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RESEARCH TITLE

The Development of A Smartphone Program to Solve the Problems Of transportation Congestion Case Study (Ministry of Transport, Khartoum State)

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Abstract

For a long time, in the region of Khartoum State, a major change occurred in the Fields of daily life, in the field of education, for example, where the transition from Home to school and vice versa, and in work areas as well, which leads to great Changes in the economic situation to a bad situation, which makes us think about Facilitating the life of the citizen And save his time for other things.

The problem of research lies in the lack of modern solutions to the problems of Traffic congestion, which in turn causes waste of citizen's time on the road and Consumption of a lot of car fuel.

Our goal in this research is to provide techniques that solve congestion problems And provide them to the concerned authorities to apply them in a practical way. The applied descriptive approach was used using programming languages suitable For it and applied to a number of vehicles, where the communication is sent to bus Drivers by sending the plate number, place of violation, time and date, the most Important results The result is the speed in making decisions through Communication with the concerned authorities through the application.

Key Words: flutter ,Vehicles , congestion , infractions, map , Dart

عنوان البحث

تطوير برنامج للهواتف الذكية لحل مشاكل إزدحام النقل
دراسة حالة (وزارة النقل ولاية الخرطوم)

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المستخلص

لفترة طويلة وفي منطقة ولاية الخرطوم حدث تغير كبير في مجالات الحياة اليومية ، في مجال التعليم كمثال ، حيث الإنتقال من البيت إلي المدرسة وبالعكس ، وفي مناطق العمل ايضاً مما يؤدي إلي تغييرات كبيرة في الوضع الإقتصادي إلي وضع سئ مما يجعلنا نفكر في تسهيل سبل حياة المواطن وتوفير وقته لأمور أخرى.

تكمن مشكلة البحث في الإفتقار لوضع حلول حديثة لمشاكل الإزدحام المروري للسيارات والتي بدورها تتسبب في إهدار زمن المواطن في الطريق وإستهلاك الكثير من وقود السيارات .

هدفنا في هذا البحث توفير تقنيات تحل مشاكل الإزدحام وتوفيرها للجهات المعنية لتطبيقها بصورة عملية ، تم إستخدام المنهج الوصفي التطبيقي بإستخدام لغات برمجة مناسبة له وتطبيقه علي عدد من المركبات حيث يتم أرسال البلاغ إلي سائقي الحافلات عن طريق إرسال رقم اللوحة ومكان الإنتهاك والوقت والتاريخ ، أهم النتائج المتحصل عليها هي السرعة في إتخاذ القرارات من خلال التواصل مع الجهات المعنية من خلال التطبيق.

INTRODUCTION

Mobile technologies such as smartphones enable the use of business and resource Management applications such as fleet management and passenger transport.

The web and e-mail can also be used to connect customers and workers with Service institutions

There is no limit to what can now be achieved with mobile devices. A recent Survey by IDC (www.idc.org) indicates that 70% of organizations are currently Deploying at least one mobile app, with more than a third of these companies Deploying multiple mobile apps. Research shows that global sales of smartphones For year 2008 amounted to 139 million, outstripping sales of laptop computers[1].

Ministry of Transport in Sudan The Ministry of Infrastructure and Communications consists of three bodies and three public administrations to cover The various aspects of infrastructure in the state, namely the Roads and Bridges Authority, Water Drains, the Khartoum State Water Authority, the Sanitation Authority, the General Administration of Transport and Communications, the General Administration of Planning, Development and Follow-up, and the General Administration of Financial and Human Resources The ministry is also Implementing the electronic monitoring project and many projects that have a Significant impact on the development and development of the infrastructure of the State of Khartoum, including the Soba Bridge as major project that connects Khartoum and East Nile, a major project at the Mawlid intersection with [2].

Al-'Hurriya' Street, a major project at Wad Al-Bashir intersection, the local train project for the state of Khartoum, and the Khartoum tram project. And the river Transport project, in addition to the sewage project for 'Bahri' locality, Wad 'Defa'a Station project, and other projects. This is in accordance with the directives of the Comprehensive national strategy and the Quarterly strategy[3].

