Real-Time Non-Contact Road Defect Detection Using Inexpensive Sensors

Zhao Xing Lim, Da Cheng, Shutao Wang, Mohammad K. Sweidan, Aanis Ahmad, Xi Chen, Omar Hesham
School of Electrical and Computer Engineering, Purdue University
Mohammad R. Jahanshahi, Tarutal G. Mondal
Lyles School of Civil Engineering, Purdue University

ABSTRACT

Road defects such as potholes, humps, and road cracks have become one of the main concerns for road and traffic safety worldwide. Pavement defect detection is crucial to ensure road safety. However, current solutions to this problem are either too time-consuming or too expensive to be employed large-scale. We propose a novel approach which has the ability to autonomously detect potholes in real-time using cost-effective sensors. Inexpensive sensors are mounted on a vehicle and a deep learning algorithm is used to identify road defects. The detection system is paired with a GPS and positional sensors to map the location of the pothole. The data that is collected is annotated and used to train deep learning networks to learn the patterns of potholes. This approach is low-cost, accurate and time-saving. It can potentially be employed in large-scale crowdsourcing of road condition data where normal road users constantly update the road conditions as they use the roads.

KEYWORDS
Road defect detection, pavement distress, pothole detection, inexpensive sensors, deep learning, sensor fusion