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Sensor-based solution for maintaining social distancing during the COVID-19 pandemic

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Abstract

Background: The only way to remain safe in the current COVID-19 pandemic is by maintaining physical distancing. The current paper is an attempt to justify the use of sensor-based equipment in maintaining social distancing as much as possible during the unprecedented crisis of the COVID-19 pandemic. **Method:** Databases considered for the relevant literature search were PubMed, Scopus, and Google Scholar for the government reports and hand-searched articles. **Results:** Initiatives such as wireless interchanges and versatile processing have prompted the upgradation and improvisation in Intelligent Transport Frameworks (ITS) which focuses on street wellbeing applications. As a promising innovation and a centre part of ITS, Vehicular ad-hoc networks (VANET) have arisen as use of Mobile Ad hoc Networks (MANET), that uses Dedicated Short-Range Communication (DSRC) to permit vehicles to maintain distance and keep safe social separation through the method of correspondence with each other, or to communicate with the road gear equipment. Mediations are needed from all areas to keep up with the security of our transportation framework. Without convenient activity, a serious degree of viral transmission will be subsequently followed to public transit. **Conclusion:** Social distancing and personal security of the people by use of IT in traffic management is required. The policymakers should look for options to implement VANET use at least in the containment zones of the COVID-19 pandemic in India.

Key words: COVID-19, India, social distancing, severe acute respiratory syndrome, transportation, technology.

Introduction

Novel coronavirus or COVID-19 is the term that is currently trending worldwide. The virus has brought the world to a grinding halt, turning the global economy into disarray. COVID-19 is caused by SARS-CoV-2, a novel betacoronavirus - a member of the Coronaviridae family.[1] Unlike two other members of the family — SARS-CoV (severe acute respiratory syndrome coronavirus) and MERS-CoV (Middle East respiratory syndrome coronavirus) — it has succeeded in creating a fast-spreading pandemic. The first case in India was reported on 30 January 2020, followed by the second case on 2 February 2020. Both were students who had returned from Wuhan, China — the epicentre of COVID-19.[2,3] At midnight of 24 March 2020, the Government of India ordered a nationwide lockdown of 21 days, to limit the spread of COVID-19 across India. By then, India had approximately 500 cases of COVID-19. To get a handle on this fast-evolving catastrophe, we need to intervene from all possible sectors. We must base our planning on information that helps us to handle the present as well as the near-future challenges. As per the experts' suggestion, the only way to remain safe is by maintaining physical distancing. To this end, social distancing and personal security of the people by use of IT in traffic management is required. A country lockdown was announced in India on 25 March 2020 bringing the entire nation to a halt. As we now move to the

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unlock phase, it is of paramount importance to maintain social distancing.

Initiatives such as wireless communications and mobile computing have prompted the upgradation and improvement in, intelligent transportation systems (ITS) which focuses on road safety measures.[4] As a futuristic innovation and a center segment of ITS, Vehicle Ad hoc Networks (VANET) have emerged as an application of Mobile Ad hoc Networks (MANET), which utilise Dedicated Short Range Communication (DSRC) to permit vehicles to stay away and keep safe social distance through the method of correspondence with each other, or to communicate with the road hardware equipment. [5,6] The conduct of the driver is viewed as unsure and is characterized as a unique collaboration between the driver, the vehicle and the climate; the engineering has been constructed dependent on the idea of setting mindfulness; it is divided into three stages that represent the three main subsystems of the context-aware system; a) sensing b) reasoning and c) acting subsystems. The proposed engineering clarifies how the framework parts cooperate to identify infringement of social distancing or any dangerous conduct that is being shown by the driver; this is done to make the driver and others aware of re-establish security.

These types of communications offer a broad range of potential safety applications, to provide an intelligent driving environment that will offer road users a safer, secured, and pleasant journey maintaining social distancing in times of COVID-19 pandemic. VANET safety applications are considered to represent an essential step towards improving road safety and enhancing traffic efficiency, as a consequence of their capacity to share information about the road between moving vehicles. Nevertheless, it results in more security, decreasing numbers of incidents, and increasing the opportunity to save people's lives. Many researchers have focused their research on the development of designing an accurate and efficient driver behaviour detection system. To detect the driver behaviour and alert them to maintain social distance during parking, queuing for fuel, inside sitting arrangements with

co-passenger and also to the co-drivers/road users to keep safe distancing which may have an impact on the prevention of spreading infections. Moreover, using Context-Aware systems can improve the collection and analysis of contextual information about the driving environment, hence, increasing the awareness about safe distancing while driving his/her car.

Due to the continuous pandemic situation travel interests had significantly decreased as individuals have been telecommuting. It may bring about low traffic and clog during top hours. Individuals are additionally more slanted to return home with the conveyance for food and other fundamental materials needed for everyday endurance. The individuals who don't have different choices than utilizing public vehicles attempt to stay away from swarmed transports and prepare by going during off-top hours. To this end, increment social contact can be kept away from during dynamic travel. Cycling may – on account of short outings – increment since social contact can (generally) effectively be decreased during dynamic travel. Due to the decrease of out-of-home work and activities, individuals may likewise walk and cycle all the more casually.

In light of the survey, this article proposes a driver conduct recognition framework like VANET which is thorough, non-meddlesome, and can recognize social distancing during four styles of driving conduct: intoxication, weariness, wild and judicious lead. The VANET is an arising innovation to accomplish vehicle correspondences, consistent web availability bringing about further developed street security, fundamental alarms, and getting to solaces and entertainment. The innovation incorporates WLAN/cell and Ad Hoc organizations to accomplish non-stop connectivity.[7] VANET transforms each partaking vehicle into a remote switch or node, permitting vehicles roughly 100 to 300 meters of one another to interface and, thus, make a network with a wide reach. As vehicles drop out of the sign reach and exit the organization, different vehicles can participate, interfacing vehicles so versatile web is made. The VANET intends to give security to drivers and other street clients, investment funds

space as much as 70%, decreases complete parking cost, is harmless to the ecosystem, and furnishes higher throughput with quicker activities. It is a vast subject of study which is utilized to execute a huge number of ITS. VANETs are a mix of both Inter-Vehicular Communication (IVC) and Road-Vehicular Communication (RVC).[8]

Using VANET provides the information to accompany user with traffic congestion update ahead, which helps in reducing the average traffic halt time during predictable and unpredictable obstacles. It integrates the data related to location, density and distance between the node and the location of the jam. It will relay this clustered information to the source node, i.e., the driver's information panel. With this pre-fetched information, drivers can avoid the congested route. It just decreases the aggregation of vehicles on that course, while saving time too. However, the major drawback is that they all process data and relay it to the prevailing traffic data centre. Another serious issue with this arrangement is that it is planned statically, while the traffic stays dynamic.

Interventions are required from all sectors to maintain the safety of our transportation system. In the absence of timely action, a severe level of viral transmission will be later traced to public transit. The current paper is an attempt to justify the use of VANET in maintaining social distancing as much as possible during the unprecedented crisis of the COVID-19 pandemic. It is now very much evident that social distancing is one of the best ways to prevent COVID-19 infection, and the use of technologies like VANET can assist in achieving it. The policymakers should look for options to implement VANET use at least in the containment zones of the COVID-19 pandemic in India.

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