BMMS: Bus Monitoring Management System

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Abstract

Transportation is one of the most important issues that is faces students in their daily lives. So, some educational organizations act to provide free transportation service to deliver the students between homes and university buildings. Nowadays the registration for these services is complicated, and subject to error tasks which is done manually and with its multiple collision .Also the supervisor could not have a real time monitoring, and waste time, effort and possibly not in accurate way. Sometimes it will be late to take the proper action to face any problem that might arise. This work introduces a smart transporting system to enhance the management of buses and   all its related work. The proposed work is called: Bus Monitoring Management System (BMMS). BMMS aims to allow the supervisor to monitor the buses remotely. BMMS will make the registration task easier, faster, with automatic attendance to save time, and real time monitoring, too. We are going to use this technology to provide on time information for the supervisor and to help him keep track of all buses .   By this way, we will speed up the Monitoring process, decrease the time for doing it, controlling the buses. The main goal of the proposed system is to enable students to easily register, and access data related to their buses. Also, the system can provide some operations and features to help the supervisor in keeping track and monitoring.

الخلاصة

يعد النقل واحدا من أهم القضايا التي تواجه الطلاب في حياتهم اليومية. لذلك تعمل العديد المؤسسات التعليمية على توفير خدمة النقل المجاني لتوصيل الطلاب بين المنازل والمباني الجامعية. في الوقت الحاضر أصبح التسجيل في هذه الخدمات معقدا، ويتحمل العديد من الأخطاء والتعارضات التي تتم يدويا. كما انه يفتقد لآليات تمكن المشرفين من تتبع فوري لحركة النقل مما يؤدي الى العديد من المشكلات منها اهدار الوقت والجهد في عمليات متبعة ربما تكون غير دقيقة. في بعض الأحيان يكون الوقت متأخرًا لاتخاذ الإجراء المناسب لمواجهة أي مشكلة قد تنشأ. يقدم هذا البحث نظام نقل ذكي لتعزيز إدارة الحافلات وجميع الأعمال المتعلقة بها. العمل المقترح يسمى: نظام إدارة مراقبة النقل (BMMS). يهدف BMMS إلى السماح للمشرفين بمراقبة الحافلات عن بعد. كما يعمل BMMS   على تسهيل مهمة التسجيل وتسريعها، وكذا مهتم التتبع في الوقت الفعلي أيضًا. يمكن استخدام هذه التكنولوجيا لتوفير المعلومات في الوقت الحقيقي للمشرف ولمساعدته على تتبع جميع الحافلات وبالتالي بتسريع عملية المراقبة، وتقليل الوقت اللازم للقيام بذلك، والسيطرة على الحافلات. الهدف الرئيسي للنظام المقترح هو تمكين الطلاب من التسجيل بسهولة، والوصول إلى البيانات المتعلقة بحافلاتهم. كما يمكن للنظام توفير بعض العمليات والميزات لمساعدة المشرف في المتابعة والمراقبة.

Key word: Student Transportation, Smart, GPS, Bus Monitoring

1. Introduction

BMMS   was produced and designed for any university that introduces buses services for its students because most of the work is performed manually, which is a time-consuming process. So, we do not have a system which could inform students about their Bus Number, Schedule, or any other information because the registration is done by the supervisor verbally[1]. On the other hand, the process of specifying a bus for each driver is done manually also by the supervisor. The supervisor could keep track of buses only by making call phones to the drivers, which wastes time, effort and possibly not in an accurate way.

BMMS is a web-based and will allow the supervisor, the students, and the drivers to use it whenever an Internet connection is available . It should improve the current state of registration ,monitor. For the first

time, University bus riders can now get registered on the bus over the internet and BMMS will enable them to specify their exact homes [2]. BMMS will make the registration task easier and quicker, with zero mistakes , and without the necessary physical attendance and these routine procedures which always waste time . One of the most important goals of BMMS is to enable students to register in the university bus and easily access data related to it that they are interested in [3] . They can access their Id and SSN without the need to sign up. Another feature will be provided by our system which is enabling students to change the password after logging into the system.

BMMS is a web-based system which is helpful for bus supervisors, who want to operate many buses trips in a day [4]. The system focused in the area of adding, editing, and deleting the students , drivers and the bus routes . The supervisor can manage the bus routes and the drivers, Students' details . Also , Supervisors can add the details of the drivers and their information in the system, and he can add a bus and its details like the type, bus number, bus board and the bus route details [5]. BMMS works with GPS technology which provides a real time Information to Supervisor about all buses. Also, this facility can be used to give him information by web and Display on students` homes [6] .On the other hand it will allow supervisor to monitor the location and estimate each route time . Students will use a Google map to specify their home exactly in case they know how to deal with it [7]. Otherwise ,they could click just a button and it will directly send the coordinate to the database [8]. BMMS will enable drivers to set the new trip with timing which helps the supervisor in monitoring process . He can also get information on the number of students on his bus.

