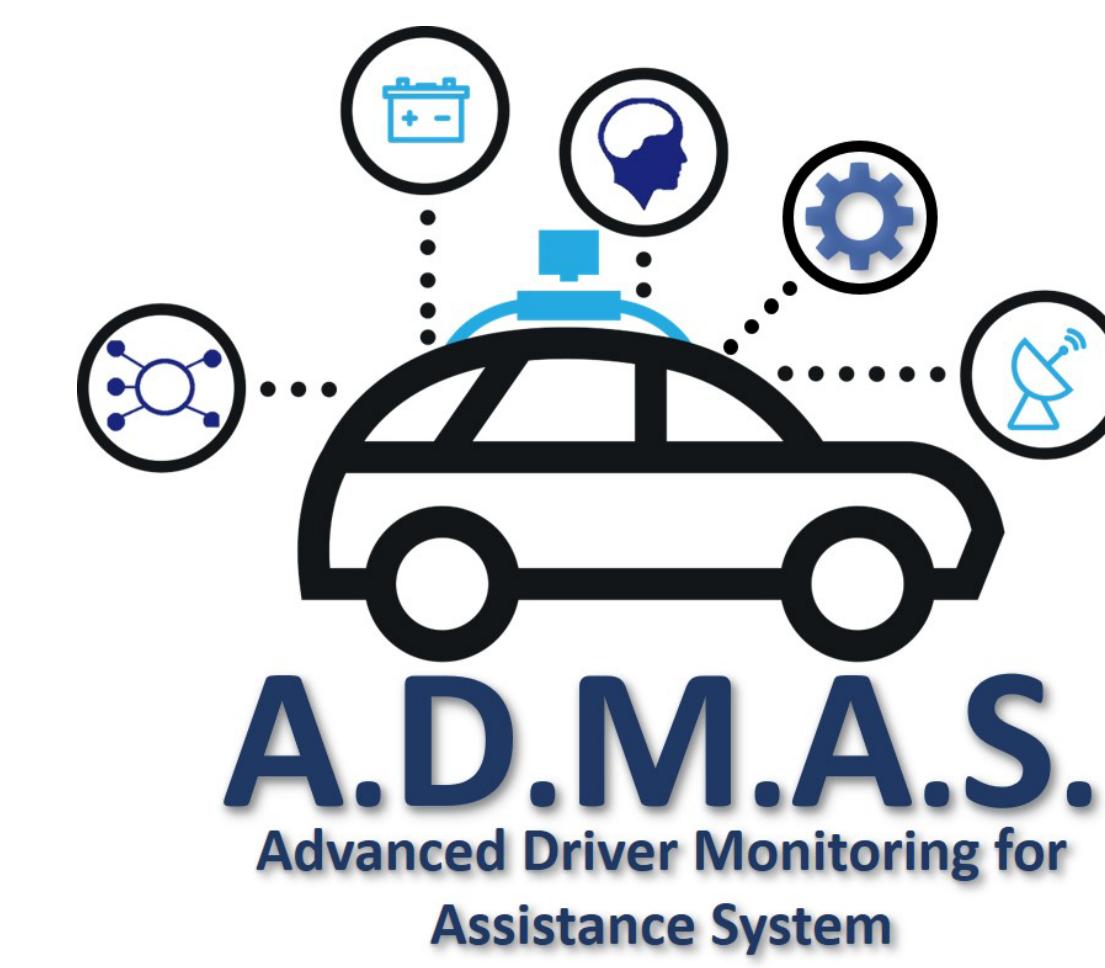
Mechatronics Engineering Project

IMT - Luis Alejandro Arce Sáenz - A01271635
IMT - José Gabriel Vergara Álvarez - A01333672
IMT - Yosef Rodríguez Ascorve - A01338766

Advisors

Ing. Luis Alberto Curiel Ramírez
Ing. Javier Izquierdo Reyes
Ing. Javier de la Tejera de la Peña
Dr. Rogelio Bustamante Bello

15th November, 2018.



