

Parking Finder Application

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Abstract-- The obstacle of locating a vacant spot in streets that are also available is not an easy task for people. As drivers waste a lot of their time and effort driving through the streets trying to find a spot and they get more unsatisfied with this process that they go through repeatedly during their daily life. Hence, our purpose and motivation are to try to solve the previous issue. We want to save people's time and effort they exert every day, so we thought of an application that provide the user to book a parking hourly, daily or monthly and this will be prepay through visa or Fawry, that in turn will be sent to our system to illustrate them as results to users through the application so that they can view the locations with their number of vacant spots and decide which place is better and which they would like to head to. Our Project mainly focuses on solving the parking issue whether in the streets and help user to get his desired destination with estimated duration and price.

Keywords: mobile application; parking system; parking QR.

1. INTRODUCTION

Nowadays the world is getting bigger and the digital world is being expanded. In addition to the issue of the expansion of population all over the world especially in Egypt. It is thought that most people

already own at least one car. The number of drivers is getting bigger on a daily basis, and more people are having an issue that they cannot find a place to park their car easily and it takes them a lot of time. Hence, parking slots are getting more insufficient every day so the first and most important step is to clearly understand our problem. This is more difficult than it sounds, but it is the key to success. Our problem can be defined as the unorganized way of parking in Egypt. Drivers can waste much time trying to find a vacant spot in the street or nearby garage to park their cars. Such as searching for a vacant spot in a street especially if it's crowded it may take a long time, or searching for empty spot can take a long time too. Furthermore, our purpose and motivation are to try to solve the previous issue as it will increase the efficiency in a digital way using technology. We want to save people's time and effort they exert every day.

Our Goal is to facilitate the operation of finding vacant spots in the crowded streets, the uncrowded streets and the garages, also to minimize the messy process of parking. It is about having an online system that

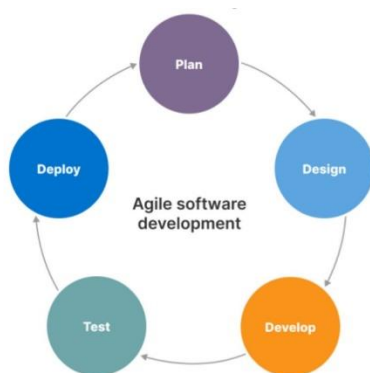
detects unoccupied spots in certain areas via object detection. Our app allows user to compare spots, rates, and pre-pay for parking by visa or fawry.

2. PROBLEM DEFINITION

Our problem can be defined as the unorganized way of parking in Egypt. Drivers can waste much time trying to find a vacant spot in the street or nearby garage to park their cars. Such as searching for a vacant spot in a street especially if it's crowded it may take a long time, or searching for empty spot can take a long time too. Which may lead to the possibility of parking the car in an unauthorized or unsafe parking spot and result in even more crowded and unorganized streets.

3. PROPOSED APPROACH

In this section we will talk about algorithms and methodologies used in our project. First, we use the Software Agile Model. Agile methodology: it is a project management methodology purposely adopted for the development of sophisticated software. The framework allows for iterations, which helps a lot in minimizing mistakes and errors that commonly occur.



1-Authentication: It is the process of identifying users that request access to a system, network, or device. Access control often determines user identity according to credentials like username and password.

2-Encryption: It is a method that used to transform data into ciphertext (ex: RxQ3v) An algorithm will use the encryption key in order to alter the data in a predictable way, so that even though the encrypted data will appear random, it can be turned back into plaintext (ex: Esraa) by using the decryption key.

3-Location Based Recommendation: It's a recommender system that incorporates location information, such as that from a mobile device, into algorithms to attempt to provide more-relevant recommendations to users. This could include recommendations for streets, garage, or other points of interest or events near the user's location.

4-Design Pattern: Design pattern improve our project in general as if we need to add or update any feature we don't need to do in the whole project or in the old class as it will cost use a lot of time and effort and may error occur as it is a general repeatable solution to a commonly occurring problem in software design. A design pattern isn't a finished design that can be transformed directly into code.

Second talk about algorithms:

1-One-time passwords (OTP): It's an algorithm that provide a mechanism for logging on to a network or service using a unique password that can only be used once, as the name suggests. One-time passwords are a form of strong authentication, providing much better protection to eBanking, corporate networks, and other systems containing sensitive data. OTP is an automatically generated numeric or alphanumeric string of characters that authenticates a user for a single transaction or login session. It's also more secure than a static password, especially a user-created password, which can be weak and/or reused across multiple

accounts. OTPs may replace authentication login information or may be used in addition to it to add another layer of security.

2-Firebase Authentication: To verify email and password.

3-Firebase Fire store: Cloud real time database.

4. ARCHITECTURES

System architecture means the conceptual model that defines the structure, behavior, and more views of a system. And our system architecture here defines how the user interact with the application through GPS. We use map service provider to build the map in our application, we use Google Maps API key to track the location and firebase to support our platform and store user's information.



5. RELATED WORKS

- a) ParkMobile: Using ParkMobile, you pay and park easily using your mobile. Get the facility to arrange garage and stadium parking ahead of time. ParkMobile is offered in St. Louis, Minneapolis, Pittsburgh, Philadelphia, Washington, DC, San Francisco, Atlanta, Chicago, Miami, New Orleans, and Dallas.
- b) Best Parking: Best Parking is a parking finder app that helps you find parking in many major cities like New York City (Manhattan), San Francisco, Chicago, Boston,

Los Angeles, Seattle, Atlanta, and Toronto.

