

# Urban Traffic Flow: Repairing and Synchronizing Traffic Lights in Paraná City

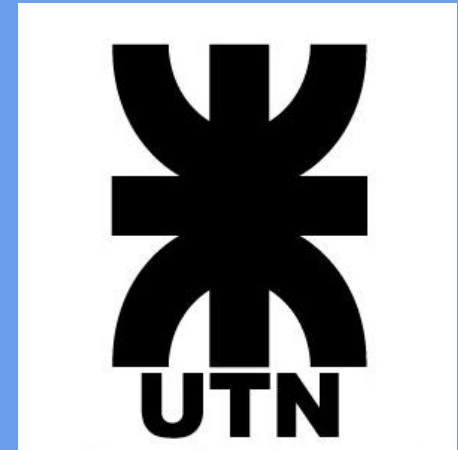


Universidad Tecnológica Nacional  
Facultad Regional Paraná

Electronics Engineering Department, Inglés 1

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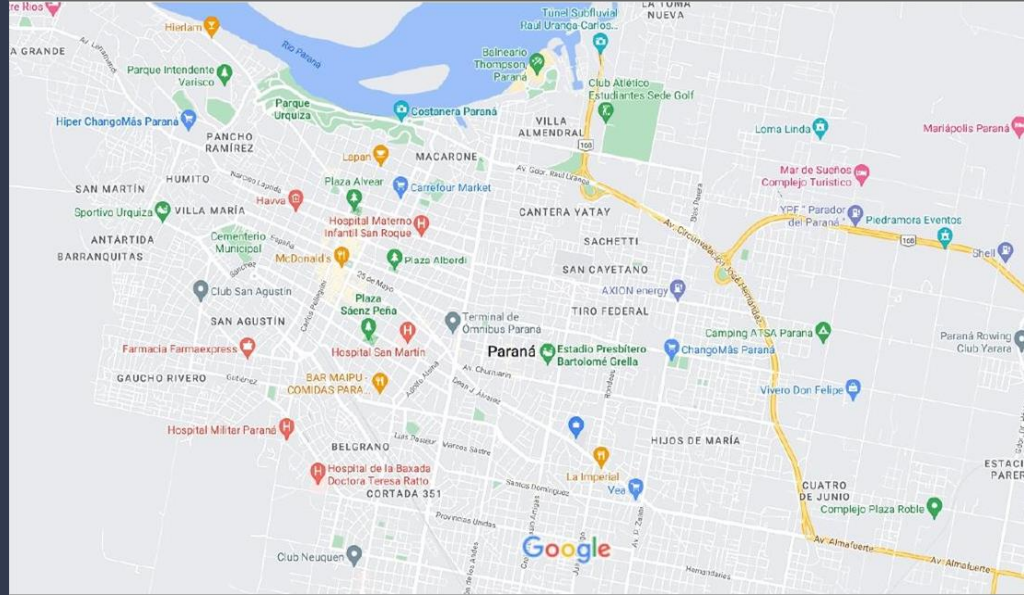


Alejo Penchansky – Alejandro Cafaro

# Introduction

# Introduction

- Paraná is a big city and is the capital of the province of Entre Ríos, Argentina.
- The area of the city is 137 square kilometers.



# Introduction

- One vehicle for every three people (137000 vehicles throughout the city)
- 391.000 inhabitants



# Introduction

## Purpose of the Project

In this project the focus is on the traffic lights that affect traffic on the streets in the centre of the city and the main streets that cross it.

## Purpose:

Improve the traffic in the city from the repair of traffic lights out of operation and the synchronization of these to achieve a fluid vehicular circulation.



# Introduction

## Map of the Presentation

- ❖ **Description of the Context**
- ❖ **Problem Statement**
- ❖ **Description of Scenes that Help Picture the Problematic Situation**
- ❖ **Problem Definition and Analysis: Identification and analysis of causes or factors that give rise to the problem**
- ❖ **Problem Definition and Analysis: Identification and Description of the Consequences**
- ❖ **Problem approach**

# Introduction

## Project Impact

It is hoped that this project can generate a change in the thinking of those in charge of traffic in the city and allow people to reflect on their day-to-day actions when driving.



