SAMSON

SURFACE ASSESSMENT FOR MOBILITY SUSTAINABILITY IN URBAN NAVIGATION MODEL

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Content

BACKGROUND

- Traffic congestion is a major global issue, and the Philippines, particularly its capital, experiences some of the worst traffic conditions. This congestion arises when traffic volume exceeds road capacity, exacerbated by poor road conditions. Improving road infrastructure, measured by the Pavement Condition Index (PCI), can help reduce accidents, travel times, fuel consumption, pollution, and health issues—key challenges to urban sustainability.

- The project introduces SAMSON (Surface Assessment for Mobility Sustainability in Urban Navigation), a machine learning tool designed to assess road conditions defects.

THE PROBLEM

The application of the Visual Condition Index (VCI) in the Philippine road network has not yet been fully explored. The SAMSON model aims to address this gap by applying the VCI to detect road damage and defects classifications.

OBJECTIVES

The following outlines the objectives of the SAMSON model:

1. Establish a comprehensive assessment of the current condition of road infrastructure through image detection.
2. Utilize data scientific methods to apply machine learning modeling to road images.

SCOPE & DEFINITIONS

The SAMSON model focuses exclusively on the road, specifically targeting asphalt road surfaces that can be assessed using satellite imagery. This focus is due to the parameters identified by Ramos, which will serve as the primary reference for the Visual Condition Index (VCI) in this project. On-site inspections will be disregarded in the methodologies, and the forecasts of the model will be based on its training and testing phases.

DATASETS UTILIZED

The SAMSON model used the **N-RDD2024** dataset. It contains road images from six countries: India, Japan, Czech Republic, Norway, China, and USA. The defect classes labeled are longitudinal cracks (D00), transverse cracks (D10), alligator cracks (D20), repaired cracks (D30), potholes (D40), pedestrian crossing blurs (D50), lane line blurs (D60), manhole covers (D70), patchy road sections (D80) and rutting (D90), respectively (Kaya & Çodur, 2024).

METHODOLOGY

Data Gathering

The SAMSON Model used the N-RDD2024 dataset to identify and learn about ten specific road defects, such as cracks, potholes, and blurs.

Metadata Extraction Automation for Data Organization

Efficiently organizing and managing large datasets involves using techniques like data compression, partitioning, indexing, and distributed storage to improve storage efficiency, query performance, and overall data accessibility.

Machine Learning Modeling

A subset of the N-RDD2024 dataset used in a supervised learning approach, where the model will learn defect severities. TensorFlow will guide the training and validation process, employing cross-validation to evaluate and refine model performance.

Thank You