A Proposed surveillance model in an Intelligent Transportation System (ITS)

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Abstract ----- Progress in the complexity of large cities, highly complex systems, and intelligence science, in particular, smart city technology, has shown great ability in helping to reduce traffic congestion in developing cities. All ideas from the development of intelligent transportation to a town that wants to build and want to change into a smart city, especially in the field of ACP (system created, computing developed), based on parallel management and control system (PTMS). PTMS is considered to be enlarged to a new generation of an intelligent transportation system, and its essential component of architecture then make the hardware and software that will support a new architecture in a developing city to a smart city. The case in a lift is a communication system on a car that uses peer to peer networks and smart cards, with a communication system in a vehicle is expected to control congestion in a developing city through an original town with a connected system. This paper proposed four aspects of surveillance such as Traffic surveillance, vehicle Surveillance, passenger surveillance and driver surveillance. The combination of these surveillances will create best applied Intelligent Transportation Systems (ITS) or can be called as Smart Transportation Systems(STS).

Keywords - ***smart transportation systems; parallel transport management and control systems (PTMS); Intelligent Transportation Systems.***

I. INTRODUCTION

Cities in Indonesia has been recognized as a crowded city, particularly Jakarta as a capital city which is having traffic jump on a daily basis, where at the end will create chaos, air pollution, congestion, waste of fuel, wasting time and so on. Technology can be used to overcome the daily basis traffic jump, where the concept of intelligent can be applied. Using Smart integration payment can be as one another solution where the government makes a fintech technology where passenger pay for riding transportation cashless and get cash back from the payment they did[17]. Artificial Intelligent (AI) technology such as data mining technology such as Attribute Oriented Induction High Emerging Pattern (AOI-HEP) [28,29,30,31,32,33,34,35], Attribute Oriented Induction (AOI) [18,19,20,21,22,23,24, 25], or Emerging Pattern (EP) [26,27] can be used.

In today's global era of rapid progress, a highly developed economy and many social problems that occur in the field, the development of a developing city brings its challenge for a city leader. A smart city is an elegant city and all connected to a network that vast, lively city in the allotment for a very modern big city. [8]. In a developing city transportation system plays a significant role, the smart transportation system is the most important thing, the government continues to develop a very sophisticated transportation system because it is expected significant problems that congestion can be solved and with smart transportation is one of the mirrors from a developed city. [8].

Transportation is an essential thing for a city, not just about moving from one place to another, but many important things that can be done with a smart transportation system, with intelligent transportation and all connected can change the character of an early city his private vehicle users become users of public transportation. [10]. The paper discussed car to car communication using peer to peer and smart card networking, and they proposed an application which supports the mobile app [2].

II. CURRENT APPROACHES IN INTELLIGENT TRANSPORTATION SYSTEMS (ITS)

There are many approaches to the Smart Transport System (STS) or recognized as Intelligent Transportation System (ITS) at this time, and there are several approaches used in several developing cities and some of them such as Artificial systems, Computing experience, and parallel execution (ACP) and Artificial Transportation Systems (ATS), in this section the author discusses the two methods.

1. ACP approach

The initial goal of the artificial system, computational experiment, and parallel execution (ACP) approach is the modeling, analysis, and method that can be controlled. The strategy has three stages such as, Artificial society in use in modeling and representation, Computational experiments in analysis and evaluation, Artificial and original systems are

the basis of control and management [3]. The method used in the artificial system, computational experiment, and parallel execution (ACP) approach has two essential basics [3] such as *Inseparability* and *Unpredictability* [3]. Artificial system, computational analysis, and parallel execution (ACP) approach proposed by Prof Wang to solve the problems of a transportation management system are to connect the original system with the artificial system, within connection with the artificial system of inspection can be done quickly. [8].

