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iGuard: mobile security guard system with infrared biosensor and google glass

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ABSTRACT

Nowadays, most security companies hire guards' team for different tasks to protect the company's assets. At least one guard should monitor the cameras or other systems. The goal of the proposed research in this paper is to add mobility to security guard by using Google Glass. The guard can do many tasks to control and keep the building safe from any damage. Accordingly, the guard doesn't have to stay in one place to monitor, and hence many security guards are required to cover all the building. The system would require supporting the building and the important rooms with the infrared sensor, light intensity sensor and camera, whilst supporting the guard with Google Glass. The sensory data will be dealt with through a sensor board that sends all the information to the main controller. The system has a look-up table that contains data, such as: temperature and light infrared readings; the sensors keep sending readings to the system. The system calculates the difference between the stored readings with the sent data. If the difference is greater than zero, then the alarm is sent to the guard and the image is displayed in the Google Glass to the guard

KEY WORDS: GOOGLE GLASS, INFRARED SENSORS, LIGHT INTENSITY SENSOR, MOBILE SECURITY

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INTRODUCTION

Securing work, institutional, business, tourism or military facilities is highly demanded. Current security management systems rely on hiring teams of security guards supported by a set of surveillance cameras and monitoring devices. These systems verify the visited points by security guards in the building/facility and report the deviation of security check plans. Meanwhile, these systems require at least one guard should monitor the cameras displays in a control room. In addition, the currently available mobile security guards systems, for example: Pancomp, monitors the security guards' performance not the facilities.The main problem is the shortage of security guards and the high level of effort required from them. Controlling the whole building requires many guard rounds within the building. The second problem is that the guard who monitors the cameras or the systems has to stay all the time in the room. For this, the proposed solution is to add mobility to guards. One guard can control and keep the building safe from any damage without having to stay in one place to monitor. Therefore, we need to use some tools such as Google Glass and Motion sensors, sounds, and heat as a mobile security tower. The proposed system is composed of multi-sensor boards and a main controller using Arduino technology. Each sensor board retrieves different forms of data such as the light intensity, sound waves and temperature for example in the offices, labs and servers room also in order to monitoring room then sends all the information to the main controller which sends the data to a web server and its database. Hence, when any of these data changes by unauthorized access or especially out of working hours, the security guard will receive this data change from the second part of the network which displays the information retrieved to the security guard. One of the most functionalities that the proposed system offers is to let the guards keep their mobility and give them the ability to move and monitor at the same time. What we aim for in mobile security tower is incorporation the Arduino technology and Google glass to enhance security devices these days, (Safavi & Shukur 2014 He et al. 2015).

RELATED WORK

A. Internet of Things Status Monitoring with Augmented Reality on Google Glass

It is a system that implements the augmented reality capabilities of Google Glass and connects them together with the idea of internet-able items across an environment (Atzori, Iera & Morabito 2010), the Internet of Things (Jiang, Liu & Yang 2004) (Safavi, Shukur & Razali 2013). This system gathers information from an environment, and stores it to be accessed either by the web or by scanning QR codes on a custom app on the Google Glass. On the Glass interface, it brings up a real-time info-graphic for the information related to the scanned QR code. It is mirrored by the web interface with the addition of more in-depth analysis of the data, (Ghemawat, Gobioff & Leung 2003 and Safavi & Shukur 2014).

B. Immune chromatographic Diagnostic Test Analysis Using Google Glass

Google Glass-based fast symptomatic test (RDT) peruser stage equipped for subjective and quantitative estimations of different parallel stream invulnerable chromatographic measures and comparative biomedical diagnostics tests. Utilizing a custom-composed Glass application and with no outside equipment connections, at least one RDTs named with Quick Response (QR) code identifiers are at the same time imaged utilizing the inherent camera of the Google Glass that depends on a sans hands and voice-controlled interface and carefully transmitted to a server for computerized. The procured JPEG pictures are consequently prepared to find all the RDTs and, for each RDT, to deliver a quantitative analytic outcome, which is come back to the Google Glass (i.e., the user) Also, put away on a focal server alongside the RDT picture, QR code, and other related data (e.g., statistic information). A similar server additionally gives a dynamic spatiotemporal guide and ongoing insights for transferred RDT come about open through Internet browsers, (Feng et al. 2014).