# Description of the Context

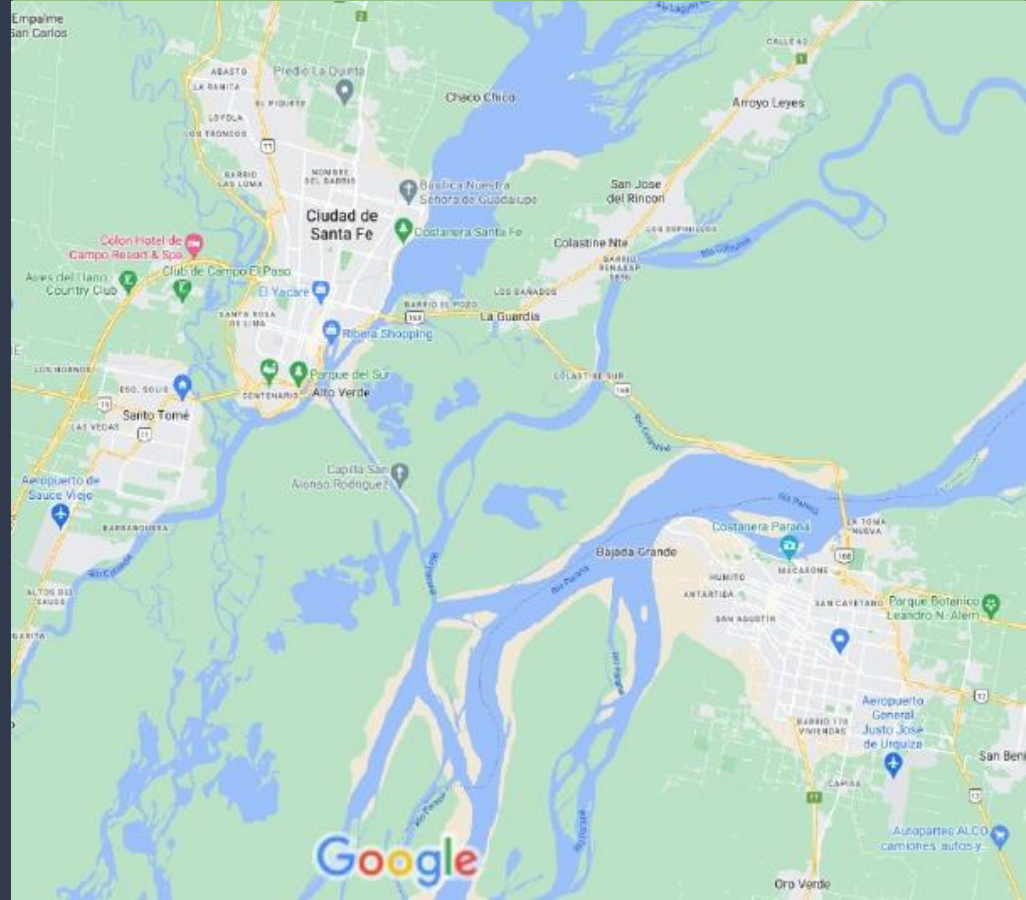


# Description of the context



## Characteristics of traffic in Paraná:

- Paraná is a city located on the left side of the province of Entre Ríos.
- It is very close to the city of Santa Fe.