2. ATS approach

The artificial system, computational experiment, and parallel execution (ACP) approach was the foundation of artificial transportation systems (ATS) from 1990 to early 2000 whose early emergence from the lack of extensive data. In the artificial system, computational experiment, and parallel execution (ACP) approach in artificial transportation systems (ATS) provides the fastest way, but there are two primary data provided [3] such as *Objective* and *Scope*. [3].

III. ARCHITECTURES IN ITS SYSTEM

There are several architectures in Intelligent Transportation System (ITS), which is used in this paper there are three architectures that are used, which structure supports the Intelligent Transportation System (ITS) use.

1. PtMS:

The PTMS includes both the original system and the artificial system. There are four modules in the unique system [7] such as *Video Detection and Analysis Platform, Field Data Management System, Taxi Monitoring and Guidance System and Official Traffic Website [7]*.

The development of the new architecture of Intelligent Transportation System (ITS), which utilizes the development of technology from IoT and cloud system which is the basis of transportation system, transportation system that directly related to human activities must be very useful because it has social component in development of research and development of smart city system. [8]. The computational system is one of the most effective tool systems for studying very complicated system, from method to a network, both regarding analysis and result of the instant system, from some of the proposed systems has raised some suitable ideas in some cases [8].

2. OTST

For a traffic operator and a lot of administrators are OTST (Operator Transportation Training System), OTST (Operator Transportation Training System) that makes the system realistic and highly useful in emergency handling, with various modeling testers and evaluations applied against the reliability of traffic operations [11].

3. DYNACAS

DynaCAS is a system designed for integrated transportation, a policy recommended for a system that adequately supports the use of Advanced Tourist Information Systems (ATIS) and Advanced Traffic Management Systems (ATMS) at the Traffic Management Center (TMC), the Chinese Academy of Sciences and Shandong Academy of Sciences are developing it [6].

IV. HARDWARE AND SOFTWARE IN ITS SYSTEM

A lot of hardware and software are used in Intelligent Transportation System (ITS), with the latest hardware and software, it is hoped that it can help problems that occur in a developing city, there are also hardware and software.

1. Transworld

   The urban transport system is the most demanding system to understand with its particular social component and system engineering, an ideal case for various cases to see if the artificial system, computational experiment, and parallel execution (ACP) approach is well used in the case. For this purpose, then we need to establish a variety of artificial transportation systems (ATS) need to be set to model and analyze the problems occurring in the example field is the traffic system. Another purpose and aim of artificial transportation systems (ATS) are to study transportation knowledge, a case study that we can do a lot of good transport in a smart city [11].

2. iTOP

   In a traffic management lot of platforms, one of its platforms is ITOP, PTMS, ATS, OTst, DynaCAS, Adapts, from all the most existing iTOP platforms that provide the function, there are five fungi that have iTOP that is [3] such as *Traffic data collection, Traffic information processing, Traffic analysis and evaluation, Traffic information services, Traffic-control operations* [3].

3. PtMS

   There are 6 Intelligent Transportation Systems categories in PtMS [4] such as *Advanced Traffic Management Systems (ATMS), Advanced Travellers Information Systems (ATIS) , Commercial Vehicles Operation (CVO), Advanced Public Transportations Systems (APTS), Advanced Vehicles Control Systems (AVCS)* and *Advanced Rural Transports Systems (ARTS)* [4].

V. CATEGORIES OF ITS SYSTEM.

There are two types of categories used in this paper, let's discuss them one by one.

1. Vision-driven Intelligent Transportation System (ITS)

   One of the most commonly heard problems in a big city or a developing city is the congestion, and almost all of these bottlenecks are very difficult to find in solving problems, to decrease the congestion level of many strategies in use. One of them is the intelligent transportation system (ITS) with the development of this system; this system is expected to make solving the problem of congestion in urban areas, with intelligent transportation system (ITS) also can improve the level

of travel security. [12]. There are six fundamental components in the intelligent transportation system (ITS) [5] the six elements are advanced transportation management systems, advanced traveler information systems, advanced vehicle control systems, business vehicle management, advanced public transportation systems, and advanced urban transportation systems [5].