C. Texting while driving using Google Glass

Texting while driving is risky but common. This investigation assessed how messaging utilizing a Head-Mounted Display, Google Glass, impacts driving performance. Experienced drivers played out a great auto following errand while utilizing three distinct interfaces to content: completely manual cooperation with a head-down cell phone, vocal collaboration with a cell phone, and vocal association with Google Glass. Completely manual collaboration created more awful driving execution than both of the collaboration strategies, prompting more path journeys and variable vehicle control, and higher workload. Contrasted with messaging vocally with a cell phone, messaging utilizing Google Glass delivered less path trips, all the more braking reactions, and lower workload. All types of messaging disabled driving execution contrasted with undistracted driving. These outcomes suggest that the utilization of Google Glass for messaging impedes driving; however its Head-Mounted Display setup and discourse acknowledgment innovation might be more secure than messaging utilizing a cell phone, (He et al. 2015).

D. Google Glass in pediatric surgery: An exploratory study

The utilization of innovation to help restorative training is very much portrayed. We report another such case in which wearable innovation could be utilized to help the educating of systems without a lot of costly gear (eg, video headsets, transmission wiring and screens). The creators presumed that Google Glass would be a decent path for students to effectively procure intra-operative film for self-audit though the more lumbering GoPro would be utilized to store up a video library of basic operations. A current public statement from the University of California, Irvine (UCI) has recommended that Google Glass might be incorporated into its therapeutic showing courses for precisely such reasons, (Muensterer et al. 2014).

E. XBee Wireless Sensor Networks for Temperature Monitoring

XBee is an embedded wireless sensor network (WSN) prototype system for temperature monitoring in a building. This network is used for management of air conditioning systems at SIIT. The ultimate goal is to help saving the energy cost and reducing energy consumption. The system provides a web user interface for any user to access the current and past temperature readings in different rooms. The network consists of a data gateway or coordinator which wirelessly polls each WSN temperature-monitoring node located in each classroom. Each WSN node consists of a microcontroller on Arduino board and an Xbee wireless communication module based on the IEEE 802.15.4/ Zigbee standards. The coordinator also has an Ethernet interface and runs a simple data web server. Hence, the coordinator allows data collection over Xbee and data access from web browsers, (Greenwald 2013).

MATERIAL AND METHODS

System Architecture: The proposed system design focuses on commonly known design pattern for security of the mobile connection providing the maximum availability of the services that the system provides: reliability, fast response, availability of secure connection, usability, and efficiency (Bialas 2011) (Modares, Moravejosharieh & Salleh 2013). After analyzing the system architecture, a layered pattern is most suitable to serve the system to meet up with its services, iGuard architecture is composed of the following layers:

- Presentation Layer

Presentation of the web pages, UI forms and end user interacting API's

- Business Layer

The logic behind the accessibility, security and authentication happens in this layer, middle ware and other various request interceptors to perform validations.

- Persistent layer

This is the presentation layer for the Data. This includes the DAO (Data Access Object) presentation, ORM (Object Relational Mappings) and other modes of presenting persistent data in the application level. In more meaningful words this demonstrates the persistent data in RAM which usually stays in Disks at the below layer.

- Database Layer

Simple Databases is expanding up to SANs (Storage Area Networks).