Problem statement:

1. Ignoring technical solutions to solve this crisis and keep pace with modernity

2. Lack of proper analysis, reading and anticipation of busy times

3. Congestion problems due to the large number of cars and vehicles in one street.

4. Traffic congestion also leads to unhelpful fuel consumption

5. Lack of awareness and spreading the culture of using public transportation instead of private cars.

Aims of this paper:

1. Recording the data of buses and bus drivers in the system to provide safe and Modern means of transportation and distinctive operating systems for passenger Transport.

2. Avoid congestion problems, through the application where vehicles are ordered By sending the time and date

3. Attempt to assist the Department of Transportation in traffic problems.

Importance of study

Developing transportation systems and upgrading them to the appropriate level in line with the development and changes that have occurred in the country to meet the demand for them through:

1. Using technology to solve the transportation crisis by recording data in a database, reporting vehicles through smart phones.
2. Develop transportation demand management in accordance with the directives of the traffic transportation structural plan.

Methodology

The applied descriptive approach was used, where the programming languages PHP, HTML, CSS and Dart were used and work environment IntelliJ IDEA & Notepad++ & using flutter google maps application .

Related Work:

Ibrahim Mohammad Ali (2015). The effect of traffic congestion on the driver's Driving behavior after congestion [4][5]

Purpose of the study

Traffic congestion is more likely to lead to aggressive driving behavior that is associated with an increased risk of collision. Previous studies mainly focus on crowded driving behavior when studying the effects of crowding. However, the negative effects of congestion on driving behavior may also affect drivers driving after congestion. To fill this research gap, this study examined the effect of traffic congestion on driver behavior on post-congestion roads (that is, roads cut immediately after congestion). Twenty-five people participated in the driving simulation study. They were asked to complete two experiments corresponding to post-crowded and non-crowded conditions, respectively. Driver behavior measured by measures of driving performance, measures of eye movement, and measures of electroencephalography (EEG) was compared between the two conditions. Ten features of the statistically significant scales were selected. The selected features were combined to characterize the drivers' response patterns using the hierarchical clustering method. The results showed that driver behavior in post-crowding situations

Became more aggressive and more focused in the frontal region but less focused in the dashboard region, and was associated with decreased β-band strength in the temporal brain region. Pooling results showed more aggressive and unconscious response patterns while driving in post-traffic situations.

Muhammad Abdullah Muhammad (2010). Traffic congestion and urban real estate rental values in the city of Khartoum [6]

Purpose of the study

This study examines the effect of road traffic congestion on the rental values of Residential properties in the state capital, Khartoum, Sudan, with the aim of Recommending cost-effective and sustainable basic options that would help Alleviate road congestion, and enhance real estate investment and rental property Values in the study area. To achieve the goal of the study, both qualitative and Quantitative research

methods and investigative research methods were adopted. The closed questionnaire and content analysis was the main research tool used to Collect data. The specific causal factors of road traffic congestion with negative Effects on real estate rents in the study area are the increased rate of office and School activities, poor driving habits, poor road network or design, traffic Management problems, and increased peak period motor vehicle use among others. In order to mitigate the impact of road congestion on property rental values, the study recommends adopting options of an integrative/holistic

Approach through strategic traffic planning and management programs which Should include the use of the latest/latest tools to address road traffic congestion And incorporation of road user concerns into design engineering Methods and Policy Formulas .

Abdul Salam Mustafa (2019). A study on traffic jams in Khartoum - an Executive note [7][8].

Purpose of the study

Traffic congestion is a growing problem in the greater Khartoum metropolitan area and has negative repercussions on the quality of life and the economy. This study aims to conduct a comprehensive investigation on the problem of traffic congestion in the greater Khartoum metropolitan area, including its size, causes, related economic costs and potential solutions. In terms of GDP and job opportunities. It is expected to witness an additional increase in the population, which may reach 15 million people by 2027, and in return will also increase its importance to the country's economy. Traffic congestion is a growing problem in the greater Khartoum metropolitan area and has negative repercussions on the quality of life and the economy. In addition to the time one wastes stuck in traffic, which can be used to do useful things.

