An enhanced framework for multimedia data: Green transmission and portrayal for smart traffic system☆

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ABSTRACT

The object tracking in video surveillance for intelligent traffic handling in smart cities requires an enormous amount of data called big data to be transmitted over the network using the Internet of Things. Manual monitoring and surveillance are impossible because traditional computer vision technologies are no more useful for massive processing and intelligent decision making. In this paper, a framework is proposed which enables both on spot data processing and intelligent decision making by using cloud computing. The developed application is a trained on Artificial Neural Network, which can handle different traffic techniques with congested traffic scenario and priorities traffic such as ambulance handling. The Message Queue Telemetry Transport protocol is used for green transmission with mobile access to traffic data. The results analyzed with thirty videos processed data which handle real-time data prioritization for the people for smart surveillance to fastest route and enhance the intelligent data transmission.

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1. Introduction

Internet of things was firstly used by Kevin Ashton in 1999 for supply chain management, but in past decades this term also covers other applications like healthcare, transport and everything of our daily life. The definition of 'things' has changed with the evolution of technology, but the goal of making such computer which sense information without interaction of humans remains same. Evolution of internet into a massive network of interconnected 'things' that extract information from the atmosphere and interact with the world, but it also provides services by using existing Internet standards for data transmission, analysis, and ease of life. It has stepped forward for transferring the current internet into a future Internet of interconnected objects. The revolution of the web has led to a wide-scale of connection among people. Next revolution will be a connection between objects to create a smart internet. Currently, have 10 billion devices connected to the internet, and expecting 14 billion more by 2020. Mobile operators can generate approximately $1.5 trillion revenue from health, automotive, utilities, and electronics [1].

Making cities 'Smart' is a concept of tackling the problem of the big cities caused by urbanization. It includes the problems of health, wastage of energy causing a shortage of energy, Communication among peoples. For the first time, this term was used in the 1990s. At that point importance of modern Information and Communication Technologies (ICT) for upgraded infrastructure, the focus was on the significance of new ICT with regards to modern infrastructures within cities [2]. For the first time, The California Institute focused on how Communities could become smart and how a region could be designed to implement Information Technology (IT). Now Researchers are stepping ahead of standardizing this term. In marketing language "smartness" is more easy, user-friendly and attractive word concerning a more limited to having quick response word 'Intelligent'. Smartness is an adaption of an intelligent system according to user need. According to International Business Machines (IBM) corporation, the definition of the smart city includes three words instrumented, interconnected and intelligent [3]. Instrumented is referred as, equipped as with sensors, meters, and devices that collect data. Interconnected is used to refer to the integration of that data with computing grid which also allows sharing of that data into other city services. Moreover, intelligence is the use of complex and sophisticated algorithms that lead to better operational decisions.

Cloud Computing is a service where a user can gain access to computing, software, or infrastructure as needed without any human interaction [4]. Moreover, this all happens within no time automatically through the server and as needed. In general, the user does not know how and where its data is being stored, or computing is happening. At the remarkably higher level of abstraction, a user can only specify the state, at more abstraction level the province at maximum level the data center, but no further abstraction is allowed. This service is available anywhere on any device; it can be thick computing or thin computing device using the internet. The resources can be automatically allocated and relocated with demand. The request for any resource can be entertained at any time automatically. It also has the best metering system with not only meters each account separately but also every resource separately as computing, storage, and infrastructure.

As technology is evolving day by day number of vehicles are also increasing, so it is causing traffic jams, which can lead to more disaster and wastage of resources. People in a traffic jam can become hyper. It can cause less use of resources. This situation can also result in something fatal. Like an Ambulance can be in a traffic jam which can cause the death of the patient. Another problem happens when the traffic meets traffic to cross. Traffic cameras are used for this purpose, but they are intelligent. It gives equal time to always but in most scenarios [5]. Traffic is not same on all sides, and if traffic at some side is more than other sides, it causes more delay on that side. They get the same time but have more traffic. Sometimes at specific roads have no traffic, but that signal turn is given same timing as in heavy traffic congestion. So that time is also wasted resources. Also, if Priority traffic wants to pass there is no way, only if there is a traffic warden who will stop other sides and give way to that vehicle. Increasing number of traffic vehicles with different priorities are a significant issue for modern cities. It is, therefore, required an Internet of Things (IoT) base Intelligent Traffic Management framework for smart cities. This Problem will be resolved by using computer vision over cloud along with the help of IoT Protocols for smart cities. Currently, smart cities Frameworks are using the sensor based network to get data and control city assets [6]. However, Data provided by the sensor are not too much and no so accurate that we can take some serious steps on behalf of that data. Also, Sensors can be easily overridden to bypass and Produce False-Positive Results. Message Queue Telemetry Transport (MQTT) is an energy efficient protocol used between IoT devices for transfer of data. It has an efficiency level of higher than all other protocols. It has its Quality of Service (QoS) protocol which allows it to transmit data at maximum level.

The rest of the article is organized in such a way that next section describes the literature review about the topic. The third section comprises of proposed solution which is discussed in detail. The fourth section is composed of result and discussion about the proposed solution presented. Before the references section, the conclusion is presented in the paper.

2. Literature review

Smart City is a hot area of research in the current era. It has acquired the popularity and attraction of government, business, and academia. A smart city is monitored and composed of ubiquitous computing devices. The smart city governance is derived from the entrepreneurship, creativity, and innovation which endorsed by intelligent people [7,8]. Bulkeley in his paper focuses at the IoT in urban cities specifically. The urban IoT systems can be categorized by the special properties of the special application domain. Smart cities aim to utilize the most advanced technologies for the values added service support. IoT infrastructure for Smart Cities is shown in Fig. 1. Smart cities vision with urban IoT used by the administration for the management of services in the cities for the betterment of the citizens [9].

Especially for the elderly and aged people using a wheelchair with the navigational system [11], Jin in 2014 presented a survey for the utilization of protocols, technologies, and architecture for the Smart City and urban IoT [12]. These days unmanned are top priority and field of high research. In this scenario, the big deal is crashing of such drones without any notification. This can cause a huge a severe issue for us. Like a person in the field can be wounded by a drone used for surveillance of agriculture.

A drone can fall on disastrous area surveillance that area. Moreover, increase that disaster. For this raspberry can be used to pre-measure such scenarios that the drone can be landed in time to avoid such scenario [13].

There are significant advancements in the field of technologies associated with IoT solution in real life problems. The use of experimental facilities is considered a key enabler to facilitate the design and evaluation of novel IoT systems that work more reliably under realistic operational conditions and for their evaluation. Plethoras of testbeds have emerged in the past decade. Many of these are lab-based testbed which suffers from various shortcomings such as realism of experimentation