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Route History Based on Speed Limit Camera Monitoring/Tracking System

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ABSTRACT

The number of injuries is increasing on a regular basis, as are concerns about driver and passenger safety. Countries that have minimized road traffic risk effectively have adopted a "systems approach" to road safety. The issue of road safety is centered on speed. There is a clear connection between speed and the number of accidents as well as the seriousness of the crash's consequences. This framework proposes a speed limit camera monitoring/tracking system that uses the Global Positioning System (GPS) and cloud computing with the Software-as-a-Service (SaaS) module to provide valuable information about roads in order to improve safety. It also alerts the driver about signs, breaks, and which roads it connects to in the future.

Key words : GPS, Software-as-a-Service (SaaS), Cloud computing.

1 .INTRODUCTION

The Cloud computing is a newer technology that includes a scheduling mechanism as a key component, allowing for the processing of large amounts of data [1].Cloud computing is a new technology that has the potential to transform traditional IT systems. It is extremely important in today's technological world. Every day, people use cloud computing in some form or another [2].Cloud computing and storage systems provide individuals and businesses the ability to store and process data in third-party data centres. To achieve network coherence and economies of scale, it is essential to share resources. Cloud computing has become popular due to benefits such as low service costs, high-performance computing power, scalability, usability, and availability [7].Speed limit compliance is a traffic police initiative to increase driving safety by enforcing speed limits and deterring drivers from violating them by fining those who do. Roadside speed traps set up and run by the police department, as well as automated roadside ‘speed camera' devices, are among the instruments, procedures, and approaches used. As long as the speed issue is not solved structurally by road design, engineering steps, or vehicle technology, speed enforcement will remain an important speed regulation tool. In this article, a speed enforcement camera monitoring/tracking system has been introduced using cloud computing by combining the (SaaS) model with (GPS) to provide the driver with a street guide, thus improving speed limit enforcement and preventing further accidents.

2. RELATED WORK

[1] Z. N. Rashid, “Distributed Cloud Computing and Distributed Parallel Computing: A Review,” 2018 Int. Conf. Adv. Sci. Eng., pp. 167–172, 2018. In this paper, we provide a panel discussion on distributed parallel processing and distributed cloud computing, two of the hottest topics in this field. Several components of this review study have been investigated, including whether or not these topics have been treated concurrently in previous studies. This study also discussed the techniques, which were simulated in both distributed parallel computing and distributed cloud

computing. The goal is to spread jobs among resources and then rebalance calculations between servers for maximum efficiency. These help us achieve the device output rates we want.. During our research, we revealed some of our findings. During our research, we presented several papers that explained how to construct distributed cloud computing apps, while others introduced the concept of minimizing reaction time in distributed parallel computing. [2] S. Md Aminur Islam, Faisal Bin AbulKasem and F. Ahmed, "Cloud Computing in Education: Potentials and Challenges for Bangladesh C LOUD C OMPUTING I N E DUCATION : P OTENTIALS A ND," IJCSEA, vol. 7, no. 5, pp. 10–21, 2017. Cloud computing is a notion that is still in its infancy. It's a young technology with the potential to upend traditional IT infrastructure. It is critical in today's technology environment. It is used on a daily basis in some form or another by many people. This trend is not exclusive to the education sector. By exchanging information technology-related materials in the cloud, educational institutions will be able to better focus on delivering crucial instruments to students, teachers, faculty, and staff. Bangladesh is a developing country in the process of becoming more developed. As a result, Bangladesh faces a tremendous problem in deploying this technology in the education sector. In this essay, we'll look at how Ban

