

Literature survey

Signs with Smart Connectivity for Better Road Safety

1. **World Health Organization, “Decade of Action for Road Safety 2011-2020 seeks to save millions of lives,” [http://www.who.int/ roadsafety/decade of action/en/](http://www.who.int/roadsafety/decade%20of%20action/en/).**

In September 2020, the UN General Assembly adopted [resolution A/RES/74/299](#) "Improving global road safety", proclaiming the Decade of Action for Road Safety 2021-2030, with the ambitious target of preventing at least 50% of road traffic deaths and injuries by 2030. WHO and the UN regional commissions, in cooperation with other partners in the UN Road Safety Collaboration, have developed a Global Plan for the Decade of Action, which was released in October 2021.

The Global Plan aligns with the Stockholm Declaration, by emphasizing the importance of a holistic approach to road safety, and calling on continued improvements in the design of roads and vehicles; enhancement of laws and law enforcement; and provision of timely, life-saving emergency care for the injured. The Global Plan also reflects the Stockholm Declaration's promotion of policies to promote walking, cycling and using public transport as inherently healthy and environmentally sound modes of transport.

Progress made during the previous Decade of Action for Road Safety 2011-2020 has laid the foundation for accelerated action in the years ahead. Among achievements are inclusion of road safety on the global health and development agenda, broad dissemination of scientific guidance on what works, strengthening of partnerships and networks, and mobilization of resources. This new Decade of Action provides an opportunity for harnessing the successes and lessons of previous years and building upon them to save more lives.

2. **F. Wegman, “The future of road safety: A worldwide perspective,” IATSS Research, vol. 40, no. 2, pp. 66–71, 2017.**

The United Nations has adopted several resolutions on road safety and proposes actions to tackle the global road safety crisis. Considering the current level of road safety to be unacceptable, the UN has taken several initiatives. One effort, the Decade of Action for Road Safety 2011–2020, has generated substantial activity around the world over the last couple of years. Furthermore, it is very encouraging that the UN included road safety in the Sustainable Development Goals that it laid out in September 2015. Road safety is part of the public health agenda and the urban development agenda. Measured in “real actions,” however, the responses so far from the overall global community and individual countries do not suggest that we are already on the right track to bringing down the death toll on roads. The future of road safety is uncertain and definitely not the same for all regions of the world. Countries with a mature road safety approach and an ambition to make further progress are expected to move in the direction of a pro-active approach: a Safe System approach. It is reported that many LMIC, meanwhile, are on the brink of designing road safety strategies and implementing action plans. The international community is willing to support LMIC, but LMIC cannot simply copy successful HIC strategies because local circumstances differ. The principles of successful HIC strategies are applicable, but the priorities and action plans should take root in and align in local condition

3. World Health Organization, “Save LIVES - A road safety technical package,” 2017.

Road traffic crashes lead to the loss of around 1.3 million lives and cause non-fatal injuries to as many as 50 million people around the world each year.² Nearly half (49%) of the people who die on the world’s roads are pedestrians, cyclists and motorcyclists. Road traffic crashes are the main cause of death among people aged between 15 and 29 years. In addition to the grief and suffering they cause, road traffic crashes constitute an important public health and development problem with significant health and socioeconomic costs.

Aimed at halving road traffic deaths and injuries by 2020 and providing access to safe, affordable, accessible and sustainable transport systems for all by 2030, Sustainable Development Goal (SDG) targets 3.6 and 11.2 provide a powerful focus to galvanise governments and the international community into action on road safety policy.³ The challenge is to seize this opportunity and to significantly scale up implementation of road safety measures at national, subnational and urban levels. In this context, the *Save LIVES: a road safety technical package* was produced and launched in May 2017 by the WHO to support road safety decision makers and practitioners in their efforts to significantly reduce the number of road traffic deaths in their countries.⁴

4. W. E. Marshall, “Understanding international road safety disparities: Why is Australia so much safer than the United States?” *Accident Analysis & Prevention*, vol. 111, pp. 251–265, 2018.

