YOUR IDEAS, YOUR INITIATIVES 2020

SAFETY THROUGH INNOVATION

Srednja strukovna škola Antuna Horvata
Đakovo, Croatia

PROJECT GOAL

To raise public awareness regarding road safety by proposing solutions which would help decrease traffic mortality rates

The issue of road safety in Croatia is being analysed daily in recent times due to alarming rates of deaths in traffic accidents, especially with young people. We have identified three key issues adversely affecting road safety in Croatia:

1. misuse/overuse of mobile phones while driving,
2. pedestrian unawareness
3. alcohol and/or drug abuse.

IDEAS

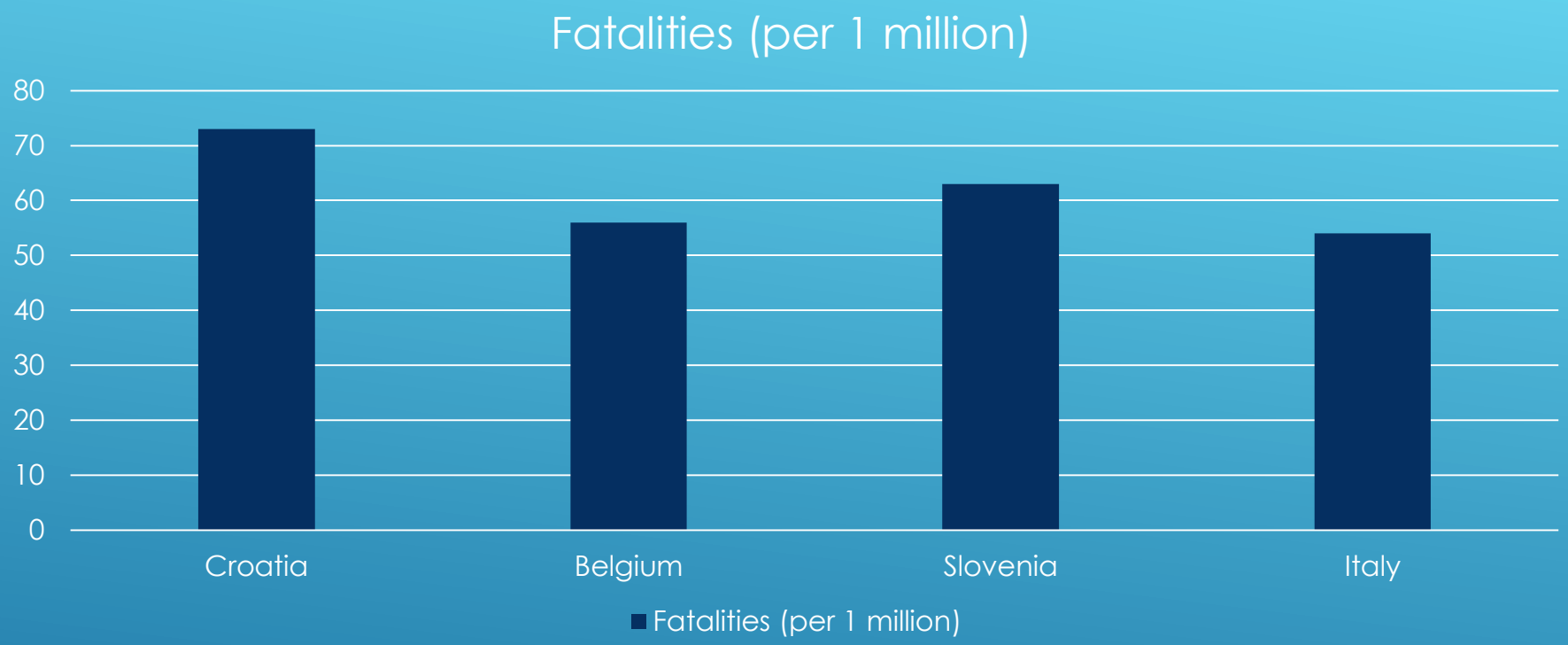
RESEARCH

When we were analyzing what our initiative might be, we have found a number of striking statistical data. Source material includes:

- ERSO Annual Accident Report 2018
- European Comission website
- News clippings from local and national newspapers
- World Economic Forum report on road infrastructure
- Croatian Ministry of Eternal Affairs Road Safety Bulletin 2018

