

BIOINFORMATICS-BASED APPLICATION FOR REDUCING THE RISK OF THE COVID-19 USING FINGERPRINT AND FACE RECOGNITION

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ABSTRACT

In recent years, the use of Global Positioning System (GPS) smart device applications has become increasingly popular, which has emerged significantly during the spread of COVID-19 by reducing interaction and direct contact between humans. Such as tracking students, staff, and vehicles, monitoring soldiers and finding the exact location and distance, among the many software and applications for smart devices. The development of a new technology for a tracking system to monitor students who are training in universities is the goal of this proposal. Users' profiles will be activated by this system when logging in to the system from the site through fingerprint, eye, face recognition, or the traditional way through username and password. Here, the fingerprint is activated and recognized using the device of the fingerprint installed in most of the smart mobiles. Moreover, face recognition is also developed to activate the user. Before activation, the system must confirm the following information: International Mobile Device ID Card ID and Student Subscriber ID Card ID, and this verification will work by translating that information and ID to the server. When students' status becomes active, they can access and use the system to download and upload documents and communicate with their partner and supervisor. This proposed project also reduces the spread of COVID-19 by reducing interaction and direct contact between supervisors and their students, Machine learning and IoT is used.

Keyword: Smartphones, Global Positioning System, Location, Student, COVID-19

1. INTRODUCTION:

The follow-up of university graduates during the training period in the places of their training is considered one of the basic matters in universities, including Jordanian ones, but this follow-up by traditional methods has many negatives, which appeared more with the increase in the number of students in universities.

Among the disadvantages of following up on students in their university training are the financial cost, the need to travel in the car to reach some training places, the loss of time for the teacher, the difficulty of visiting all students, as they are large, and many more.

Modern technology can be used to overcome this problem by electronically tracking students at their training sites, which can be done through

smartphones and smart devices for students at the training site.

As a result of the spread of the Corona virus, it was suggested to use contactless technologies by students and teachers to access systems that allow the use of eye print and handprint, which were proposed in this work.

The use of modern technology, through which the user's location is determined using multiple techniques referred to in this proposal, including what depends on the cell phone card and the cell phone itself, which is linked to the coordinates of the student's training site itself, which was previously determined and added to the proposed system, which depends on the time of activation(Login) of the system and the time Exit the system used(Lgout), where in the end the total training hours for the student are calculated through the system after the

student has submitted the reports and duties required of him.

2. BACKGROUND STUDY

Recently mobile technology (Apps) is considered as the most significant common technology. Apps for smart devices, which are vastly used all over the world, have been created and developed. [1]. The popular operating system in smart devices is Android, and till now the number of Android smart devices users reach two billion [2].

Smartphones include many sensors, which are used to do many tasks in numerous areas. These sensors contain Wi-Fi, Bluetooth, near field communications (NFC), Global Positioning System (GPS) Wi-Fi, Bluetooth, etc... [3]. The main use of GPS is to restore location and to keep an eye on a person's locomotion in real-time [4].

Tracking systems are very crucial in the contemporary world. They are beneficial for patient, employee, scholar, student observation, and other diverse applications. Furthermore, they are essential for tracking a student's motion in a training site, reducing the supervisor and student time. Until now, no device gives these functions and procedures. Hence, the current observer proposes a tracking machine model together with GPS and GSM. A GSM modem, which comes with a SIM card, employs the same verbal exchange procedure as that determined in a normal phone [5]. The proposed system is not always limited to locating the place of the target; it may also sign up the login and log-out times, assemble a channel through the manager and the student, and upload reviews between the manager and student.

The aim of this research is to develop a new approach or method to enhance the employee monitoring in the institutions and to develop the privacy and security of institutions systems. To conduct the study and according to the lack of using mobile features to be complementary with GPS we determined the trainee students in Jordanian universities to be our case study in this research. These will help the institutions administrators to (i.e. President, deans, head of departments, instructors, and supervisors) in universities to solve the problem they faced. The departure points of technique for the tracking system to monitor the students who are training in universities have been studied in [4].

2.1 Smart Devices

Smart devices are a present-day manner of connection technology that may be used every time and anywhere. The evolution of mobile apps also used to extend the recognition of smartphones. Such apps assist the development of Smart devices specification and services and traits and are generally smooth to apply and free to download.

Smart devices are multi-functional mobile telephones and cellular systems, which are notably and significantly developed, have numerous services and specifications and are enhanced, linked, than traditional cellular telephones [6]. The most critical characteristic of smart devices is their capacity to enhance their capability among mobile software apps. [6]. Like desktops and laptops, smart devices have many cores and effective image processors. They include numerous sensor platforms, together with GPS, NFC, Wi-Fi, Bluetooth, and cell ability. They lately hold big amounts of private information: the social networks, inter-non-public communication, health care, banking, documents (cloud computing), and banking, health care inter-non-public communication [3].