1

PROBLEM STATEMENT

In Mexico, more than 16 thousand deaths and 400 thousand people are injured every year due to 1.5 million road mishaps; most of these are predictable and preventable.



Source: Ramón, J.A. (2017). Accidentes viales en México ocasionan 16 mil muertes y 400 mil heridos al año. Comisión Nacional De Seguridad. (S/A). Accidentes y sus Factores



From the main causes of vehicular accidents on federal highways, the National Security Commission indicates:



2

OBJECTIVES

General Objective

Develop an algorithm capable of identifying vehicular lanes through computer vision applications and machine learning architectures.

1

Obtain a video database of the roads of Mexico City.

2

Use computer vision tools for vehicular lane detection.

3

Create a database of vehicle lane labels from the videos.

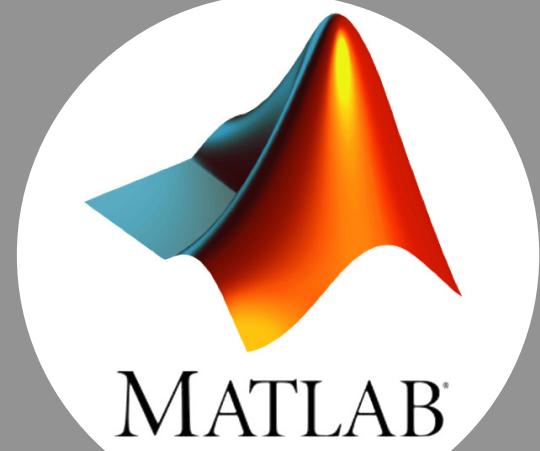
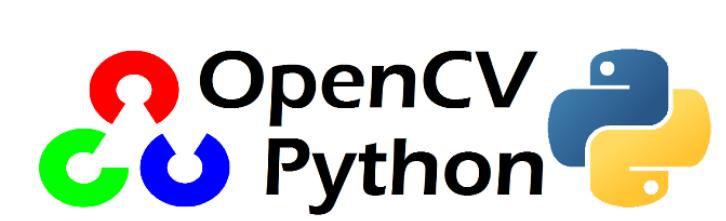
4

Train a Convolutional Neural Network capable of segmenting pixels of a vehicular lane.