2. Data-driven intelligent transportation system (ITS)
   D2ITS have their component; The previous section discussed the technology side of the development [5] such as *Learning Issues, Cost Issues and Multimodal Evaluation Criteria* [5].

VI. Proposed Model of Surveillance in Intelligent Transportation Systems

There are a four surveillance in an Intelligent Transportation System (ITS) (see figure 1) :

1. Traffic Surveillance.

   In developing countries Traffic control system (TSS) is a highly needed system in every corner of the city, proper supervision will make developing towns will become developed cities because traffic control system (TSS) has been developed. Traffic control system (TSS)) is beneficial to the city in planning the development of the city and overcome the congestion that becomes a very complex problem in a developing town or a developed city.

2. Vehicle Surveillance.

   With increasingly sophisticated system, traffic control system more comfortable and with the progress of technology increasingly able to control traffic, the development of computer vision is increasingly sophisticated is beneficial system traffic is very complicated. Supervision is almost in use for the last 30 years is the video sensor, and video system has become part that can not be released from intelligent transportation system, with this method may want to know about traffic system which suitable in use in a city. Therefore many research in flower in a developing town by using system video on the side of traffic control.

3. Passenger Surveillance.

   The system is intended for passengers in the car or motorcycle for the safety and comfort of the passengers, with this system in the hope of the passenger's first safety, with good drivers will deliver passengers to the destination well, passenger control system will bring passengers not just survived but also supervised by the system. [16].

4. Driver Surveillance.

   This system is designed to provide comfort and safety to the users of the road, with the behavior of various drivers, a lot of research that examines the mechanism of vehicle diagnosis. To optimize the system running, with the integration of this system is expected to reduce the mistakes of drivers, and this system can help up to the condition of the driver's vehicle [15].