# Description of the context

## Central Zone



Landmarks found there:

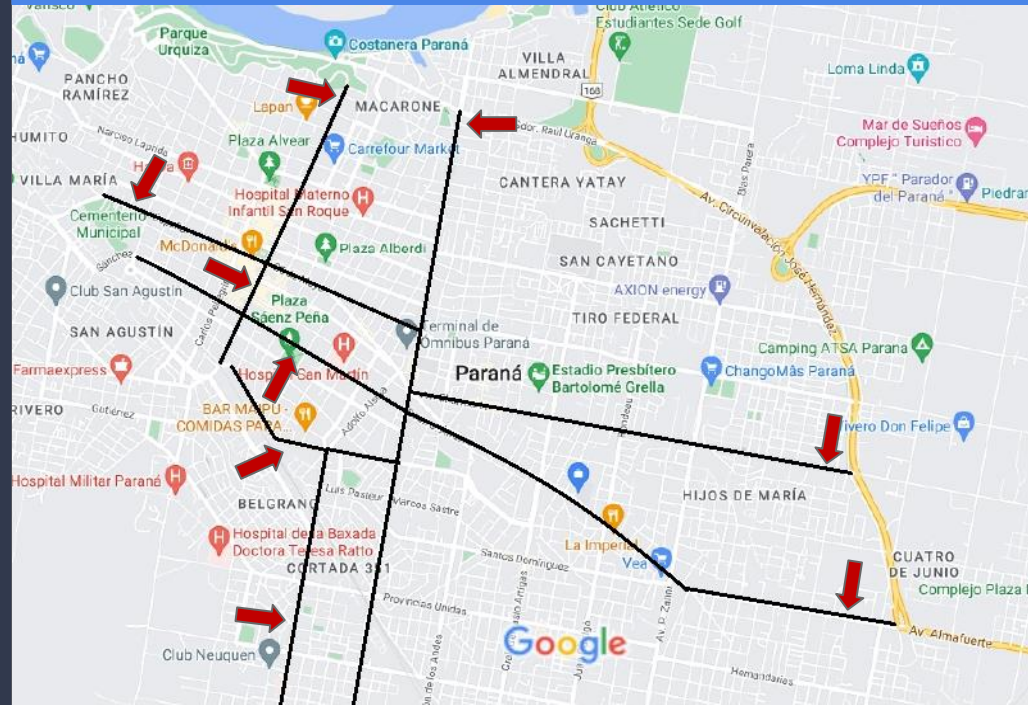
- Saenz Peña square
- Círculo cinema
- La Paz shopping mall
- The San Martín pedestrian Street
- San Martín hospital



# Description of the context

## Main Streets

- Churruarin Ave.
- Francisco Ramirez Ave.
- De las Américas Ave.
- Almafuerate Ave.
- Eduardo Racedo Blvd.
- 25 de Mayo St.
- Monte Caseros St.
- Corrientes St.
- Carbó



# Problem Statement

# Problem Statement

## Traffic lights:

A traffic light is a signaling device that allows the regulation of traffic on public roads and generally has three different lights for its signaling, red, yellow and green (as it is in Paraná).



# Problem Statement

Paraná

Bad synchronization of traffic lights



Traffic lights out of operation



# Description of Scenes that Help Picture the Problematic Situation

# Description of Scenes that Help Picture the Problematic Situation

## Bad Synchronization of the Traffic Lights

### **Green wave:**

The traffic lights should turn on the green light as the cars circulate at a certain speed, allowing them to move freely without having delays.





# Description of Scenes that Help Picture the Problematic Situation

## Traffic Lights Out of Order



Traffic lights out of activity

### Ways in which the problem develops

- Traffic lights without any active lights

# Description of Scenes that Help Picture the Problematic Situation

## Traffic Lights Out of Order

### Ways in which the problem develops

- Constant blinking of yellow traffic light, indicating careful driving



Traffic lights out of operation

Problem Definition and Analysis: Identification and analysis of causes or factors that give rise to the problem

# Identification and analysis of causes or factors that give rise to the problem

## Causes:

- ❑ lack of maintenance
- ❑ obsolete or old materials in their components
- ❑ bad synchronization of traffic lights



# Problem Definition and Analysis: Identification and Description of the Consequences

# Identification and analysis of Consequences or factors that give rise to the problem

## Consequences:

- ❖ slow traffic
- ❖ car accidents



# Problem Approach

# Problem Approach

Solution proposed → Developed countries → Fluid traffic

Fluid traffic

- Renewal of traffic light materials
- Good synchronization
- Traffic light maintenance