3

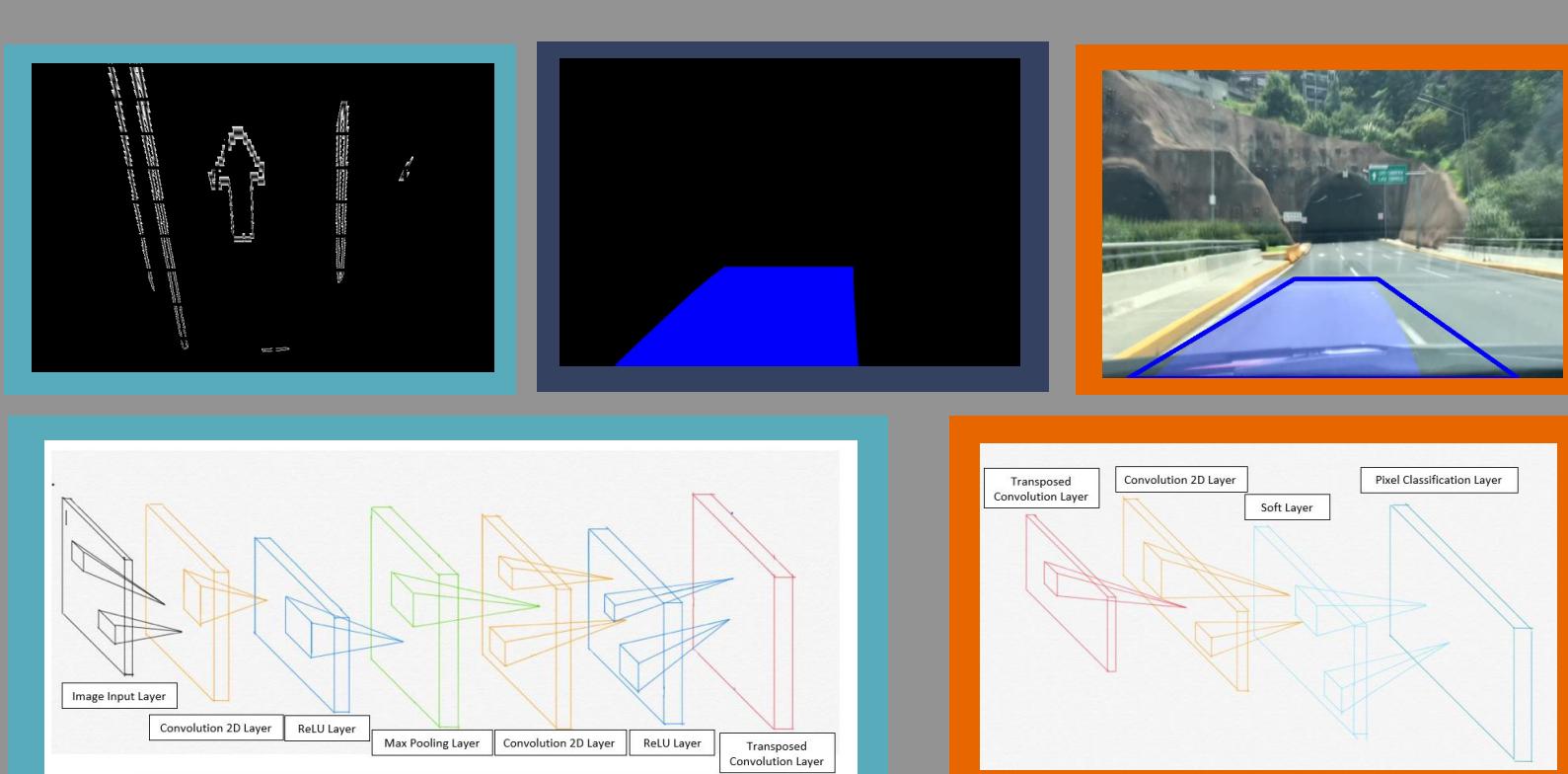
DEVELOPMENT

Software Used

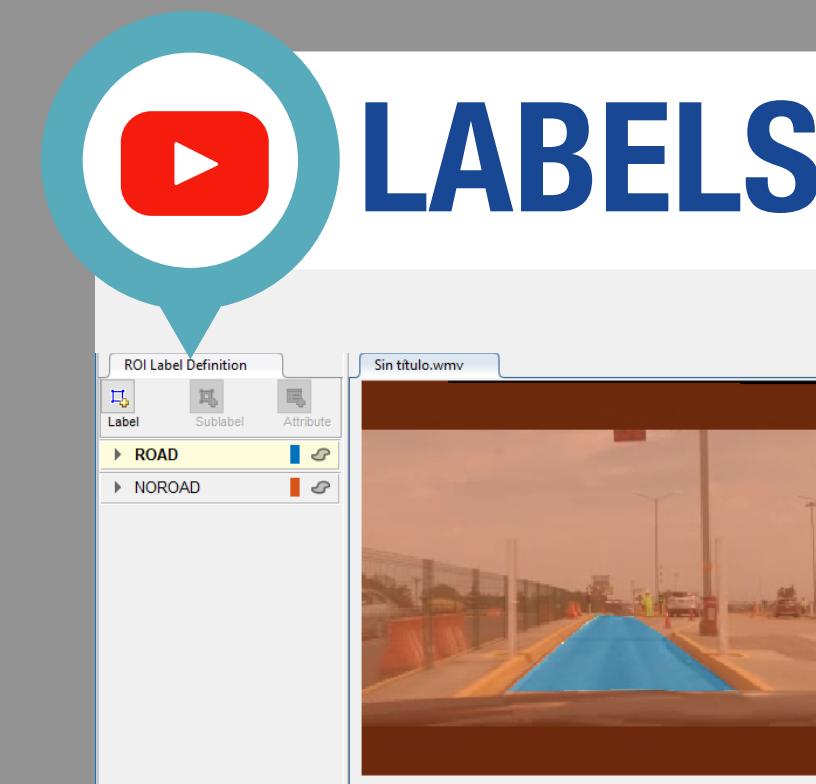


OpenCV Algorithm

Vehicular lane identification through the tools of Python, taking the lines of the road as a reference.