It increases vehicle depreciation and harmful emissions that lead to poor air quality.

It also raises transportation costs on the business front and makes

the greater Khartoum metropolitan area an unattractive place for business and industry. Recognizing the seriousness of the traffic

jam problem, and at the request of the Sudanese government, the World Bank funded an investigation into the extent of the problem, its causes and solutions that can be applied in the greater Khartoum metropolitan area. The aim of this study is to conduct a comprehensive investigation of the traffic congestion problem in the greater Khartoum metropolitan area, including its size, causes, related economic costs and potential solutions. This report documents the findings of the study, which should be of interest to policy makers and professionals in the Greater Cairo metropolitan area, the Egyptian government and other cities with similar problems, and international financial institutions.

Related Study Comment

These studies touched on a common factor, which is the effect of traffic congestion In cities in general on people’s lives. The first study focused on its impact on Human mood, behavioural changes in driving style, and violence in dealing with Society. The

first study did not address the problem causing this effect, which is a point of contention. Between this study and our study, where our study is based on Technical solutions that reduce the incidence of congestion that causes the problem Of mood change for congested road users, in the second study focused on studying Traffic congestion in an area and its impact on the value of real estate rent. And Solve it in terms of investment for a small group of people.

We agree with these studies in developing island solutions to the problems of Traffic congestion in cities in the long run, in any way that can be followed, but the Goal is common, which is the final solution to the problems of congestion.

Applied Study

Flutter

It is an open source user interface software development kit created by Google. It is used to develop cross-platform applications for Android, iOS, Linux, Mac, Windows, Google Fuchsia and the web from a single database. The first version of Flutter was codenamed "Sky" and runs on the Android operating system [10][13][14].

Dart

It is a programming language designed for customer development, such as web and mobile applications. It is developed by Google and can also be used to build server and desktop applications [11][12].

Dart is an object-oriented, class-based, garbage-compiled language with C-style syntax. Dart can compile to native code or JavaScript. It supports interfaces, abstract classes, standardized pharmacokinetics, and type inference

Application screens

Login screen :

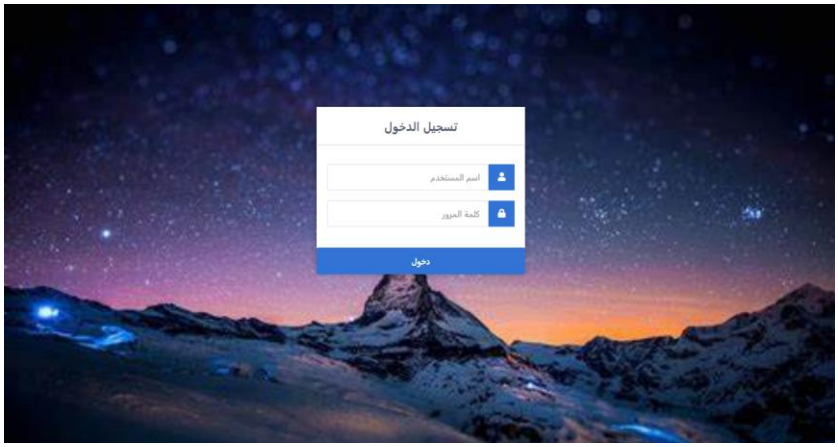


Figure No (1) represents the login screen

Add users screen:

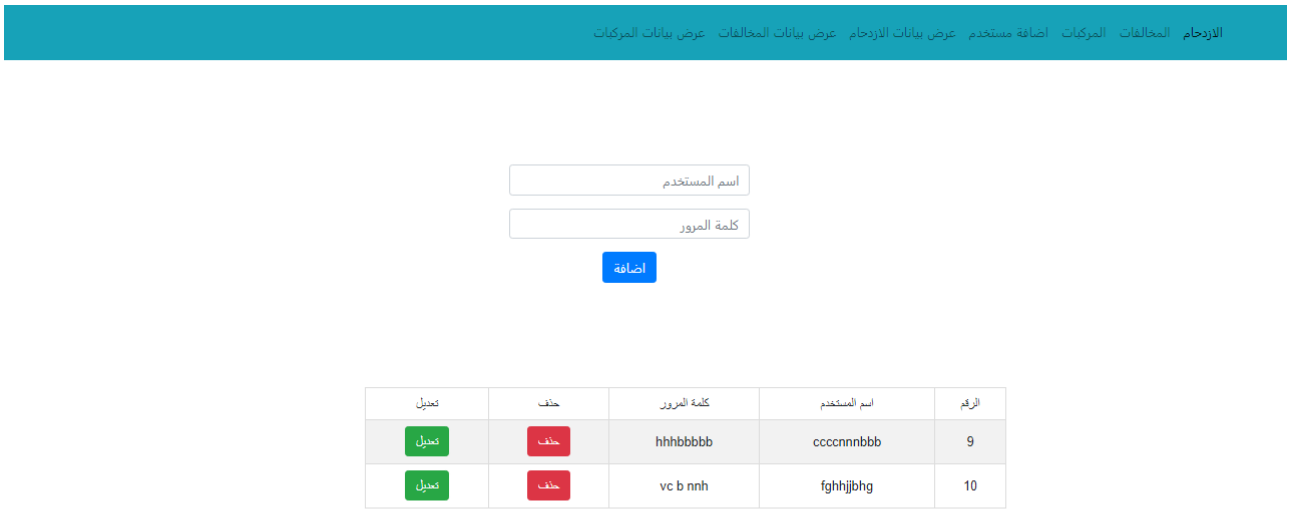


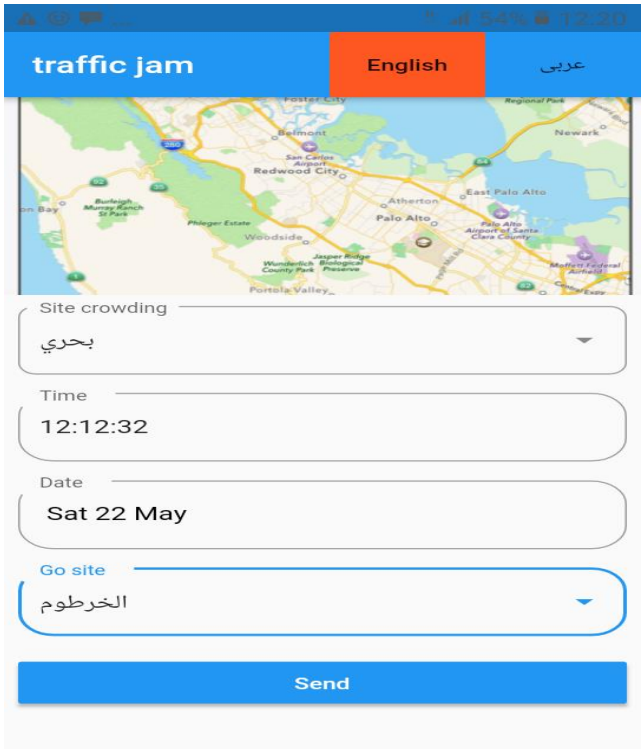
Figure No (2) represents an addition and display screen and represents the contact information screen

The following necessary packages have been added:

1- A dio package has been added that allows us to send http requests to the Google Trends app interface to get the route information afterwards.
2- The other package is googling flutter maps to display a map to users
3- To use Google Map, we need the api key in the api library

When you run the application, the map appears below :

Figure No. (3) Vehicle order screen



Here the vehicle requests information window has been added to the map

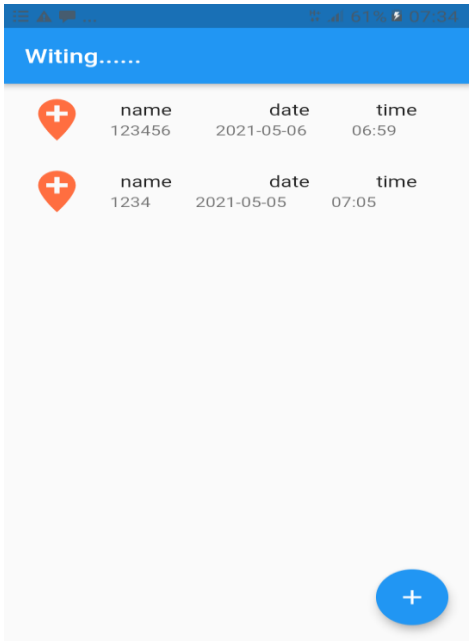


Figure No. (4): A screen showing information about the vehicle

The window shows all the vehicles and their different destinations available during the day .