ROAD QUALITY

- According to WEF Global Competitiveness Index, Croatian roads are one of the best in the world, with the grade of 5,5 (out of 7).
- Some countries with lower grades include Canada, United Kingdom, Slovenia, Italy, Greece, and Belgium
- Because of this, we have concluded that road quality is not the main issue affecting road safety in Croatia



MORTALITY RATES

STRIKING NUMBERS

- EU countries with the highest fatality rate in 2016 were Romania (96/million), Bulgaria (88/million), Latvia (78/million) and Croatia (77/million).
- Osijek-Baranja County, where we live, had the second greatest increase of fatalities from 2017 to 2018 in Croatia (+10,6%)
- More than one-third of traffic related fatalities in Croatia happens during the weekend (36,3%), when young people go out

- Although the number of fatalities is decreasing in the EU, pedestrians are still the most endangered group
- 69% of all accidents in EU involve pedestrians or cars/taxis (22% + 47%)
- Alcohol abuse violations have increased between 2017 and 2018 (+3,5%)
- 14% of all accidents are the result of alcohol abuse (2018)
- 90% of Croatian drivers use mobile phones
- Since the average age of a vehicle in Croatia is over 12 years, many Croatian drivers misuse mobile phones, and those who own handsfree-equipped cars often don't use the system properly

INITIATIVES

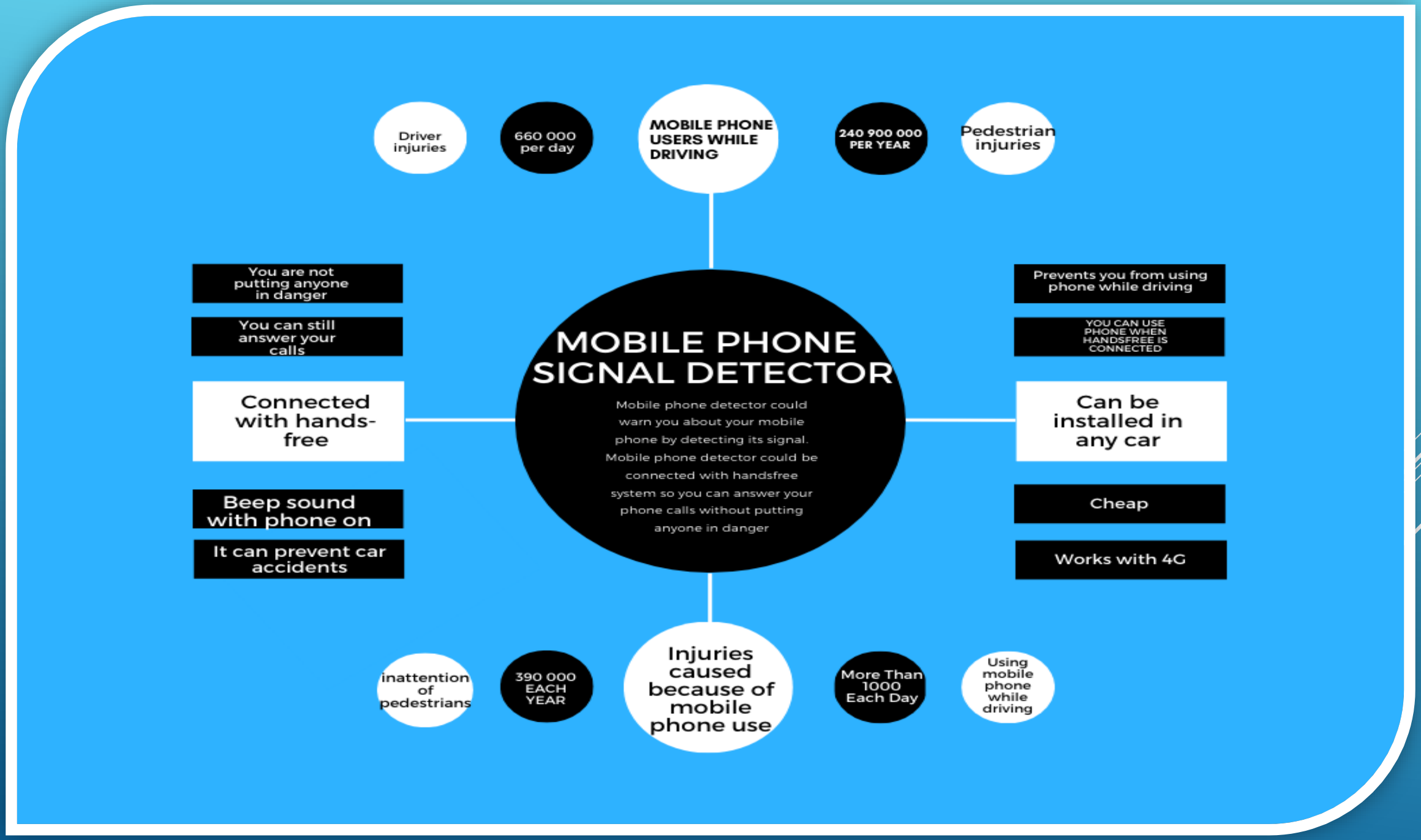
Taking all this into account, we have decided to propose the following solutions:

1. misuse/overuse of mobile phones - MOBILE PHONE SIGNAL DETECTOR
2. pedestrian unawareness - LED ZEBRA CROSSING
3. alcohol and/or drug abuse – ALCOHOL AND DRUG DETECTOR

Most importantly, the technology needed to implement these solutions already exists.

MOBILE PHONE SIGNAL DETECTOR

- The system would engage when the car is started
- First, it would allow the phone to connect to handsfree system via bluetooth
- If the connection is not successful, the system would disable the phone using signal scrambling


Driver injuries
660 000 per day
MOBILE PHONE USERS WHILE DRIVING
240 900 000 PER YEAR
Pedestrian injuries
You are not putting anyone in danger
You can still answer your calls
Connected with hands-free
Beep sound with phone on
It can prevent car accidents
MOBILE PHONE SIGNAL DETECTOR
Mobile phone detector could warn you about your mobile phone by detecting its signal. Mobile phone detector could be connected with handsfree system so you can answer your phone calls without putting anyone in danger
Prevents you from using phone while driving
YOU CAN USE PHONE WHEN HANDSFREE IS CONNECTED
Can be installed in any car
Cheap
Works with 4G
inattention of pedestrians
390 000 EACH YEAR
Injuries caused because of mobile phone use
More Than 1000 Each Day
Using mobile phone while driving