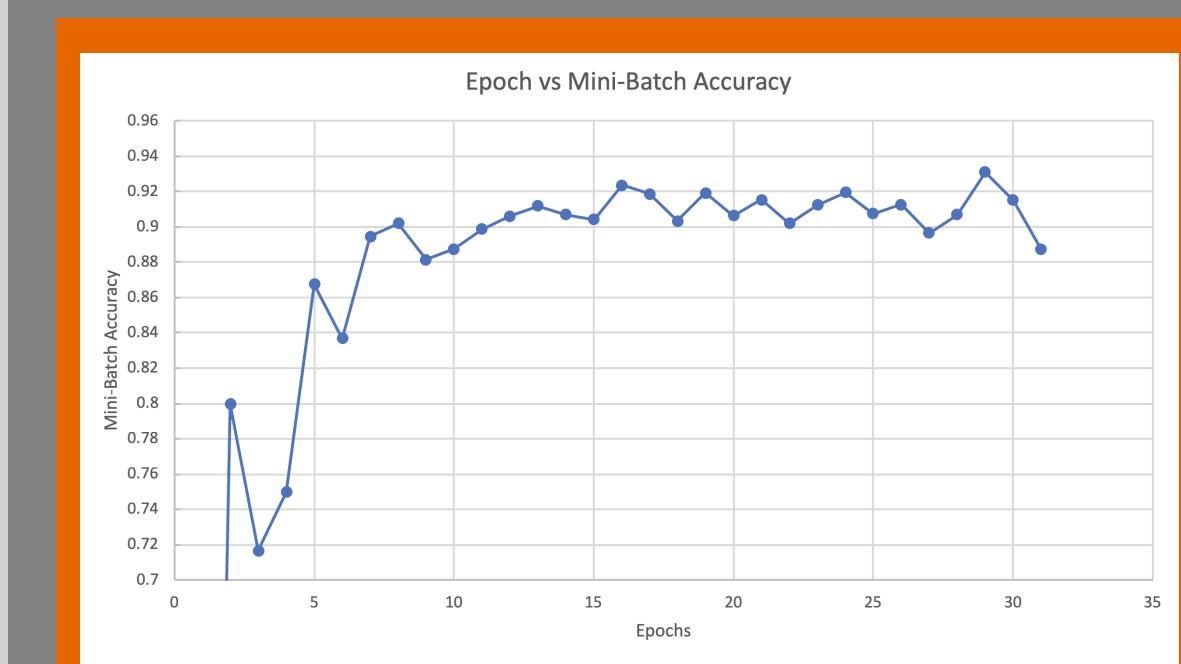
DATABASE DEVELOPMENT



4

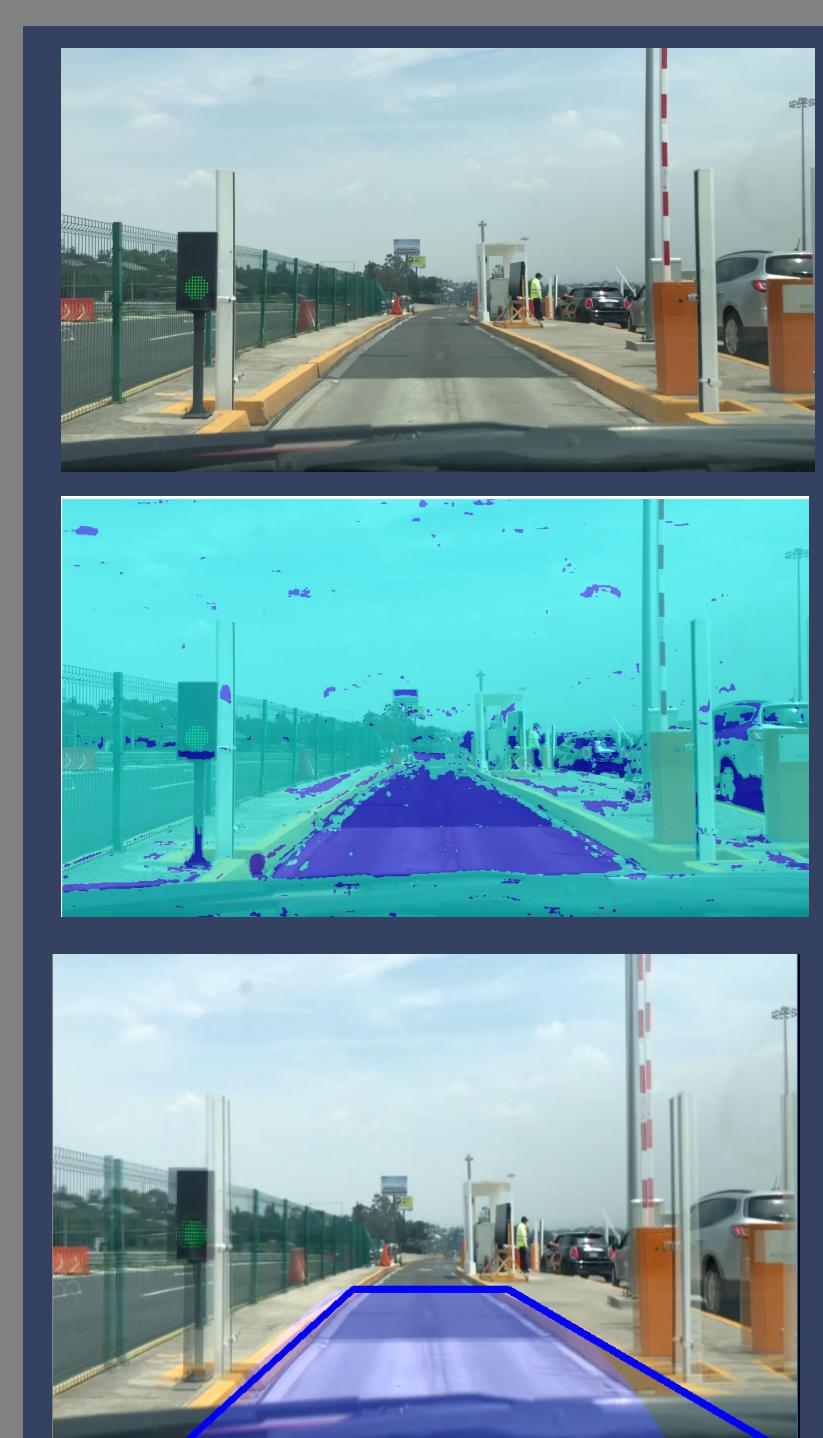
RESULTS

4.1 Neural Network Training



4.2

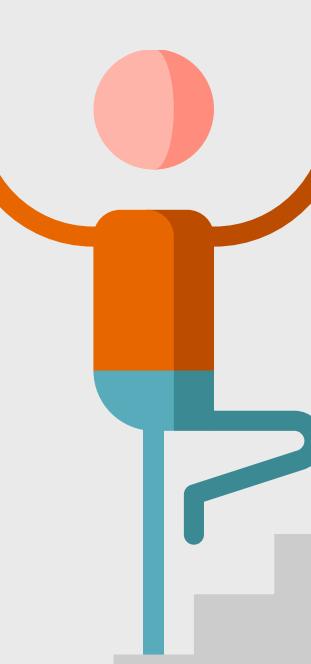
Results Comparison



5

CONCLUSION

It was possible to complement the tools of image analysis with the processes of neural networks, to develop a video and labels database, their respective procedures, as well as results of vehicle lane segmentation for future projects oriented to autonomous vehicles systems.



FUTURE WORKS

1

Increase the number of videos and frames labeled.

2

Increase the number of items labeled: Cars, signs, lines, pedestrians, etc.

3

Improve the architecture of the neural network.

4

Use a computer with better processing capabilities, which does not limit the architecture of the neural network.