Using ML to predict Condition of Vehicle and Regular Maintenance

Krishna Vamsi Jadapolu, Arch Jignesh Desai, Dexter Law, Patricia Kio

Problem

The use of data to solve problems in the society is a development that has enabled the advancement in technology in leaps and bounds. Sustainability demands the use of data and technology to preserve the earths depleting resources. The car is the most common means of transportation in the United States of America. This study seeks to develop machine learning between the traffic light and brake pedal sensors using data of individual braking habits.

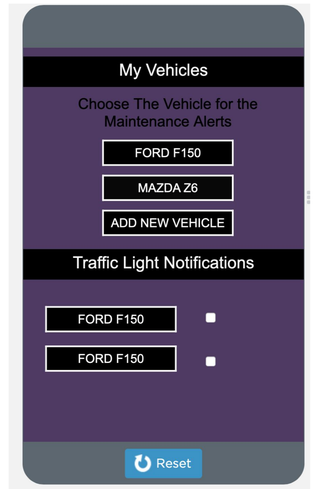
Objectives

The creative mechanism of the research is an interactive process among collaborating researchers. To generate the greatest number of creative solutions, the problem has been addressed through 1) A study of car parts, 2) Brainstorming sessions to generate ideas and 3) designing and organizing the project and research the potential impact of the project's proposed solutions.

- The research was initiated through X-Ventures design competition to foster innovative design investigations. The competitors were told to come up with creative ideas to apply machine learning.
- Graduate students in Engineering and Architecture have been involved to organize the competition and work conduct their own research, to see the project to completion.

The student led work done in each of these settings has defined new directions for the design. This work produces a novel business model approach through machine learning. The student design competition has produced strategies to transform the design into business models.

Mockplus



Proposed Solution

Apps like EnLighten, from Connected Signals, are trying to help drivers make this decision safely with a little help from vehicle-to-infrastructure (V2I) technology. The app can receive information from a city's traffic infrastructure and predict when the signal will change. So, for example, if you're waiting at a red light, the app collects such data as the current state of the light and the city's timing plan to predict when it will turn green. Just before the change, the app chimes to let you know you should start paying attention to the road again.

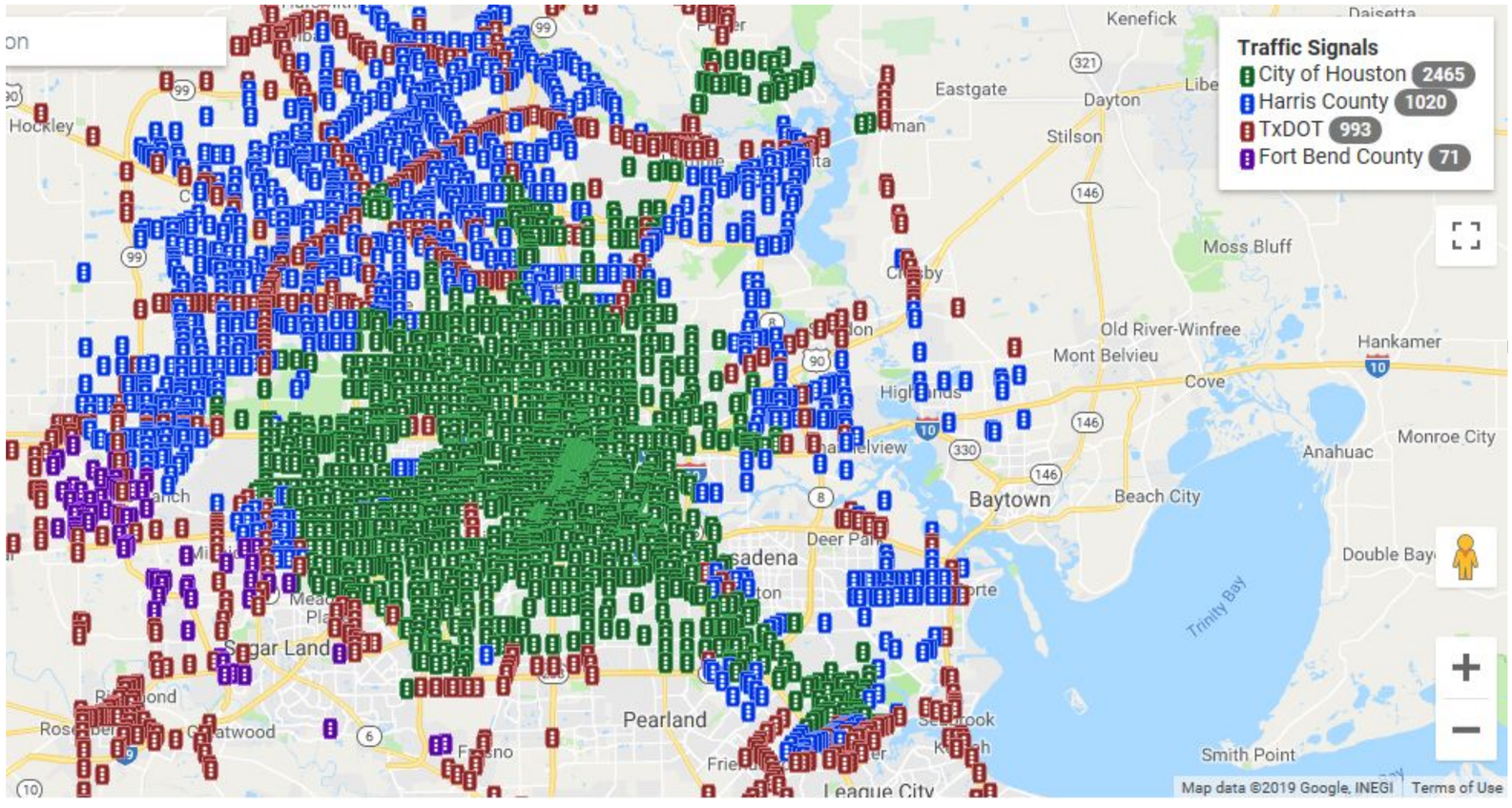
The most aggressive one percentile of stops, it takes drivers 12 seconds to come to a complete stop when traveling 60 MPH.

