Usafiri: an Open Source Gis-Based Participatory Mapping Tool to Assist Transport Need Assessment in Rural Communities

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SUMMARY

Efficient transportation systems are crucial for the development and well-being of rural communities, necessitating accurate assessment and planning to address mobility challenges. However, the complexity of existing transportation assessment methodologies, often reliant on Geographic Information Systems (GIS), can pose barriers for decision-makers lacking GIS expertise.

To tackle this challenge, we introduce USAFIRI, an open-source web-based GIS tool tailored for decision-makers in low-income and developing communities. USAFIRI is a web-based participatory mapping tool designed and developed by a multidisciplinary team comprising academic institutions, technology service providers, and transportation practitioners, particularly from nonprofit organizations. This tool has been co-designed in collaboration with practitioners in the field of transportation need assessments, as well as geospatial application design and development. The primary objective of USAFIRI is to assist decision-makers in transportation needs assessment and planning, even with limited knowledge of GIS, and also to data-scarce communities with limited access to primary datasets. USAFIRI offers an intuitive interface that allows easy import and organization of geospatial datasets, including from OpenStreetMap (OSM). The tool incorporates automatic and manual data cleaning modules, streamlining the preparation of datasets. Once ready, USAFIRI's user-friendly web interface empowers users to perform spatial analyses, facilitating transport-related decision-making by identifying mobility patterns and barriers.

In this paper, we present the key features and applications of USAFIRI in transportation planning. We highlight its user-friendly design and intuitive functionalities, making GIS-based analyses accessible to non-experts. Real-world case studies demonstrate USAFIRI's effectiveness and its

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potential to enhance transportation systems. We also address limitations observed during implementation. Finally, we discuss future development and the global impact of USAFIRI in advancing transportation systems.