LED ZEBRA

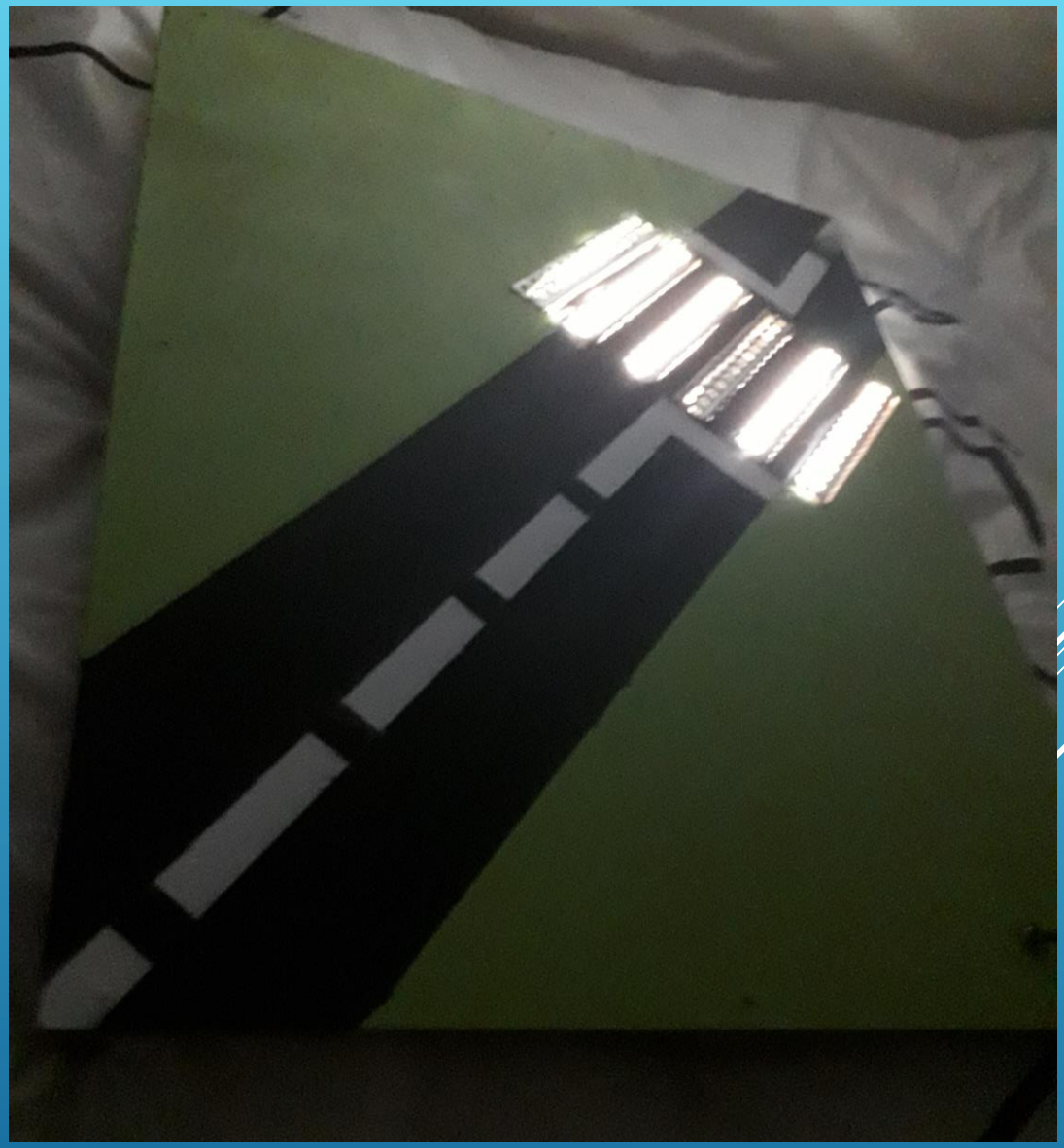
- The idea is to make the pedestrian crossing as visible as possible
- There are many similar solutions around the world, but the crossing itself is not illuminated
- The system could be solar powered
- The model was made by one of our students

Our student Gabriel said:

The idea came to me when we were discussing our project ideas. I knew that there are no LED pedestrian crossings, so it seemed like a good idea to try and make one. I told my dad about the idea, and he liked it very much.

