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An Online Mobility Management System to Automatically Avoid Road Blockage and COVID-19 Hotspots

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Abstract

The unprecedented road blockage mostly generates unnecessary hindrance, delay, and interruption during travel. Moreover, the emergence of the sudden third wave through the rapid spread of the omicron CoV-2 variant along with its new combinations with delta SARS-CoV-2 is leading to newer travel restrictions through various hotspots and containment zones contributing to enhanced travel interruption. While traveling, passengers in vehicles are unaware of road conditions during transit time due to blockage in a route. This causes a huge confusion and decision crisis at the edge of such blockage to find the most suitable alternative route. We have developed a software-based system including a mobile application that is capable of handling real-time constraints, transit service, and actual road conditions of a route. This system can be used to find and display alternative routes or maps without any confusion in case of sudden route blockage caused by mass gathering, accidents, or road construction in transit time. During this pandemic COVID-19, this system can also be used to avoid the localized hotspot for a safe and convenient journey. As this system is developed at the time of the pandemic, it is called an Automatic COVID-19 hotspot avoidance navigation system (ACHANS) that generates a unique optimal travel path while traveling to avoid road blockage/COVID-19 hotspot areas. The system works from the user perspective with coordination among the ACHANS Database, map routing server, ACHANS web applications, and ACHANS mobile applications. The process works by creating a buffer-centric radius generation, considering open and closed hotspot regions, and controlling clusters of hotspots. ACHANS database cum alternative roadways bypass system will be independently executed to avoid the localized hotspot for a safe and convenient journey. The proposed system is theoretically, experimentally, and statistically evaluated and verified for various traffic conditions where the performance dictates the efficacy of the scheme and can thereby establish travel and trade during the pandemic.

Keywords Routing · Navigation · Database · Map routing server · Web application · COVID-19

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