2. Related Works

GSchool [1] is a school bus management system which was approved by the U.S government. It based on latest position technologies such as: GPS to track and monitor buses, RFID to provide awareness to parents and school about students status. It depend also in communications technologies (GPRS), and web services. They help school bus operator to plan, monitor, and rout. They provide notification of bus and student status to parents which maintain student safe, and give peace of mind to their parents. They also work to send immediate notification to school about delaying bus and missing student

GPS-GPRS [2] is a Vehicle Tracking System for Students at AL-Nahrain University in Baghdad introduced an Implementation of Web-Based GPS-GPRS Vehicle Tracking System " to offer a real time map which enables companies' owners to see the place of the target vehicle on the Map through the web page. The map views the current place, and the location coordinates are sent through GPRS service provided by the GSM network. They said The GPS data are sent using Get method of HTTP protocol ,the data at server side are stored in a database table and can be retrieved as request for position browsing on map.

Real Time Position Tracking System Using Google Maps API V3 [3] is introduced by MihirGarude et al ., about Real Time Position Tracking System Using Google Maps API V3. They introduce new technology for monitoring the physical world specifically in urban areas. where they have a lot of vehicles equipped with on board sensors. Their system combines the installation of an electronic device in a vehicle with the designed computer software at least one operational base. To make the owner or a third party able to track the vehicle's location , collecting data in the process from the field and delivering it to the base of operation. This system is not very new, but it provides several advantages, it allows fair access to all users ,and the system can be scaled further to display more information about the vehicle by adding various sensors. The point is, there is no need to add any hardware component and the effect on power is requirement is negligible.

BMMS is planned to control and manage the university`s buses. It can deal with supervisor, student and driver [9]. BMMS   facilitate the management ,Monitoring , registration and will give real time

information about the scheduled routes of the bus . Another feature of our web-based system is that it is available to students, supervisor and drivers at any time.

3. The proposed System

We investigate the expected user activities to be sure that they were able to use it easily and with minimal training and the system is actually meeting our objectives. During this phase we tried to operate the system quickly, smoothly and with minimal usability problems to make sure that the system was easy to use , saving time, and resources.
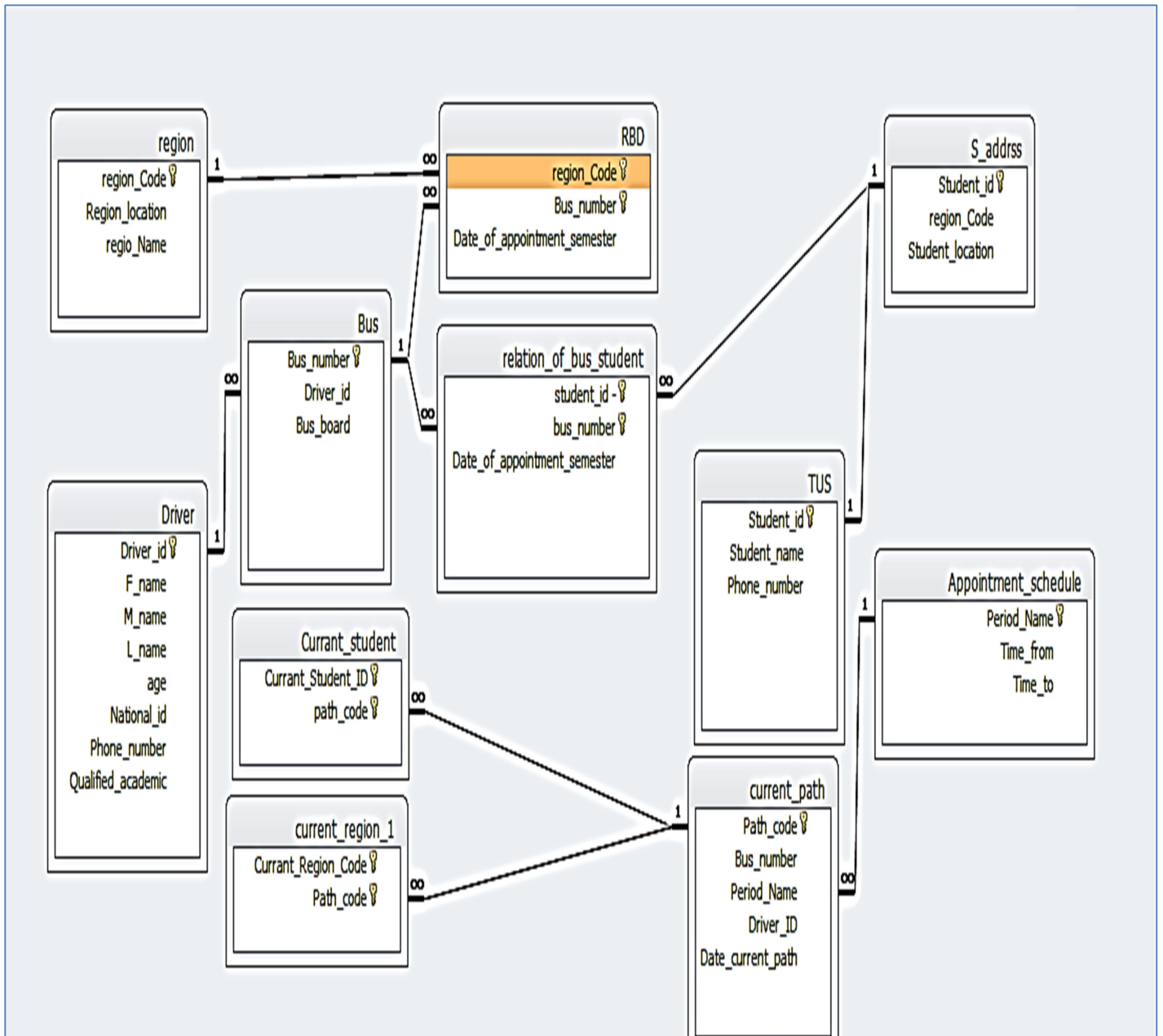
a. Database Schema :