Starting Speed	Distance to Stop	Time to Stop
10 MPH	86 feet	8 seconds
20 MPH	207 feet	11 seconds
30 MPH	372 feet	14 seconds
40 MPH	581 feet	17 seconds
50 MPH	851 feet	20 seconds
60 MPH	1,262 feet	24 seconds

The BCM's value is used to **determine the action of the driver applying the brake pedal** and to provide this information to the vehicle's subsystems via the GMLAN communication bus. The ECM's value is used for the new Electronic Brake Pedal Override feature.

The 5th percentile female maximum brake pedal force is about 400 newtons, it is recommended that no more than this force be required to attain near maximum braking capability from a passenger car

Map of Traffic Lights

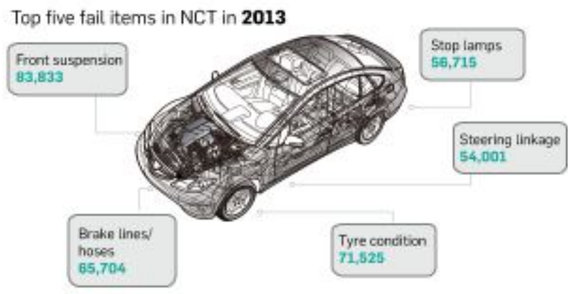


Using ML to predict Condition of Vehicle and Regular Maintenance

Krishna Vamsi Jadapolu, Arch Jignesh Desai, Dexter Law, Patricia Kio

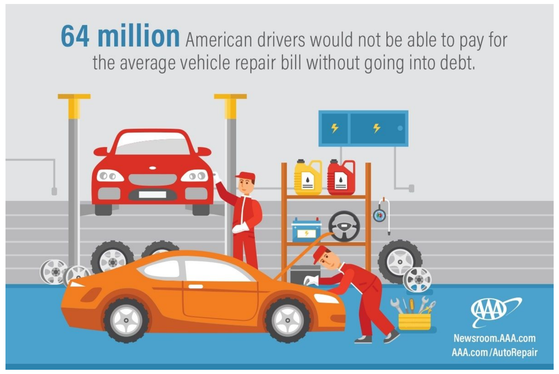
Problem

1. Lack of information on vehicle condition and timely maintenance
2. Damage to brakes due to overuse, directly affecting the transmission.

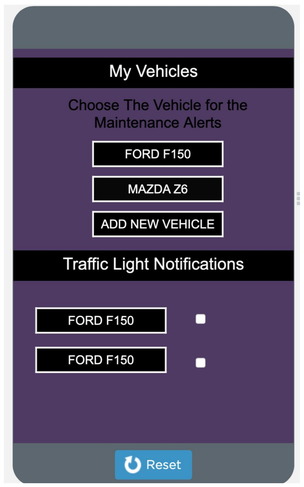


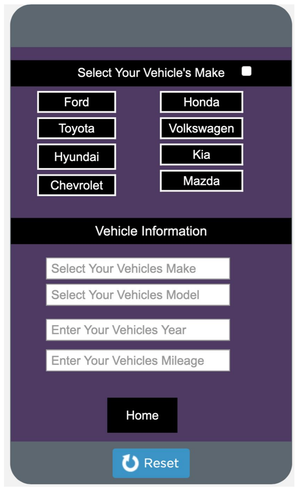
Why Solve this Problem?

1. Save Money and Time
2. Reduce accidents due to vehicle failures



Mockplus

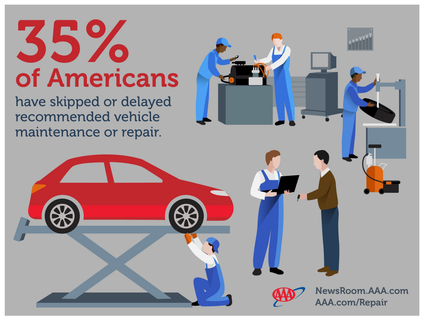




Proposed Solution

IOT Devices attached to the car will collect data and use machine learning:

1. Provide maintenance alerts
2. Predict brake failure and transmission failure



Map of Traffic Lights