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AN IMPLEMENTATION OF GEOLOCATION BASED EMPLOYEE ATTENDANCE MONITORING SYSTEM USING GEOTAGGING

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ABSTRACT

This thesis implemented to focuses geotags used to monitor employee attendance in government offices and campus. The term geotag refers to adding geospatial data to various media files (e.g. photos, video). The project includes a conceptual geotag model, which dissects the components of a geotag, using this information to categorise employee activities as to which geotags would be used to represent them. The strengths and limitations of both applications in regard to geotagging employee attendance are tested and discussed.

KEYWORDS: Geotagging, Geospatial, Employee Attendance.

INTRODUCTION

Geotagging is the process of adding geospatial data to different forms of media. This involves enriching various media (such as photos or video) with location data; latitude, longitude, and altitude. Therefore, these two components (media and location) are the two components of a generic geotag. However, other elements, such as time, can be added to diversify geotags and make them more specific. The popularity of geotagging is growing as technology is becoming more spatially diverse. It has become common place for modern smart phones to come equipped with a GPS sensor and built-in geotagging capabilities. The selection of software (not just for mobile phones) capable of geotagging is also growing, with Google and Yahoo! leading the way, providing freeware that can instantly geotag photos, video, and other forms of media . Virtual globe applications, such as Google Earth, are a huge factor as to why geotagging has become so relevant amongst the online community, as media browsing and sharing using virtual globe software has also grown in popularity. Using a virtual globe as a way to share media in its spatial context is a phenomenon that has caught on through websites and software such as Yahoo!'s Flicker, and Google's Picasa. Storing and sharing media in its spatial context is fast becoming common place due to the growing world of geotagging. While on campus, employees partake in various activities, from attendance, to attending meetings. As technology has become an integral part of everyday life, the way normal activities are approached is constantly changing and evolving. The components of a geotag itself are explored and a conceptual geotag model is created. Breaking down how a geotag works and what information one can represent is the first step towards using them to employee's attendance. However, geotagging in this scenario is also beneficial, as it takes very little time and resources, yet can potentially reaching a whole new audience. Following the introduction, this paper provides an extensive background section that covers geotagging, volunteered geographic information (VGI), and location-based services (LBS), as well as insight into current mobile phone technology. Further background study on the ethical issues and accuracy/data quality is also included, as is an in-depth look at various geotagging and geospatial software and hardware. The method section follows on from the background, describing the techniques used to identify as possible, as well as the process employed to create a conceptual geotagging model. Furthermore, the method section describes several geotagging applications that will be used to determine how useful different software use geotagging on campus. A results and discussion section pursues the method, indicating the results of geotagging using several geotagging applications.

Several techniques and methods have been carried out effectively to monitor employee attendance.

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EXISTING WORK

A cost effective computer based embedded attendance management system by which authority electrically monitors the attendance for verification using an improvised electronic card. These cards contain necessary information of an individual. These are inserted in an electronic machine which will record the time and other information to a server system. Password based authentication and verification of attendance monitoring system of any individuals has also been carried out in the literature. A system that applies user id and password of a person for authentication was designed and implemented. However, an issue with these electronic cards or password based system allows for imposture since cards or passwords can be shared or someone can ask other person to insert his/her card or password.

Limitations of Existing work

This problem can be addressed by using biometric recognition system which includes finger print or iris recognition. A system was proposed and implemented by authors in fingerprints to identify and calculate the attendance and generate the reports after fixed time duration. Individuals simply put their fingerprints on the fingerprint reader which scans the finger print and verifies that person.

The problem by proposing a wireless attendance management system where iris of an individual is used for authentication. It is also like fingerprint where no two people can have the same eyes. A scanner will scan the eyes and automatically log the person in. Unlike fingerprint, iris is more preserved from the external environment. But both the fingerprint and iris recognition based approach needs some extra devices or scanner which can be connected to the server computation system. In our work, we addressed the problem utilizing smartphones internet connectivity for monitoring the presence or attendance of an individual. Smartphone based monitoring system reduces the surplus cost of additional scanning device because now a days almost each employee possess a smartphone of his own. An area is fixed for every employee when an employee enters or exits that area, that time stamp is saved and the time duration of any particular employee residing within its area is calculated by the system.

METHODOLOGY

Overview

Geo Tagged Attendance System. Through this system user can locate where the attendance has been marked on the Map. The advantage is to track Field Employees and contractual employees. Our Fingerprint Identification includes offerings starting Time Attendance system to complicated Automatic Finger print Identification system for Police. The geotagging attendance system solutions provide customer the privilege of end to end solution that includes expertise of IT to Network to Biometrics to Software. It helps you manage your entire manpower from your field force to office manpower. It has inbuilt module for Employee self-help as well as payroll system. The system is available Geo-tagging / Territory Management

Methodology

Prior to this Geography 010 project, I was involved in the building of 3D models. This involved creating and texturing accurate 3D building models in Google SketchUp, and exporting them into Google Earth, creating a realistic virtual campus environment. Geography 011: Building the 3D campus

i. The building of the 3D models of the Office campus began in Google SketchUp. Buildings were created on top of a 2D base map of the campus which had a 'too-scale' footprint of each building. The dynamic ‘Push/Pull’ tool iconic of Google SketchUp was used to build up each footprint into a 3D model.
ii. For each building model to be as visually accurate as possible, photographs of the real building were captured on a digital camera to be textured onto each face of the 3D model.
iii. Using the ‘Get Current View’, and ‘Place Model’ tools specific to Google SketchUp, the exact location of where each model was to be placed in Google Earth was marked, and the models themselves were exported into their geospatial location on Google Earth. This created a realistic 3D environment in Google Earth.

