# Princess Sumaya University for Technology

King Abdullah II Faculty of Engineering

King Abdullah II School of Engineering
كليـــــة الملك عبد الله الثاني للهندســـة

## Microprocessors & Embedded Systems

## Project Proposal

### Car Speed Tracker


*Students:*

| | | |
|---|---|---|
| Zaki Mohammed | Zak20190222@std.psut.edu.jo | NIS Eng. |
| Sereen Al Kedra | Ser20190165@std.psut.edu.jo | NIS Eng. |
| Faris Tammous | Far20180968@std.psut.edu.jo | Computer Eng. |

*Instructor:*

Dr. Belal Sababha

## INTRODUCTION

Our embedded project aims to develop a comprehensive system that measures the speed of a car between two points using radar technology (IR sensor) and time-of-arrival measurements. The project aims to provide an accurate and reliable speed measurement system that can be used in various applications, including traffic control, transportation, and safety systems. The system also aims to address important issues related to road safety and traffic control by providing an added safety feature to warn drivers when they exceed the speed limit.

## THE PROPOSED IDEA

The proposed idea is to develop a system that uses a pair of sensors placed at the two points to measure the time difference it takes for the car to travel between them by using time-of-arrival (TOA) measurements where this method relies on measuring the time difference it takes for a signal to travel from one point to another, which in this case is the time it takes for a radar signal to travel from one sensor to the other sensor. We are not only developing the electronic system that generates the radar signal, controls the sensors, measures time accurately, performs the necessary calculations, and displays the results, but we are also designing and building a car equipped with the system. The project includes an added feature where if the car's speed exceeds a pre-defined limit, a message will be sent to the driver as a warning.

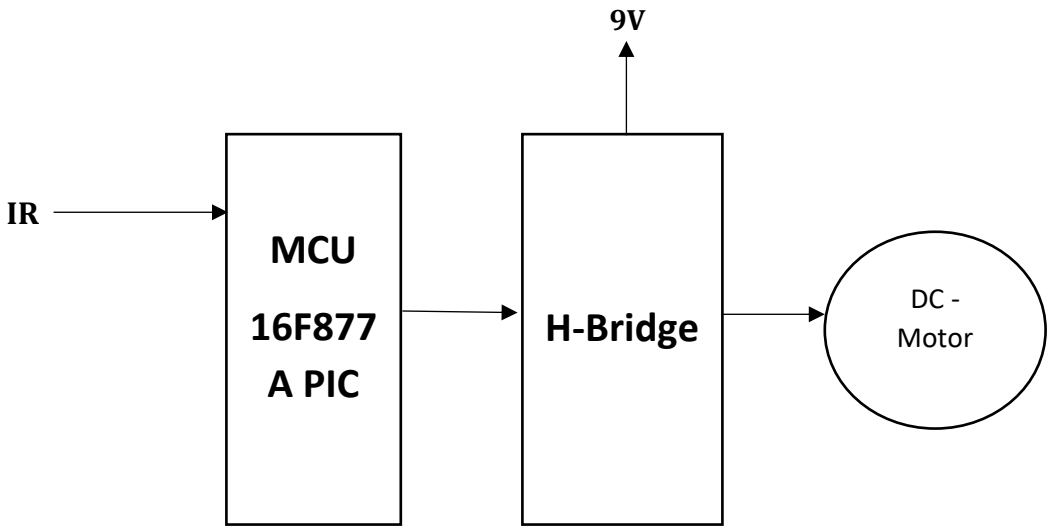
## METHOD

Here's our method in our project:

1. The first IR sensor will mark out the time initial point.
2. The second IR sensor will mark out the time second point when the DC motor passes.
3. We know the distance between the two sensors.
4. The time difference between the two timers is then calculated and used to determine the car's speed.
5. We will compare the car speed with pre-defined limit and if it exceeded a warning message to the driver will be sent using serial communication (Wireless Bluetooth).
6. We will use PWD to generate different case studies

By knowing the distance between the two sensors, we can calculate the time it takes for the radar signal to travel from one sensor to the other without the car being present. This allows us to subtract the travel time of the radar signal from the total time difference between the two sensors to obtain the travel time of the car between the two sensors. By using the travel time of the car and the distance between the two sensors, we can calculate the speed of the car.

## BLOCK DIAGRAM



## COMPONENTS AND THEIR COSTS

| COMPONENTS | PRICE JD | USING |
|---|---|---|
| DUAL H-BRIDGE DC L298N | 2.45 | 1 |
| IR INFRARED OBSTACLE | 1.45 | 2 |
| WIRELESS BLUETOOTH | 6.5 | 1 |
| 2WD SMART MOTOR ROBOT CAR | 5.95 | 1 |
| Lithium Battery | 11 | 1 |
| BREADBOARD | 1.95 | 1 |
| MCU | 6.5 | 1 |
| Total | **37.25** | |