

Проблемы и возможности использования самоуправляемых транспортных средств в Бангладеш

Зубаир Ахмед

Российский университет транспорта (МИИТ)

Аспирант

Научный руководитель:

Сафонова Ирина Евгеньевна

д.т.н., доцент

Аннотация

Идея беспилотных транспортных средств была хорошо принята в различных странах, включая Японию, Китай, Южную Корею, Америку и большинство европейских стран. В этих странах ведутся обширные исследования. В последнее время обсуждения и исследования по этой теме также начинаются в слаборазвитых и развивающихся странах, но с меньшими темпами. Бангладеш не исключение. Идея беспилотных транспортных средств серьёзно обсуждается в Бангладеш, потому что количество дорожно-транспортных происшествий увеличивается с каждым годом значительными темпами, а транспортная система в зонах повышенного риска поддерживается неуверенно. В этой статье мы выделим некоторые из тех аспектов, которые связаны с идеей беспилотных транспортных средств, и проведём обзор некоторых исследований структуры туманных вычислений для беспилотных транспортных средств.

Ключевые слова: туманные вычисления, Транспортная система Бангладеш, беспилотный автомобиль, Бангладеш

Challenges and Opportunities for Using Self-Driving Vehicles in Bangladesh

Zubair Ahmed

Russian University of Transport (MIIT)

PhD Student

Scientific adviser:

Safonova Irina Evgenievna

Doctor of Science, Associate Professr

Abstract

The idea of self-driving vehicles has been well-received in various countries, including Japan, China, South Korea, America, and most European countries. Extensive researches are underway in these countries. Recently discussions and research on this subject are also starting in underdeveloped and developing

countries but at a lower rate. Bangladesh is no exception. The idea of self-driving vehicles is being discussed seriously in Bangladesh because the numbers of road accidents are increased at a significant rate every year, and the transportation system in high-risk areas has been maintained with uncertainty. In this article, we will highlight some of those aspects related to the idea of self-driving vehicles. And some existing studies of the Fog computing framework for autonomous vehicles.

Keywords: fog computing; Bangladesh transport system; self-driving vehicle; Bangladesh;

Introduction

In several years, self-driving vehicles may have added to public transport in countries with low population and an increasing number of older people. Hence the need for self-driving vehicles in Bangladesh is insignificant. However, there is no denying for self-driving vehicles for disaster management and transportation to high-risk areas. Considering the geological aspect, Bangladesh has to deal with disasters like floods, tidal surges, storms, thunderstorms, and heavy rains every year. In many cases, the use of self-driving vehicles is necessary to reduce the number of casualties, as well as to continue the distribution of relief and transportation of goods.

Goal

Self-driving vehicles will shuttle passengers to a safe destination at the best possible speed, communicating with all of the cars around it to maximize the volume of the road network [1] and to reduce the risk of road accidents.

Unmanned Systems Technology (UST) is the software and hardware systems that operate semi and fully-autonomous vehicles [2].

The UST used in an autonomous vehicle determines its capabilities and reliability, especially those possible without human input or correction, which is the definition of autonomy. More advanced UST can drive more complex systems with a greater level of autonomy. [2]

The types of technology used in unmanned systems include:

- sensors;
- machine vision;
- object recognition;
- facial recognition;
- mechatronics;
- artificial intelligence (AI).

While the technologies can be used for many purposes and types of vehicles, there has been a focus on the development of military drones, also known as unmanned air vehicles (UAV). Along with drones, other types of unmanned vehicle systems include unmanned ground vehicles (UGV) and unmanned water vehicles, including both surface and undersea craft [2].

Using fog computing

New distributed modern processing architectures such as fog computing can improve latency, scalability, and efficiency to meet time constraints by collecting, processing, and storing data at different tiers. [3] For example a study of an existing fog computing framework relies on overhead views from cameras and data streams from vehicle sensors to create a network of distributed digital twins [6], called an edge twin, on fog machines, enhanced our idea of using fog computing framework for autonomous driving assist.

