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Order Tracking and Delivery Assisting System

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1. Introduction

1.1. The problem

The amount of online purchases has been rapidly increasing in the last decade[1]. Nowadays people can purchase almost anything from the internet and have it delivered to their home or post office in the next few days[2]. This has resulted in the creation of ecosystem of customers, producers and delivery service providers.

The growing customer needs have been met by the producers through the use of robotics and other automated equipment for the production of the goods they offer. Unfortunately, this is not the case for the delivery service providers. Their way of operation has stayed the same for the most part, especially for the delivery drivers.

We believe that this should not be the case and that we can design and implement a system that can assist the delivery service providers to meet the ever-growing customer needs, and provide better overall experience for their online purchases.

1.2. Challenges and Requirements

Abstraction

The variety of items you can purchase over the internet is pretty much endless. That means that the delivery assisting system should be abstracted as much as possible in order to be used for all kind of delivery services. It should be possible to be easily used for delivery assistance of big in size items like furniture, but also for small sized items e.g. groceries.

Independency

The system should not be dependent on specific software. It should be able to operate on every major operating system, both computer and mobile. It also should be accessible on all kind of devices e.g. computers, smartphones and tablets.

Being used by different user groups

The system should be implemented in such way that will be possible to accommodate the needs and provide assistance to different user groups. It should provide different access level and privileges to each of them accordingly.

Efficiency

The system should be as efficient as possible in the way it would solve the problems. This is an especially difficult challenge, because of the simple fact that the system will have to solve one of the most famous NP problems[3] in computer science: The Traveling Salesman Problem[4].

Adaptability

The system should be able to adapt to the needs of each of its users. There should be options to make it act in the specific way that the user desires, but it should also be able to automatically adapt the way it solves problems in order to provide as much automatic assistance as possible. For example, it should change some of its parameters in accordance to the incoming and expected workload, so it can more efficiently provide the delivery service to the end customers.

Privacy

Part of the system is the real time geolocation of the orders during their delivery to the customers. We believe that this part of the system should be not be possible to be activated without the consent of the delivery driver.[5]

Object Oriented Design

The system should be implemented following the principles of the object oriented design[6]. We believe that the advantages of the object oriented design like: *encapsulation, data protection, inheritance* and *polymorphism* will simplify the process of understanding and implementation of system specifications.

Model – View – Controller Architecture

By embracing the MVC architecture, the system will have easy to identify components, each responsible for a specific set of tasks. We believe this will result in better code structure and easier for debugging code.

1.3. Description of the System

It is important to mention that the idea for this thesis project has started by collaboration between Dr. Michael Sirivianos and Ideas2life.

Ideas2life has proved itself as the most successful startup company in Cyprus and they currently have two ongoing projects.

- Foody.com.cy: An online platform for ordering food and drinks from a catalogue of more than 550 restaurants all over Cyprus.
- AtYourService.com.cy: An online platform for finding/posting services that one can use/provide.

1.3.1. Existing System

The existing system, to which a will refer simply as Foody, is by far the biggest online platform for ordering food and drinks in Cyprus. It currently has more than 550 registered restaurants in its catalog and is known as being the easiest way to order food in Cyprus.

To make an online order through the Foody system you have to follow four simple steps.

1.Find Restaurants near you

This is achieved simply by entering the post code of your location in the corresponding placeholder which you will find on the homepage of the system.

2.Choose restaurant

You will be shown with list of available restaurants that you can purchase from. Select the one you wish.

3.Select the products for you order

You will be presented with the menu of the chosen restaurant. You may add and customize any item from the list until your order is ready for submitting.

4.Select payment method

The last part is the payment method and depending on the restaurant desire, you can pay either online with a card or with cash when you receive your order.

Unfortunately, the Foody system currently does not provide any delivery assistance services to the restaurants. It is up to every restaurant owner to find a solution to this problem.

Fortunately, the Foody team always aims in providing more and better services to their clients and together with Dr. Sirivianos they have decided to propose this very thesis project in order to upgrade their system with Order Tracking[7] and Delivery Assisting capabilities.

1.3.2.Thesis Project Idea

The main goal is to create a system which will automatically manage and track all orders that need to be delivered by vehicle to the clients of the Foody system.

It will provide assistance to the restaurant owner by automatically deciding which orders can be grouped and delivered in a single delivery route. Who the driver for the delivery route will be and with which vehicle the delivery should be made.

Another part of the system will be used by the delivery driver through a mobile device. The main functionalities of this application will be to notify the delivery driver when a group of orders has been assigned to them, show them the optimal sequence in which the orders have to be delivered, provide navigational services for the delivery of the orders, show details about each order and provide easy way to contact the client when it is necessary.