Transactional Model Components

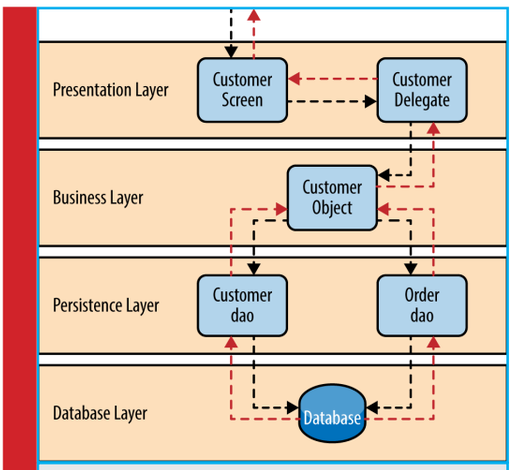

FIGURE 1. Layered Architecture

ALGORITHM

In this section, the algorithm according to which the alarm to the guard is issued will presented below

Do While
Sense the Office Temperature
If Motion Detector is triggered
If the Temperature is >24
Capture Image
Send Image to Google Glass
Else if the Temperature is <24
Check the AC and WIndows
Sense the Office Temperature
Endif
Send Notification to the Google Display
Display Image
End

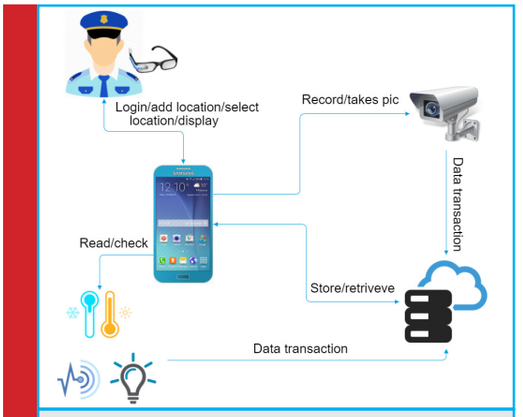

FIGURE 2. Components transactions

Development Environment

The proposed system integrates multiple technologies. It includes motion detector board and a main controller using Arduino technology. The PIR sensor board detects the motion for example in the offices, labs and servers room then sends all the information to the main controller which sends the data to a web server and its database. Hence, if there are changes in the normal status by unauthorized access especially out of working hours, the security guard will receive alarm from the second part of the network, which displays the information retrieved to the security guard. One of the most functionalities that the proposed system offers is to let the guards keep their mobility and give them the ability to move and monitor at the same time. What we aim for in iGuard is to integrate Arduino technology and Google glass with mobile application to enhance security management applications as shown in the figure below.

Figure 3 shows how iGuard system works. The guard can select the location that he will monitor. The application sends the action to the Arduino which is connected to the application by Bluetooth and starts sense any motion. If any of the conditions below is detected, then the system sends to the camera the order to capture the scene. Finally, the application sends the captured image to the Google glass worn by the guard.

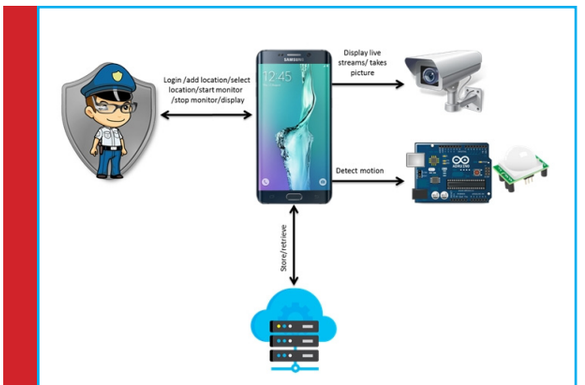

FIGURE 3. i-Guard system

In this paper, we proposed Mobile Security guard that improves the current state of security devices at most security companies. The system is composed of multi-sensor boards and a main controller. Each sensor board retrieves different forms of data such as the light intensity, sound waves and temperature for any location into the companies that will ensure the security at the building of any unauthorized access or especially out of working hours. One of the most functionalities provided in our system is to let the guards keep their mobility and give them the ability to move and monitor at the same time by applying that the efficiency of the job performance for the guard will be increased. What we aim for in mobile security tower is to reduce security guards at the company and increase their monitoring efficiency.

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