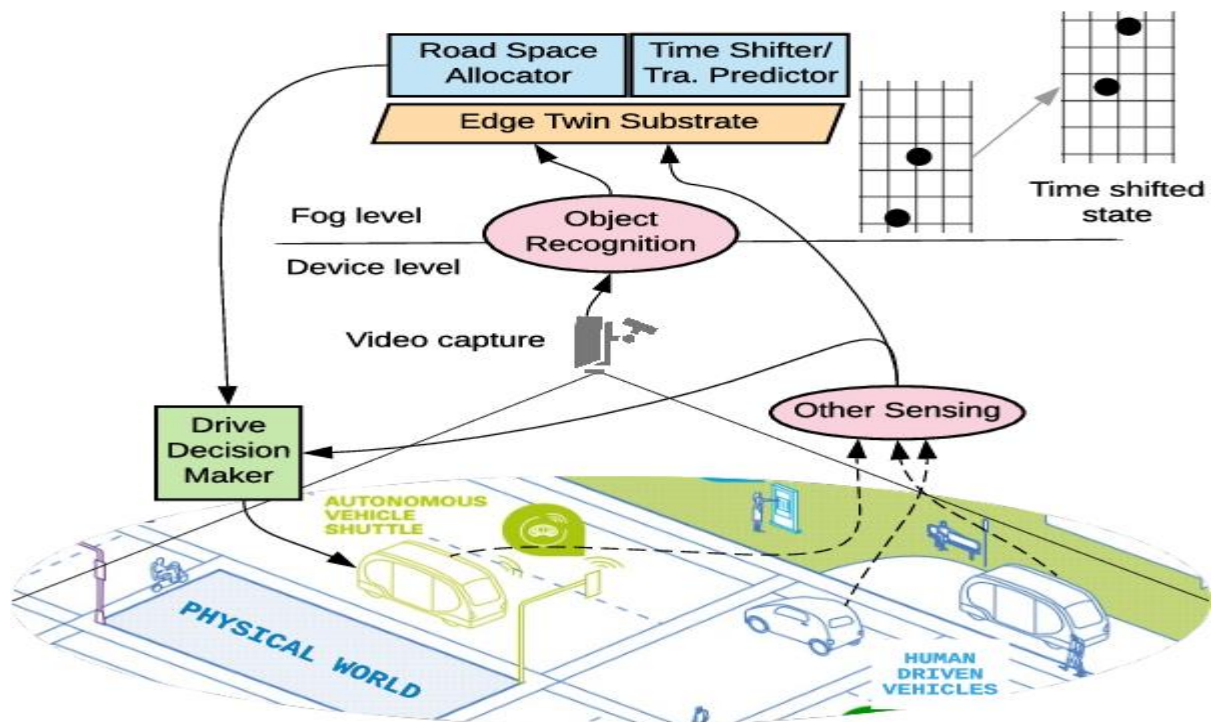


Figure 1 - A Fog Computing Framework for Autonomous Driving Assist [4]

For preventing road accidents

A total of 4,092 road accidents occurred in Bangladesh in 2020. It killed 4,989 people. Besides, 5,065 people were injured in these accidents. Of all serious motor vehicle crashes, 94 percent are due to human error or choices. Fully automated vehicles that can see more and act faster than human drivers could greatly reduce errors, the resulting crashes, and their toll [5].

Self-driving vehicles for disaster management

Vehicles that are not needed to deliver people to safety can instead position themselves to best survive the storm, flood and other natural disasters. [1] After the storm, for relief management in highly risked areas, the idea of self-driving vehicles can be an alternative to reduce casualties. Bangladesh suffers from floods, cyclones, storm surge, river bank erosion, earthquake, drought, salinity intrusion, fire and tsunami. Cyclones and floods particularly caused massive damages. [6] For this reason, in dealing with the natural disasters of Bangladesh self-driving vehicles can play a positive role.

However, there are some challenges:

- The amount of information exchange between vehicles and a station or an individual is limited to long distances;

- Low throughput;
- Limited processing options;
- Energy restrictions, etc. [3].

Some common problems include:

- Increased cost;
- Computer malfunction;
- Lack of human emotions when using self-driving vehicles in emergency;
- Technological limitations;
- Fear of rising unemployment;
- Unqualified specialists.

Conclusion

Undoubtedly, self-driving vehicles can bring significant benefit to the transport system in Bangladesh. However, due to overpopulation and technical constraints, more research is needed to make the concept of self-driving vehicles a reality. It is to be possible through the coordination of the private and public levels.

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