- c) SpotHero: SpotHero is a digital parking reservation service. The drivers can use this parking finder app to help them connect with the nearest parking. The drivers can look for a location to park in their cities and can also reserve in advance. They can pay via credit card within the app itself. They run a website, app as well as a parking developer platform.
- d) Parkopedia: Allows drivers to find the closest parking to their destination, tells them how much it will cost and whether the space is available. It is not only a parking finder app, but it is also a provider of on-street and off-street parking data. It provides all sorts of digital parking services. Parkopedia has spread across 90 countries and covers over 15,000 cities, including China, Australia, New Zealand, and South American countries.
- e) Parking.com: It serves locations and lots in over 80 cities, including Boston, New York City, Washington DC, Chicago, Philadelphia, and Los Angeles. Whether you're looking for city parking, commuter parking, event parking, airport, or even discount parking, this app allows you to compare spots, rates, and pre-pay for parking.
- f) Your Parking Space: The YourParkingSpace platform connects drivers with over 350,000 privately owned and commercially operated parking spaces across the UK, available to book hourly, daily, or monthly basis. Drivers can book parking on-demand through a website and mobile application.

Can find spots on streets, airports, stadiums and train stations.

- g) **Parking Telecom Mobile Application:** It provides a parking solution offered by Parking Telecom. Parking Telecom Mobile App is created for both parkers and parking owners. Users can locate parking spots easily, check availability in real time, book their stay to make sure space is available when they arrive. Parking owners can bring in new visitors and get extra profit by publishing their parking spaces on the platform. Industrial IoT, AI and Big Data are used in creating this application.
- h) **Parknav:** A system that solves the issue of finding parking lots which provides off-street and on-street real-time parking availability. Its services are available for mobile apps, car apps and websites. Using Machine Learning and Big Data in analyzing and collecting data about traffic, streets, cars ...etc.

App/Feature	SpotHero	Best parking	Parknav	Parkmobile	Our app
Pre-booking	X	X			X
Feedback	X				X
Bookmark	X			X	
Free trial			X		
Not free	X	X	X	X	X
Cancel reservation	X				
Scan code					X

6. RESULTS AND DISCUSSION

Mobile app which help user to find suitable parking, no more driving around looking for parking. As well as a mobile app make things easier for people to use. The application will be installed on your mobile. It will be available to the public on the internet through user-friendly designs that will give you information about parking.

7. OUTCOMES

Finally our application see the light as we finished the implementation and the application ready for using and serve the user by using these pages:

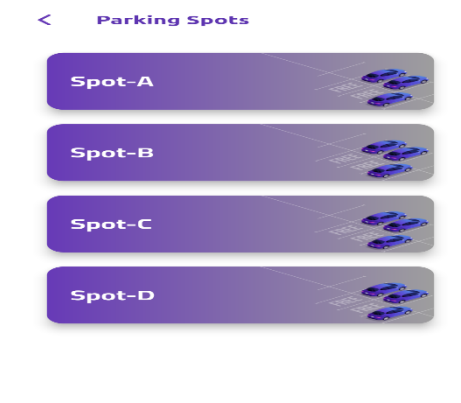
- 1-Login page.
- 2-Registration.
- 3-Home page.
- 4-Parking spots.
- 5-Choose time
- 6-Booking.
- 7-Payment.
- 8-History.
- 9-Feedback.
- 10-QR-code.
- 11-Map.

And this is a demo example of our application:

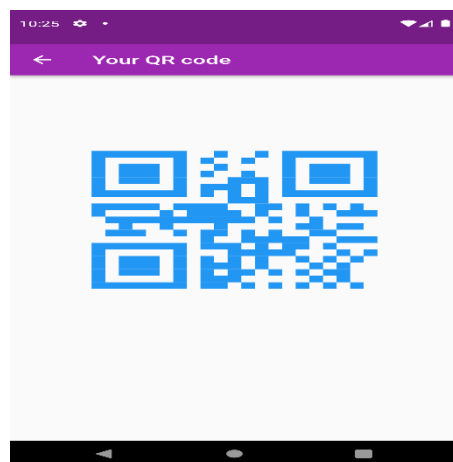
-Home page: The user is entered this page after he has an account Then he can choose his location area (The user must accept the permission to open his (GPS) to appear his location on map Then he can enter the destination he wants to go). Also from the home page the user can book his slot or see his payment and can give his feedback about us.



-Parking spots: User choose this page to choose his desired spot, user has four options to choose from them.



-QR code: This is final screen that appear to the user, when user arrive to the parking it will be scanned.



8. CONCLUSION

Our goal was to make an application that provides users an easy way of reserving a parking online where users can view various parking spaces and select nearby or specific area of their choice to view whether space is available or not. If the booking space is available, then user can book it for specific time slot. The booked space will be marked and will not be available for anyone else for the specified time. Users can also view previous parking booking details, it will saves user time and effort. At the end, we have come up with a program that made it easier for drivers to

find suitable vacancies for them in terms of time and money.

9. FUTURE WORK

Will involve implementing the proposed approach in large scales in the real world and test the system to check the results, we also wants to work on adding new features like promocode, offers for user and use shortest path algorithm to help user to find his way in shortest time. Finally, the future step would be developing a mobile application for users to find available parking slots and guide them through this application.

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