

Project I Description

Project Name: Automated Device for Pothole Identification on Various Roadway Classes in Lebanon

Sponsor: LAU

Team Size: 3 MEE Students

Project Overview

The project aims to design, implement and test a reliable low cost device to automate data collection and mapping of pavement roughness on various functional classification roadways and to quantify fuel consumption for enhanced benefit-to-cost analysis, asset management, and infrastructure investment strategies.

In order to achieve the stated goals, the project is split into two main pillars. First, two ultrasonic sensors attached to two accelerometers will be added to the bumper on the vehicles' wheel path to measure road roughness over various pavement sections. Another 6 axis accelerometer will be added to the center of the car and its recorded data over known potholes will be correlated to the shape of the pothole. The second pillar will focus on testing the system for several days on several vehicles and reporting its precision and reliability.

Project Areas and Majors needed

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| <ul style="list-style-type: none"> Instrumentation (2 MEE Student) | <ul style="list-style-type: none"> Solid Mechanics/Powertrain Modeling (1 MEE Student) |
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Project Deliverables

- Develop a combined ultrasonic and accelerometer to calculate the road roughness as the car is moving
- Assemble a low cost system that collects data from the 6 axis accelerometer, GPS and the controller of the car (using OBDII), all data should be properly synchronized
- Calibrate and validate the ultrasonic/accelerometer bumper sensors using a surveying total station
- Collect data over at least 100 potholes and bumps and use it to correlate the data of the 6 axis accelerometer and car speed to road roughness
- Test the system for several days on different cars for robustness and precision