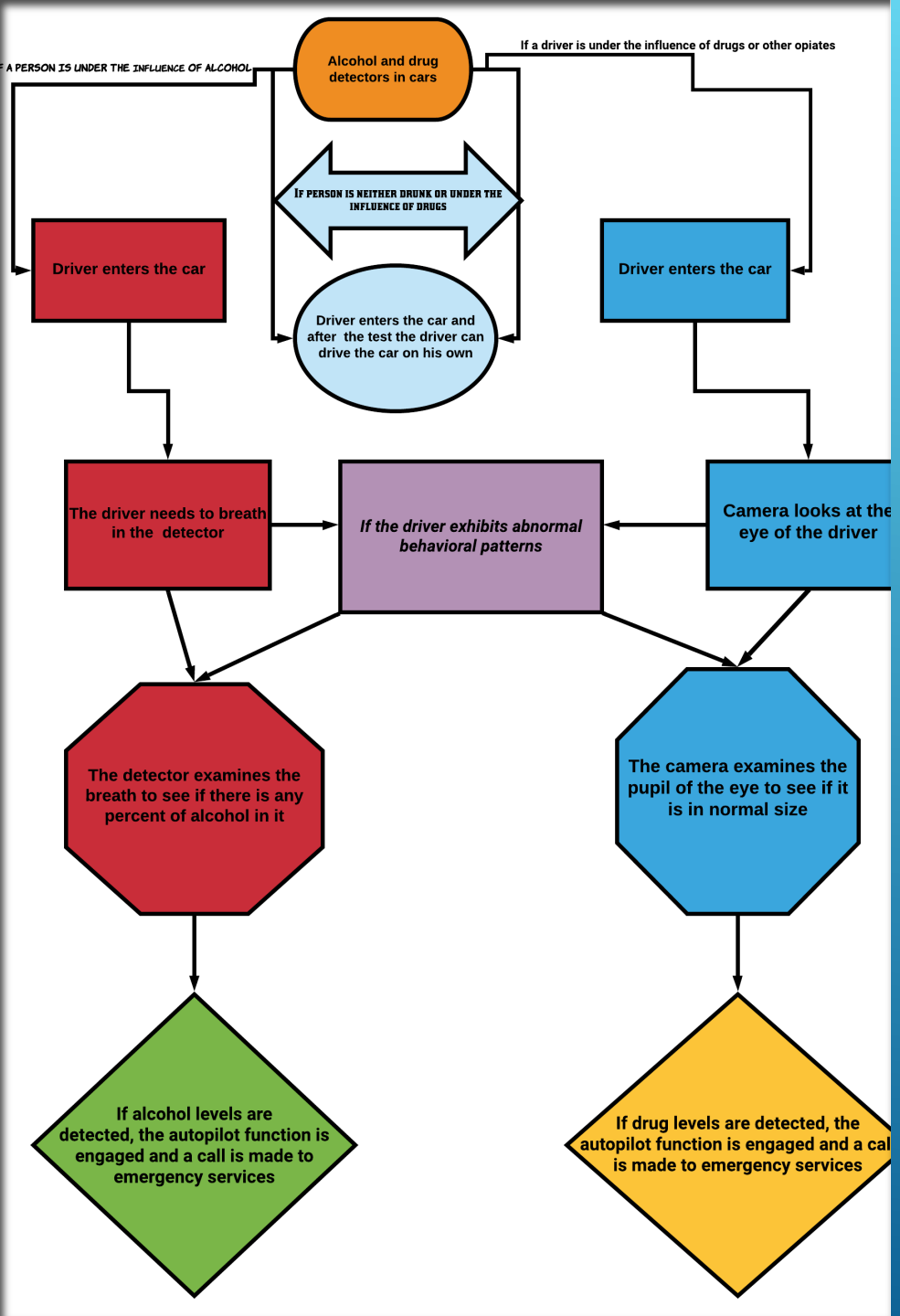
First, I drew a pattern on a paper. Then I used the pattern to draw the crossing on a wooden plate. I painted everything using spray paint so that it would look as realistic as possible. The LED lights were the most difficult part because it was difficult to get them due to Covid-19 lockdown. Finally, we connected everything with wires and brazing underneath the panel. The model is powered by 12V battery.

DESIGN



ALCOHOL AND DRUG DETECTOR

- It essentialy includes two separate detectors: one for alcohol, and the other for drugs
- Alcohol detector measures the amount of alcohol in your breath, similar to the ones used by law enforcement. If it notices high alcohol levels, it prevents the car from starting
- Drug detector consists of a small camera built in the rearviewmirror which measures pupil dialation reflex
- If the pupil remains dialated, it prevents the car from starting



RED, **BLUE** – actions during detector operation

ORANGE – product name

LIGHT BLUE – idle processes

PURPLE – processes with results

GREEN, **YELLOW** – actions occuring after detector analysis

DETECTOR DECISION TREE

COVID-19 RELATED DIFFICULTIES

- These initiatives were originally planned much differently, but we had to adjust due to Covid-19 pandemic
- This created many problems – we had to meet and discuss project goals online, which was not always ideal due to technical difficulties
- Also, our students had to do all the work in their free time and by themselves, which proved to be difficult
- The school in Croatia was not suspended, but moved to the online environment, so our students sometimes had to work nights in order to complete the project on time

CONCLUSION

- This project taught us to look at problems analytically – identifying the key points and trying to find a solution
- We have analyzed and verified many important issues affecting road safety in Croatia and we believe there exists the necessary technology to implement these solutions in practice
- Hopefully, our initiatives would motivate other students of our school to analyze the issues and try to find a solution

PARTICIPANTS

- Students of **1.TM** Class
- Special thanks to: **Domagoj Gjalić** and **Luka Sučić** (*problem analysis*), **Christian Marko Mandić** (*mobile phone signal detector*), **Gabriel Petanjak** (*LED zebra*), and **Marko Marinić** (*alcohol and drug detector*)
- Mentor: **Filip Bekavac**, teacher