2.2 GPS and 3G/4G (LTE)

Recently, many users browsed the internet to access information using smart devices and their applications anywhere they go via High-Speed Packet Access (HSPA) and Long-Term Evolution (LTE) networks [7]. Numerous scientists have notified on the choosing of LTE technology and its significance in supporting vehicular networking applications [8]. Kim et al. (2012) proved that 3G and 4G guidelines are reasonable in numerous vehicle speeds. In the interim, Trichias [9] showed the plausibility of utilizing an LTE standard for shrewdly transportation frameworks (ITS). His work comprises the execution assessment of LTE and relating it with the IEEE 802.11p standard (high-level comparison).

For GPS system mobile data, in [10] has illustrated the broad ubiquity of mobile phones and other versatile devices. With an assortment of on-board sensors, situating capabilities accomplished through GPS, and the plausibility of the network through Bluetooth, Wi-Fi Coordinate, and 3G/4G, these gadgets can give an appropriate stage for actualizing real-time following applications.

2.3 Tracking Systems and Models

Multi-object following is an imperative issue particularly within the space of worker or student following as well as sport-teams tracking. This problem arises considering the need to develop applications that help achieve the goals of the tracking process, Jingchen et al. [11] and Collins [12]. Several approaches have been proposed to solve the problem of partner tracking capabilities over time, counting the Hungarian algorithm [13], linear programming [14], cost-flow networks [15], higher-order motion models [12], maximum weight independent sets [16], and continuous-discrete optimization [17]. Meanwhile, Huang and Nevatia (2008) [13] Using ground field estimation and motion structure tracking (MST) solves the problem of tracing in crawling structured scenes, whereas Rodriguez et al. (2009) [18] used a Correlated Topic approach (CTM) for crowded, unstructured scenes.

Nowadays, many-object motion models are employed in pedestrian tracking to promptly verify the style by which individuals will regulate their routes to avoid collisions [19] or to appraise whether

a handful of routes are on interconnected motions [16].

Furthermore, the bioinformatics has been developed as an application in using the fingerprint. Many challenges have been discussed in in the literature. These challenges must be fused while the proposed application is developed.

The main objective of this project as follows:

The main objective of this proposal study is to design and develop a novel smart device/phone application to optimize the students' tracking in training courses, also to enhance the student privacy, and to increase the computerized systems security in the universities and prevent any outside attacks.

3. PROPOSED MODEL:

The Adopted System Architecture for Developing the New Tracking System Approach.

In this work, researchers have adopted a novel design for tracking systems to be used in tracking students, nurses, soldiers, physicians, etc... [20]. this system design as shown in Figure (1).

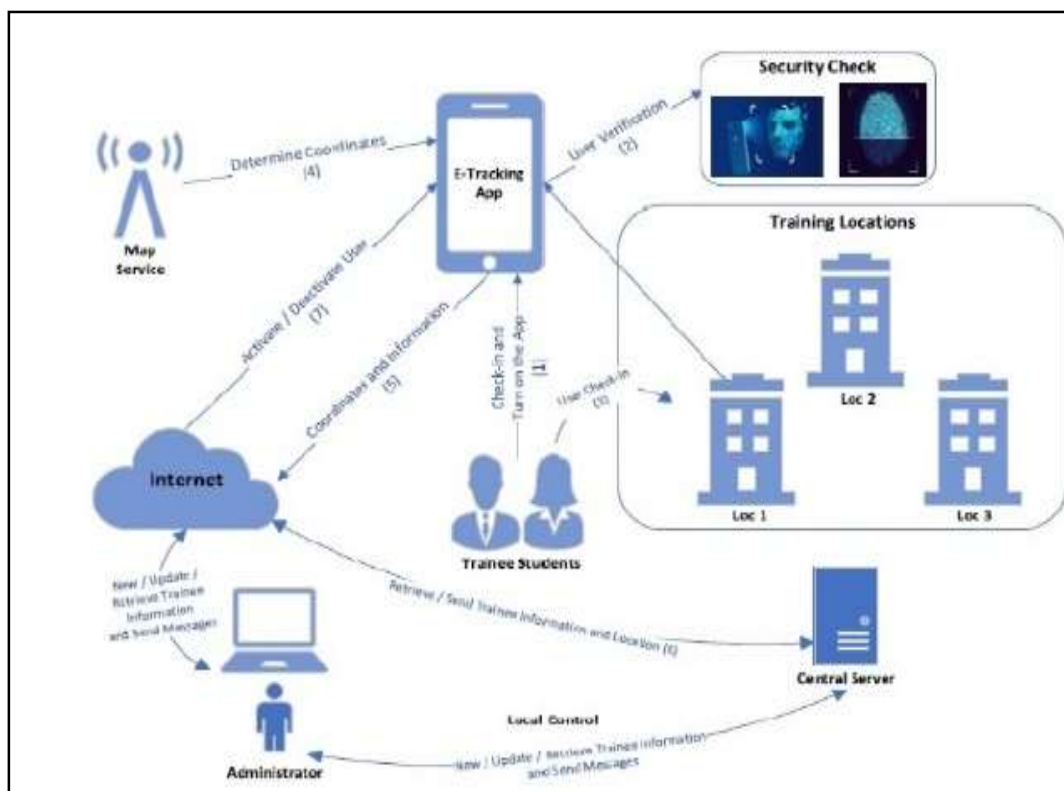


Figure 1: Student Tracking System Design [20]