.3. PROPOSED SYSTEM

- The proposed system is organized with two sides (clients (frontend) and server (backend)).
- The frontend-side consists of a mobile application that is hosted with GPS built-in on Android and iOS devices, while the backend-side consists of one host that is the hosting server where the backend component resides to manage requests and routings (Streets and traffic camera details are stored in a cloud server that is maintained in cloud structure).
- Multiple cloud components collaborate with each other through a loose coupling mechanism such as a messaging queue in the device cloud architecture of software systems involved in the delivery of cloud computing.
- Traffic-camera Monitor Services: inform the user of his or her driving speed, location, and other details. A cloud server is a virtualized compute server that can be accessed via the Internet by an administrator. All streets and traffic cameras' locations (Latitude, Longitude), street allowed speed, and other information can be found in the speed camera database.
- Model of the System (Client and Server) the term "client" in the proposed framework applies to GPS-enabled Android and iOS devices such as smart phones, laptops, and other mobile devices. The "cloud server," on the other hand, is a web server that stores a database for speed limit camera positions, processes request queries, and sends data to a client at a remote location. The client employs GPS to determine the location of the climax. The client uses GPS to determine its location and plot it on a map, as well as query the cloud server for the closest speed camera location. Additionally, storing street details in terms of speed breakers, signals, road markers, next road details

4. SYSTEM ARCHITECTURE

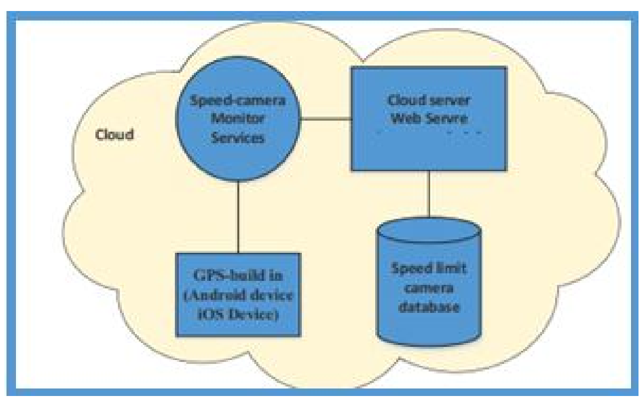

Figure 1: System Architecture

5. METHODOLOGY

- The system consists of two Modules:

• Server: Server provides the database storage for speed limit camera locations and process request query and sends data to the client at the remote location.

• Client: Refers to GPS building Android and iOS devices like smart phones, tab etc.

❖ **Pre-processing:** A mobile camera with pixels was used to capture the video. The video has been translated into frames during pre-processing. Various parameters are extracted, including the number of frames, frame rate, color format, and frame size. ROI Extraction was performed on the background image. In this project, vehicles approaching the camera are tracked, and only one lane of the road is called ROI.

❖ **Moving Vehicle Detection:** The ROI was extracted from the context model. Detecting a moving vehicle from video is a difficult challenge. There are many methods for detecting moving objects, including the temporal differencing method, the optical flow algorithm, and the background subtraction algorithm. Just two adjacent frames are used in the temporal differencing process to obtain the background image.

❖ **Optical flow algorithm:** Detects an entity using camera motion on its own. The optical flow algorithm is computationally difficult and unsuitable for real-time use. To detect moving objects, background subtraction uses the absolute difference between the background model and each instantaneous picture. An picture with no moving objects is called a background model.The context subtraction algorithm is used to detect moving vehicles in this study. Context Extraction, Thresholding, and Morphological Operations are the three phases of the background subtraction algorithm.

❖ **Background Extraction:** Context extraction is at the core of Background Subtraction. It's difficult to get a picture without a moving car when filming video on the highway. Background extraction is used to obtain such an image, also known as a background or background model. The extracted ROI is then multiplied by each frame. RGB frames are translated to Gray level before being multiplied. Other movement, such as waving leaves, or any other unnecessary movement, is avoided as a result of this identification. It is necessary to do so in order to achieve accuracy in vehicle detection. Only moving vehicles were detected by multiplying the absolute difference of each instantaneous frame and background model with the extracted ROI.

❖ **Thresholding:** Picture segmentation can be done in a number of ways, one of which is thresholding. It transforms a grayscale image into a binary image.

