Real-time Pothole Detection and Reporting Using OpenXC, Android and Machine Learning

Need, Problem or Opportunity
Millions of dollars are spent to maintain or repair roadways. This does not include repairs needed by vehicle owners as a result of poor road conditions. An opportunity exists to collect pothole severity and location and give this data to an agency such as MDOT. Vehicle owners and the agencies responsible for maintaining the roads will benefit from knowing where these potholes are through the reporting application.

Plan of Work
Development
- CAN Bus Access and Translation
- Android Application Development
  - Cloud computing
  - Data Visualization
Integration & Testing
- Testing using FCA vehicle on roads with known potholes

Current State

Resources and Materials
- Android smartphone or tablet
- FCA Vehicle with an accelerometer
- VI/ CAN Translator with BT
- Android Integrated Development Environment
- OpenXC Platform

Schedule
- April 2016 – Initial technical exchange
- May 2016- Android Application development
- May 2016 – Training Data collection
- June 2016 – Testing accuracy of detection
- August 2016- Data visualization

References

Technical Objectives
- The system should be able to detect events in real-time.
- The system should use Android as the operating system in conjunction with accelerometer as the HW/SW platform. Portability to other platform is classified as additional feature.
- System should have a calibration or self-calibration functionality as different vehicles are likely to yield different sensor data when encountering a pothole. This functionality should be based on signal patterns specific to the certain vehicle types.

Solution Concept

Pipeline