This system design consists of three main modules: Smartphone/mobile shoppers, map service, and central server. The mobile shoppers accommodate Smartphones, mobile applications, and GPS. the primary aim of this proposed module is to ensure the scholar info by recovering Smartphone info, like International Mobile instrumentality Identity (IMEI), and therefore the Subscriber Identity Module (SIM) info mobile model and mobile model, like the serial variety and signal (number calling), through AN application designed for this purpose. The second goal is to recover the current coordinates of the scholar through a GPS receiver then save them within the database. Agent based is used in the map service, providing the chase system application with map information. GPS is used in this service to recover the students' current positions. Here, the Smartphone to the online application unendingly reinvigories location info. The central server consists of two parts: the online application and

therefore the info. The database is used as a storehouse that stores all students' info, like Smartphone info, students' documents, students' location, login time, messages, SIM info, coaching coordinates, and logout time.

Using the saved info about the students' position, the chase system sends all required information regarding the Smart device/phone, students' location, and SIM to the central server to validate the information. If this information is stored early, then the student will be active in the system and the login time will be saved. In addition, a student will have the approval to upload his or her documents and information to the system. Otherwise, the user remains disabled.

Figure (2) shows the knowledge flow within the students' chase system.

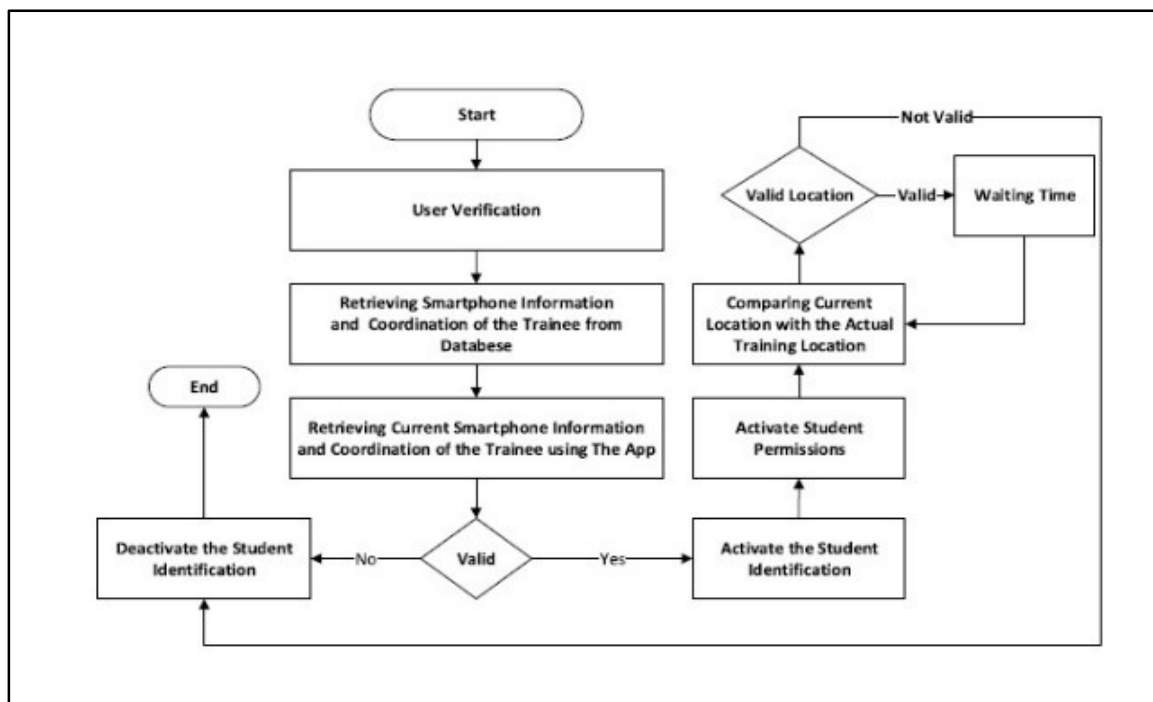


Figure 2: Flowchart of the Student Tracking System [20]

4. CONCLUSION:

The model of the tracking system proposed in this work Focuses on the Global Positioning System (GPS), GSM, smart phone applications, and web technology.

Helping developers to build a tracking system for trainees and others that has excellent features and supports contactless to reduce the negatives of previous systems and maximize the benefits for users and institutions.

The proposed goals are achieved by observing the students at the training site anywhere without the need for their physical visit, discussing their progress in training daily.

The proposed system contains student and teacher information and facilitates tracking the training process and obtaining reports from students by uploading them directly to the system and obtaining feedback from the teacher.

This system verifies mobile Information such as IMEI and SIM card ID. So, the other student cannot log into the system without using Student ID and authorized mobile device

5. FUTURE WORK:

Many researchers have studied tracking systems from different points of view. This study aims and proposes a new contactless(touchless) tracking system for students that uses phone and smart device technologies. The proposed technology contains many positives that must be focused on and improved, and which support distancing in cases such as the Corona pandemic.

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