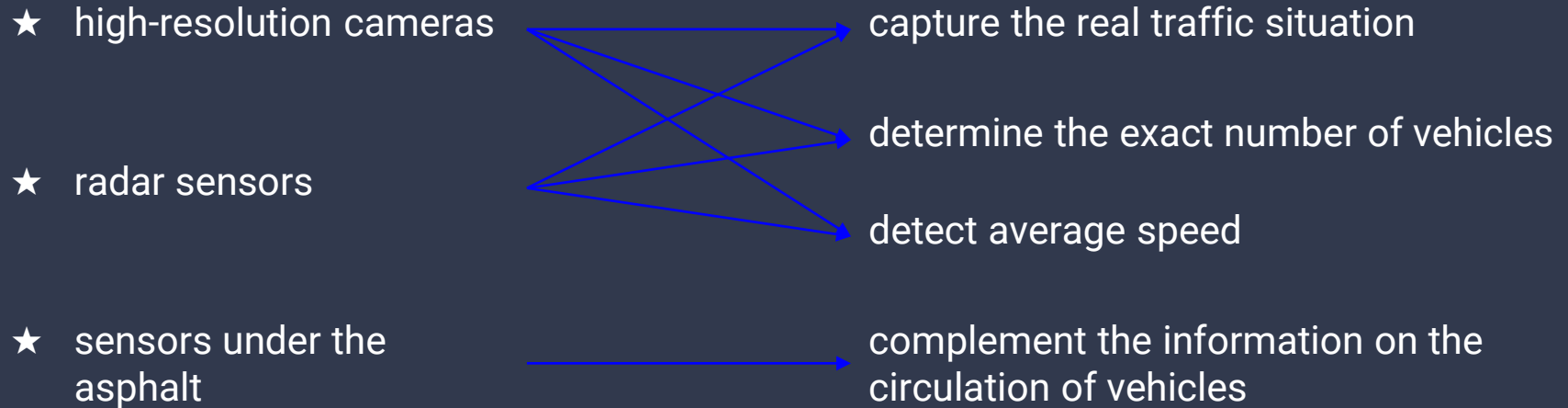
Artificial Intelligence (AI)





# Problem Approach

## AI



# Problem Approach

## Analysis in heavy traffic

High-resolution cameras and radars collect information about the position and number of cars and pedestrians at the moment.

Information



AI



Develop a plan to dissolve traffic

# Problem Approach

## Analysis in average traffic

AI's job is simplified: it should maintain traffic or speed it up by giving priority to the lane with the greatest accumulation of cars.



Results: shorter waiting time

# Problem Approach

## Analysis in low traffic

When the cameras and radars locate the first car to appear, the traffic light will immediately allow passage to reduce waiting times.



Results: much shorter waiting time

# Problem Approach

## Strengths

- ★ faster traffic
- ★ noise pollution reduction
- ★ CO2 emissions reduction

## Weaknesses

- expensive development
- fluidity only guaranteed in the center of the city

# Conclusion



Through the incorporation of modern technologies implemented in traffic lights, our project aims to improve traffic in the city of Paraná , making it safer and more orderly. This project can be an impetus for the government to implement this technology to improve the quality of life of the inhabitants.

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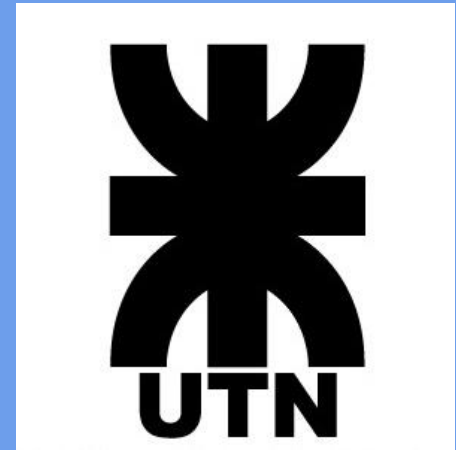


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