Figure 1: Database Schema

b. Implementation

Figure 2: main page

Figure 3 : Sign in interface Design

Figure 3: The basic data of student

The basic data: After the login , the saved data is displayed on the screen Containing of :

Student name , Student ID , Phone number ,National ID, and College name.

Figure 4: choose student region.

Choose your location: student chooses his region from drop-down menu then, she clicks on her region on the map to determine the Coordinates of region .

235

Figure 5: bus data

Bus data : it is table Contain of data about student bus, it showing: bus number , region name , driver name , driver phone number .

Figure 6: the bus code

After the student clicking on the get the code button , the code is appear on the screen .

Driver interface:

Driver Interface As shown the page display all functionality that driver can do

The basic data : After login the following page the basic data will display all information about driver . the number of drivers, the name including first, middle and last name , National identity ,Phone number , Qualified academic and Driver age.

236

Figure 7 : The basic data

Add new trip: Period Name , all Region allocate in this bus. Also he can change the Region.
Then click icon add trip

Figure 8 : Add new trip

Login student in bus: You must add a new trip before view this page. Enter student id then click next .

Figure 9 : Login student in bus

Operating process : You must add a new trip before view this page .This page shows the number of student inside the bus and path of trip. Then click icon end trip.

Figure 10 : Operating process

Supervisor interface as shown below the page display all functionality that supervisor could manage in the system .

Figure 11 : Supervisor Controls

Supervisor Controls :
1. **Adding drivers :** where Supervisor can add a new driver with his details .
2. **Adding Buses** : the supervisor can add new buses and identifying the driver for each bus
3. **Adding region :** supervisor can add regions by specifying an exact point on the map .
4. **Adding trips :** supervisor can add new trips and he can name it and identify the start and the end time of each trip .
5. **Specifying a bus for each region added :** supervisor choose bus number with region.
6. **Monitoring Process :** Supervisor can monitor drivers and students .

Figure 12 : Supervisor Monitoring options

4. System evaluation

We have present the system before distributing the following survey and distributed it to random samples of the audience ,in a way to figure out what the users have in their mind about our system and to capture any mistakes or notes about BMMS .

Out of 35 students have attended to our presentation twenty students who were interested in BMMS have answered the questionnaire .This is an accepted ratio compared to the total number of students .

239

The result is very pleased with the new BMMS . It exceeded our expectations . Survey`s result shows that 87% is pleased with the system and they supported very well , 9 % thought that is BMMS needs more updates and future enhancements , 4 % gave a bad return on the proposed system and they thought that it is not beneficial .

Figure 13: system evaluation

With this system, we have created to enable the students Register on the bus instead of the manual registration in order to reduce the time and effort spent in it and control the transfer of students to the university or to their homes safely and monitored by supervisors.

5. Conclusion:

BMMS is the best solution to use in any university , we don't need paper or pen to write and waste money and time .our system can provide services for students to register in bus by login in the system and determine his region. also, without wasting time for driver and supervisor to do their work. For future work: we attend to help educational organizations to managed bus so that it can make the work easier for driver and monitor supervisor. Some of the feature the developer would like to add:

- Real-time Bus Tracking : it shows the path of the current bus on the map.
- electronic chips .
- calculate the optimal track .

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