Preface

In a time of swift urbanization and growing infrastructure networks, potholes on roads continue to be a major problem for cities all over the world. In addition to obstructing smooth car operation, potholes seriously jeopardize commuter safety. Effectively addressing this problem calls for creative solutions that make use of real-time monitoring systems, analytics, and cutting-edge technologies.

The worrying data that show the economic and social cost of pothole-related issues highlight the necessity for such remedies. Recent studies show that pothole damage costs billions of dollars a year in automobile repairs and road maintenance costs in the United States alone. Furthermore, the financial burden on societies is exacerbated by the indirect costs, which include increased fuel use, accidents, and traffic congestion. In addition to having a financial impact, potholes exacerbate worries about sustainability and resource management by increasing carbon emissions and wasting road material.

A real-time pothole maintenance monitoring system and a Geo-Image Analytics toolkit for pothole repair quantity estimation are vital projects to undertake considering the pressing need to address these issues. The objective of this project is to use Geographic Information System (GIS) technology, especially that found in the ESRI ArcGIS environment, to transform current pothole management techniques.

For the work at hand, the ESRI ArcGIS ecosystem provides an extensive set of tools and resources that are ideal. Spatial data analysis capabilities in ArcGIS can be used to precisely predict the number of pothole repairs needed in a particular area. The toolbox streamlines resource allocation and repair activities by facilitating the effective identification and prioritizing of pothole-ridden regions through the integration of geo-image analytics, such as satellite images and aerial surveys, with GIS features.

Additionally, field personnel can gather data about pothole conditions in real-time by using ArcGIS Field Maps, which improves the precision and promptness of maintenance operations. ArcGIS Dashboards enable resource management and informed decision-making by digitizing the whole pothole repair lifecycle, from first discovery to completion. This provides stakeholders with relevant insights and performance data.