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Identifying Employee

The first step towards discovering whether geotagging can be used for employee was to identify all the activities employees partake in while on a office campus. Several sources were used to gather as many activities as possible:

i. Personally noting down activities
ii. Discussing activities with supervisor
iii. Discussing activities with Employees
iv. Creating a discussion on Event

VARIOUS OFFICIAL WEBSITES

Geotagging with the Smart Phone

An Google Android smartphone was provided for this research project. This mobile phone comes equipped with many up-to-date applications, software programs and sensors. The desire comes with a built in geotagging feature, which uses GPS to automatically add latitude, longitude, altitude, time-date and other data to an image or video as it is captured. Attaching this information to an image or video makes it extremely easy to geotag the media to a virtual globe or media sharing website, as all the spatial information attached means the media can be geotagged to its exact geospatial environment.

To test geotagging on a campus environment several images of the office will be captured using the desires built-in camera. Using the geotag application several photos will be attached with all their spatial information, while others will be taken without using the geotag option. These images will then be geotagged to Google Earth using the software program Picasa, which works directly with Google Earth and Google Maps, and also through the Flickr website, so that these can be compared.

RESULT AND DISCUSSION

The geotag model created for this research project shows the basic components of a generic geotag, as well as several more specific types of geotags. The various employees montoring that were identified for this project were separated into groups corresponding to which geotag would be used to represent them. Building this conceptual model was constructive for this research project as it breaks down and identifies what a geotag is, and how it can be used. This was important as it needed to be recognized why geotagging would be useful in regards to employees working. By designing the model, the components of a geotag could be related to the student employees working, and categorise different activities into different types of geotags. Using this information, students could recognise which geotags are suitable for the different activities that which they may wish to geotag, or what activities different geotags represent as they browse a company space that contains geotags.

Geotag Model Limitations

The geotag model created for this research project is extremely basic. Only the most important components of geotags are identified, with only three different types of geotags provided for both temporary and permanent geotags. The limited depth of the conceptual model means it is very narrow, not branching out into more specific components of geotags. Due to this many employees working may fall under several of the geotag types, or alternately fall under none of the identified geotag types, as the basic geotagg model does not provide enough geotag types.

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Smart phone geotagging application

Using the Smart phone was an effective way to collect images and video for this research project, due to the built-in GPS that provides an option to automatically attach geospatial information to the captured media. Several photos and videos were captured and tagged with their geospatial location, along with several which were captured without using the geotagging option, so that they could be compared when geotagging them using Picasa and Flickr. Using a mobile phone for data collection was valuable to this research project as mobile phones have become an integral part of western culture, and can be found in the pocket of almost every employees attending a company like Govt offices. By using mobile phones as a platform, the research is relevant to almost everyone, as in the near future the majority of mobiles while come equipped with GPS and geotagging software, making geotagging available to not only everyone carrying a mobile phone. Mobile geotagging technology makes geotagging accessible from almost any location, and as advanced mobile technology becomes cheaper, mobile geotagging will become more relevant for everyday activities (including employee's activities on campus). Figure 10. is a photo taken using the smart phone camera. Down the right hand side are the properties attached to the image as metadata, identified by the phone using the GPS and geotag application.

CONCLUSION AND FUTURE SCOPE

There are many aspects of this research project that could be improved upon. As indicated in the discussion, all the employees' activities identified for this project were done so without any campus evidence. As the main focus of the report is researching how geotagging could be used to benefit employee's activities on campus, this lack of academic background for employee's activities is a definite weakness. If further work was to be done on this subject it is recommended that more attention is dedicated to this aspect, with more time spent sorting through academic literature to find related work. Another recommendation, if more time and equipment was available for the research, would be further explore geotagging using other mobile phone technology, such as iphone and Samsung. This would therefore reach a greater majority of mobile phone users, while also building up a comparison between the rivalling hardware. Furthermore, along these lines, other media capturing devices, such as digital cameras or video cameras, could be also be explored to draw further comparisons and reach an even larger geotagging market. Another area of this research project which could be improved upon is the number of geotagging software packages tested for their strengths and limitations. Only Picasa and Flickr were put to the test for geotagging, yet there are plenty more websites and numerous other software packages with geotagging capabilities. It would be recommended to include more of this if further in the case of further research, to provide more comparisons, as well as identifying which applications suit different types of geotagging tasks. Expanding on the conceptual geotag model is another aspect of this project that could be improved. The current model covers the basic components of geotags, however this model may limit various employees activities as a number may fall into several geotag types. For example the gym both provides a service to students, while also being located on campus, therefore falling under both the location and service 'permanent' geotags. Further expansion of this model would result in other more specific geotag categories which may suit student activities better, therefore being more beneficial. Improving data accuracy is always an aim for further research. In the case of this project data accuracy could be improved by taking more care when geotagging media that either; does not have spatial data attached to them, or, when using geotagging software or a website that does not recognise the spatial data attached to the media. This is however very time consuming, making sure each geotag is in precisely the right location can take a long time, yet it would improve accuracy as well as decrease human errors which arise if a user rushes the placement of a geotag.

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