❖ In thresholding, the threshold value must be carefully chosen. Thresholding is used to distinguish the foreground vehicle from the static backdrop.

❖ **Morphological Operations**: They're commonly used to eliminate noise from segmentation errors. Binary images are well-suited to morphological operations. As a result, they are applied to the thresholding output image.

6. IMPLEMENTATION

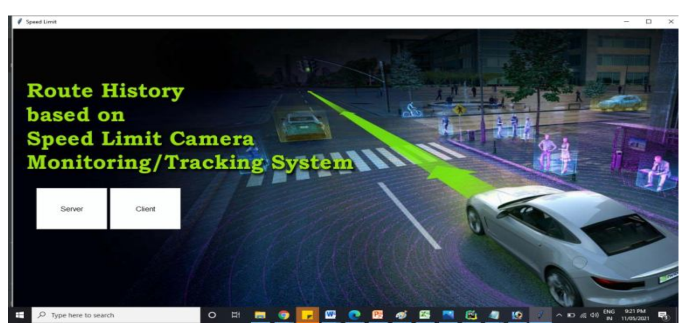

Figure 2: Home Screen

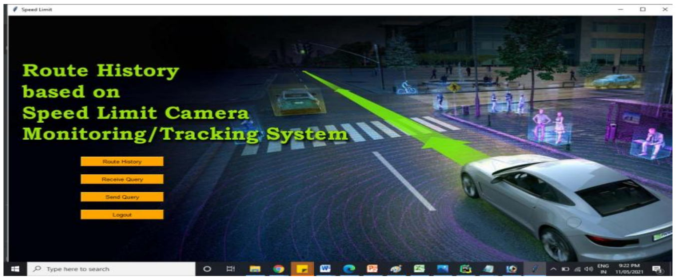

Figure 3: Admin Menu

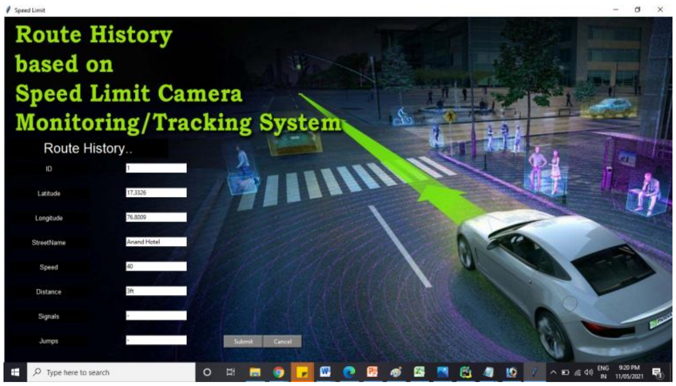

Figure 4: Route History

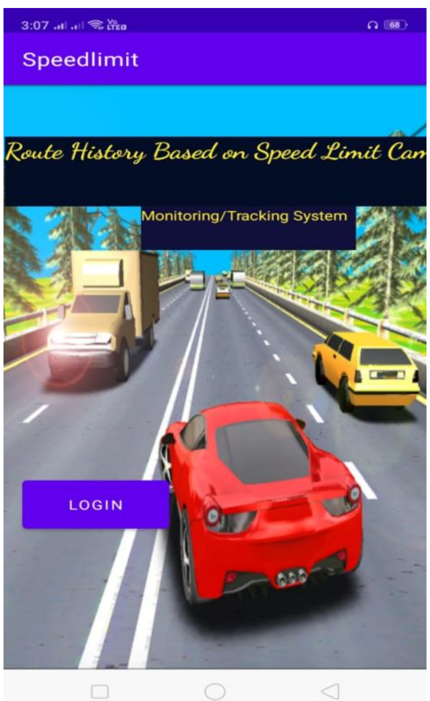

Figure 5: Main screen of client app

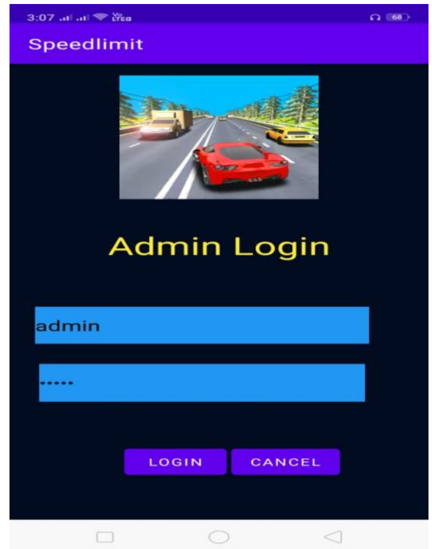

Figure 6: Client Login

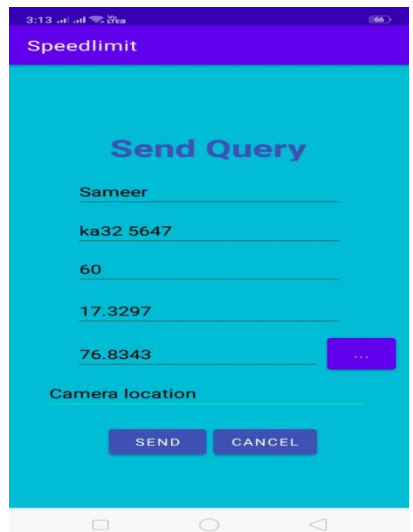

Figure 7: Send Query

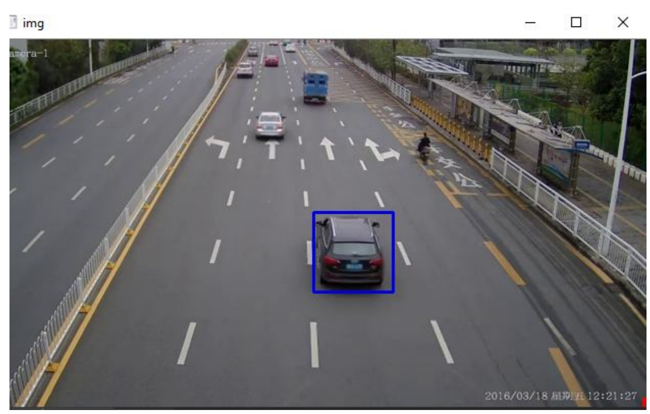

Figure 8: Vehicle Detection

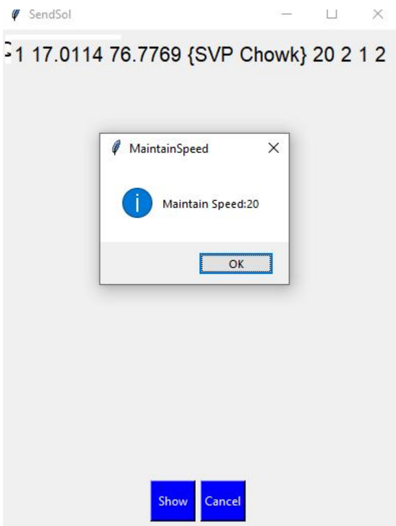

Figure 9: Send Query Solution

7. CONCLUSION

In this paper, a prototype model for a speed compliance camera monitoring/tracking system has been developed using the SaaS module as a cloud computing structure with GPS. The GPS built-in system is used to transport all of the data to the cloud server. There are a number of findings that have been marked: By the driver knowledge of speed limits, the proposed system reduces injuries. Providing vital information to the driver, such as driving speed, location, street speed, and the nearest camera, among other things. Providing tourists and visitors with information on traffic rules, road traffic signs, fines levied in the city, driving speed, and the location of the nearest camera, among other things. The proposed system has demonstrated its capacity and efficiency in quickly and easily connecting drivers with traffic laws through a mobile application.

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