- If it is crowded, the screen below will be displayed, which are vehicles and then requested previously:

Screen to see vehicles in line :

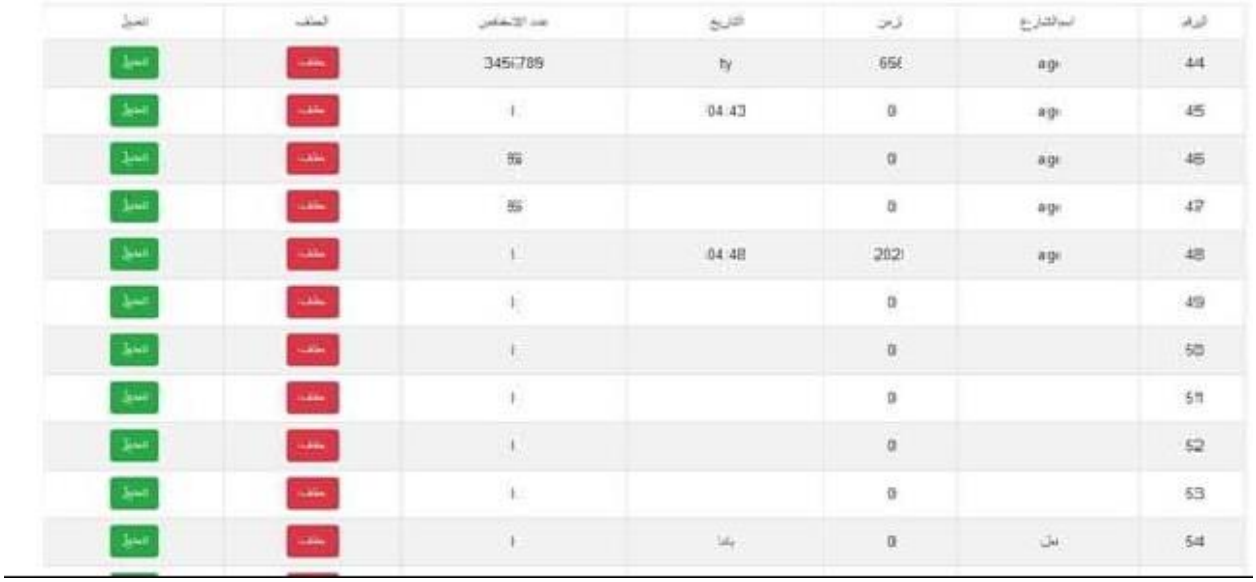


Figure No (5) represents the congestion data display screen

View vehicle data:

Figure No (6) represents the vehicle data screen

Results:

1. Develop transportation and keep pace with urban development in the states by using the application and exploiting it to know the congestion sites instead of wasting time and effort.
2. Recording and inventorying the vehicle's data and making periodic reports for that.
3. Take the administrative decision as soon as possible and at the lowest cost, through direct communication with the Transportation Department through the application.

Discussion:

By listing the previous results and their relevance to relevant studies in terms of consideration

Transport is the basic pillar of the economy and due to its effective role in providing the needs of various sectors, and thus constitutes an increasing financial, operational and environmental burden in the long run. Making the most of the unused potential

capacity of the road, based on modern technologies, leading to more efficient traffic management.

Recommendation:

1. Recommendation for smartphone software developers to develop applications and use them to solve other similar problems.
2. Recommendation for institutions of various specializations to benefit from smart phone applications to develop their work and keep pace with modern global systems

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