Despite similarities to the US in terms of transportation, land use, and culture, Australia kills 5.3 people per 100,000 population on the roads each year, as compared to the US rate of 12.4. Similar trends hold when accounting for distance driven and the number of registered cars. This paper seeks to understand what is behind the road safety disparities between these two countries. The results suggest that a number of inter-related factors seem to play a role in the better road safety outcomes of Australia as compared to the US. This includes Australia’s strategies related to seat belt usage and impaired driving as well as their efforts to help curb vehicle speeds and reduce exposure. Design-related differences include a much greater reliance on roundabouts and narrower street cross-sections as well as guidelines that encourage self-enforcing roads. Policy-related differences include stronger and more extensive enforcement programs, restrictive licensing programs, and higher driving costs. Combined with a more urban population and multimodal infrastructure, Australia tends to discourage driving mileage and exposure while encouraging safer modes of transportation such as transit, at least more so than in most of the US. Australia also enacted their version of Vision Zero – called the Safe System Approach – more than a decade before similar policies began cropping up in US cities. While it is difficult to attribute recent road safety successes to any specific policy, Australia continues to expand their lead on the US in terms of safety outcomes and is a road safety example worthy of consideration.

5.X.Wang, X. Wu, M. Abdel-Aty, and P. J. Tremont, “Investigation of road network features and safety performance,” *Accident Analysis & Prevention*, vol. 56, pp. 22–31, 2013.

The reliability and applicability of traffic operation analyses depends on their ability to integrate relevant input from disparate databases in a seamless and automated manner. Inputs include information on road geometry, traffic composition, and spatial referencing. These databases are collected by different agencies for different purposes. As a result, a common definition of roadway segments is lacking across various applications. This paper developed a systematic segmentation methodology that considers the needs of various operational and planning studies. A multi-level dynamic segmentation approach has been developed to address different levels of requirements for various studies: at the micro level, referring to the smallest roadway segmentation for traffic simulation studies; at the meso level, representing a combination of several micro segments for traffic operation studies; and, at the macro level, corresponding to planning studies. In this paper, the proposed methodology for the segmentation of freeway and arterial corridors in Ontario (Canada) is demonstrated. At each level, several criteria were selected to identify the locations where the roadway network needs stringent analysis. Next, a pilot study was designed to evaluate the proposed methodology. It was found that the new segmentation methodology can successfully identify areas of congestion and queue growth/dissipation. Finally, the proposed segmentation methodology was implemented for more than 6000 km of Ontario's roadway network. The results of this study can assist researchers and road agencies with defining a systematic roadway segmentation that can be utilized for different types of projects, ranging from traffic operation to planning studies.

6.European Road Assessment Program (EuroRAP), “European Road Safety Atlas”.

The Safe System (SS) approach to road safety emphasizes safety-by-design through ensuring safe vehicles, road networks, and road users. With a strong motivation from the World Health Organization (WHO), this approach is increasingly adopted worldwide. Our interest in this work is to complement the approach with a short-to-medium term dynamic assessment of road safety. Toward this end, we introduce a novel, cost-effective Internet of Things (IoT) architecture that facilitates the realization of a robust and dynamic computational core in assessing the safety of a road network and its elements. In doing so, we present a IoT based system “Enablement Of Driver-Mode Application For Road Safety”. Here we produce a mobile application accompanying a NodeMcu based circuit. This project is developed to minimize the risk of accidents while attending the mobile phone during driving. This application change the user's Mobile phone into DND mode if the user is riding or driving the vehicle at a speed more than 14 Km/Hour. Before start of the journey, user needs to connect with circuit installed in the vehicle. The installed circuit consist of NodeMCU and a speed sensor which will sense the speed. This is an innovative project of the “Ministry of Road Transport and Highways”. This application will provide the way to prevent the accident while driving.