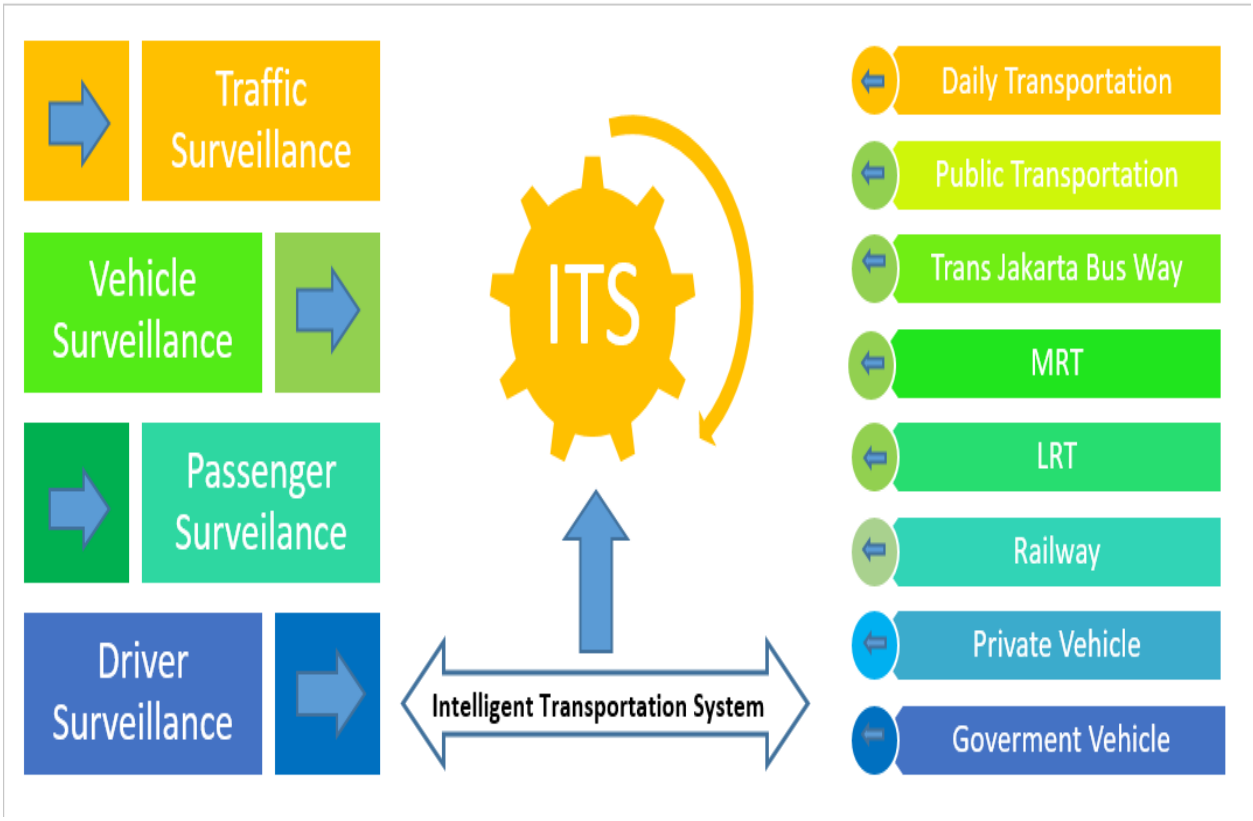

Fig. 1. Intelligent Transportation System (ITS) Surveillance

Where there are eight models of supervision applicable across all transport models, the eight models are in the vehicle : (see figure 1).

1. Daily Transportation.
2. Public Transportation.
3. Trans Jakarta Bus Way.
4. MRT.
5. LRT.
6. Railway.
7. Private Vihecle.
8. Government Vihecle.

The eight transport systems play an essential role in developing cities for evacuation of large-scale activities. However, there are many challenges in the modeling and analysis of policies that will be built, because they are too large and too complicated to model. In this paper, we have discussed the development of Intelligent Transportation System (ITS), including the results, architecture, hardware and software and Intelligent Transportation System (ITS) category and resulted in several research results.

1. smart system for all cars.

2. the price of his system is low

3. multiple tools and easy to get.

4. with this system is expected all vehicles can be connected and can be monitored by related parties.

Next research may be more in-depth about the application of software and implementation of his hardware in his real car directly because Intelligent Transportation System (ITS) its scope is broad and can develop in any direction.

VII. CONCLUSION

The implementation of traffic surveillance, vehicle surveillance, passenger surveillance, and driver surveillance has proposed the idea to create orderly transportation where there is no congestion, air pollution, waste of fuel and wasting time. Traffic surveillance is used to maintain orderly traffic, where each vehicle will be monitored with installed Internet Protocol (IP) address as vehicle identification and when the car breaks the traffic law, then the ticket will send automatically to their address.

Vehicle surveillance is implemented as a complement of traffic surveillance, where the same like traffic surveillance where the vehicle is attached with IP address, can talk between the cars. It is straightforward for the government to control the car by non physically, where the government can be easy to control which one debt vehicle which late to pay their vehicle tax, which one vehicle with many records is breaking a traffic law, which one stolen vehicle and so on.

Moreover, Passenger surveillance is another compliment to make excellent Intelligent Transportation Systems (ITS) where national identity can be used as a smart card to access public transportation in a cashless way. The passenger will be comfortable to obtain the transportation cashless and the more they are riding public transportation, the more they will get cash back which can be spending in a system which appointed by the government.

Last but not least, driver surveillance no less relevant, where each driver should be recorded when they were trained, when they do their duties, their discipline things, how many breaking traffic laws they did. Having driver surveillance is one the most important thing to make Intelligent Transportation Systems (ITS) where the excellent transportation system will nothing when having an unsuitable vehicle operator such as driver and so on.

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