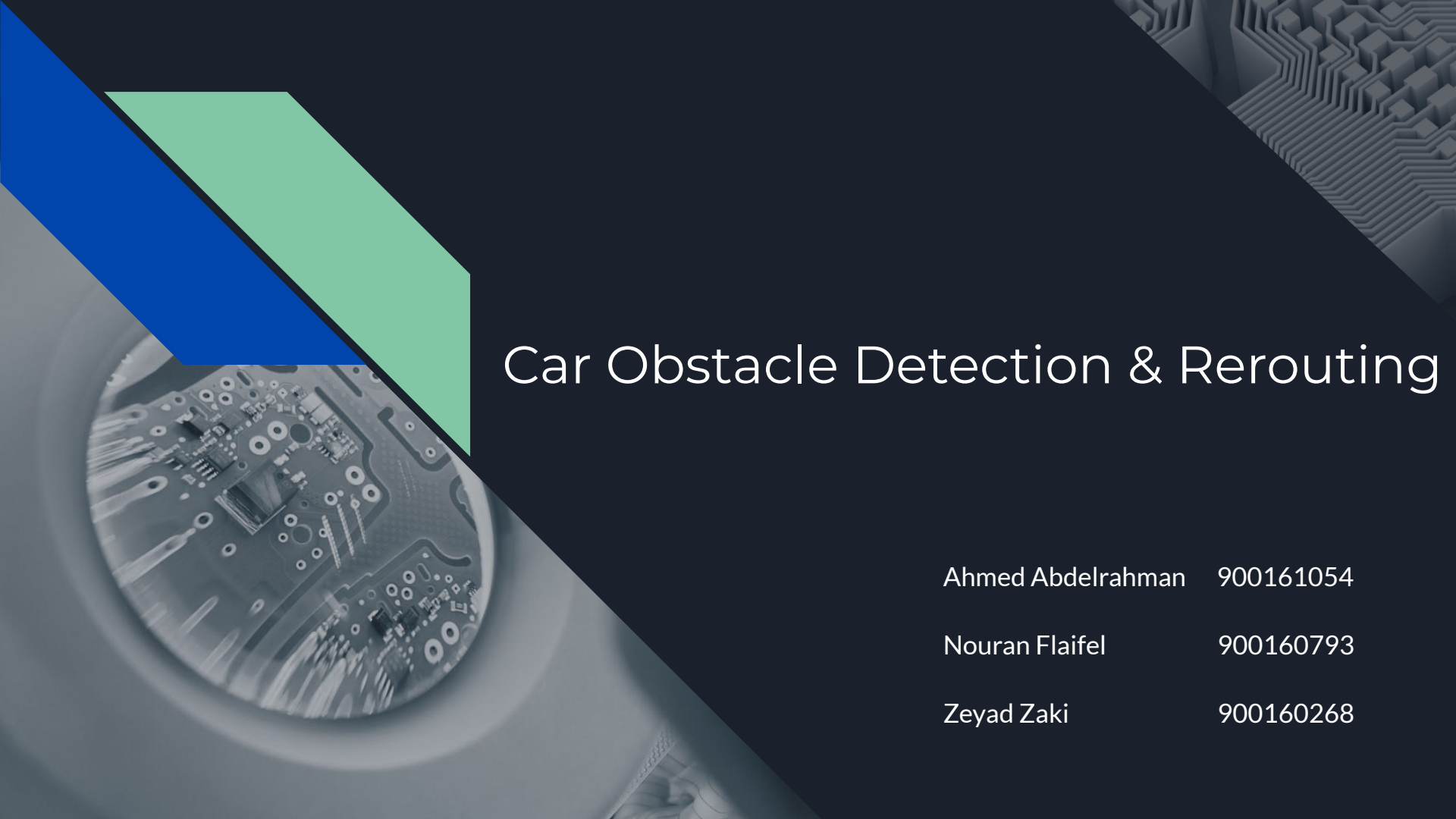

Car Obstacle Detection & Rerouting

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Agenda

Introduction

Hardware Resources

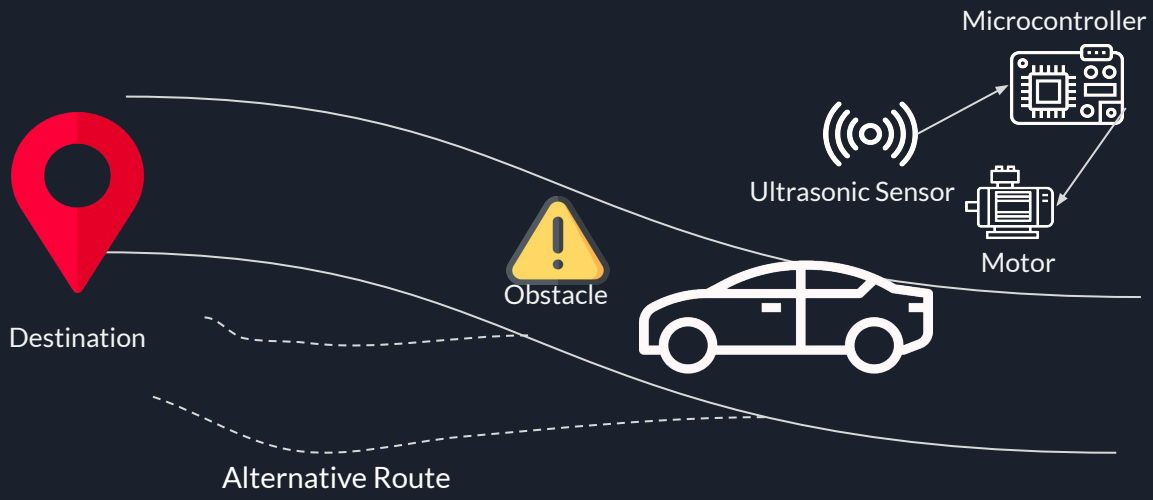
Software Resources

Initial Design

Design Logic

Introduction

The smart car will be moving in a specific track to reach a final destination. It should be able to detect any obstacles that it faces and be able to reroute in order to avoid them while still aiming to reach the destination.



Hardware Resources

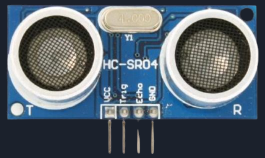
01 STM32 Microcontroller

02 Dagu Wild Thumper 4WD Chassis

03 Tri-axial Accelerometer (Still not decided which exact model)

04 Pololu TReX DC Motor Controller

05 N number of HC-SR04 ultrasonic ranging module



Software Resources

01 STM32CubeMX

02 Keil uVision

03 Application that will send the mobile Accelerometer readings through serial communication (in case no external accelerometers are available)

Initial design

- Pololu Trex connections
  - Microcontroller UART Tx connected to the Pololu Trex serial in
  - Common ground is connected
- HC-SR04 ultrasonic ranging module connections
  - GPIO output pin is connected to trigger pin in the ultrasonic module
  - Input capture mode on one of the timer channels to capture the ultrasonic Echo
  - Module VCC is connected to the 5V pin on the microcontroller
  - Common Ground is connected
- Triaxial Accelerometer connections
  - 3 input pins to receive the x, y, z accelerometer outputs
  - Accelerometer VCC connected to power source from Microcontroller
  - Common ground connected

Design Logic

- Based on the number of ultrasonic modules, these readings will be checked and tested against a minimum threshold, if this threshold is passed this means that it will collide and should reroute.
- There will be a shortest path algorithm to find the best direction in which the car should move after a rerouting occured.
    - This shortest path will be based on the current position and the final destination.
    - The current position will be the double integration of the accelerometer readings.

Thank you!