

Online Food Delivery App ‘Foodie’

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Abstract: *The purpose of this thesis is to build an online food ordering application named “FOODIE”. Our research also includes the “satisfaction of consumers by using online food services”. It will deal with consumer behaviour & helps to analyse their perceptions & will also help us to understand consumer equilibrium. Through these platforms, sharing one’s experience with others has become so easy, in the form of reviews, be it regarding a product brought or any kind of service availed.*

Keywords: Online food ordering, Mobile Application, Foodie, Customer Satisfaction

1. Introduction

With the rapid development of mobile technology, mobile application is connecting every field all together. Therefore, food industry is using this technology in connecting with vast public through online food ordering. Online food ordering may be a process that delivers food from local restaurants and other food co-operatives through a mobile application or an internet site. This type of food delivery is gaining popularity with more and more people especially the younger generation turning to mobile food ordering apps, thereby changing the way food is delivered and picked up [1]. Customers prefer using the food ordering app as they will generate an order without having to elucidate it to a special person and have the food delivered at his doorstep. Moreover, online payment makes this process easier and faster. Some popular online food ordering companies are “Swiggy”, “Zomato”.

Popular machine learning algorithms like Decision Tree were applied over a dataset of lakhs of records. For the customer, this application provides a view of food information like category, name, image, price, description etc. on the application. For the administrator in any particular restaurant, this application offers a series of operations to add, update, delete and query the information of food, food order, customer and employees. The typical mechanism behind food delivery is as follows: the user on the food delivery application chooses a restaurant to order food from, checks the menu list, select food to order and proceed to payment. Once payment is done, an employee i.e., the rider nearby the location picks food from the restaurant and delivers to the user’s home [2]. This also increases employability as a platform is provided to deliver food to the houses.

The basic features that are needed by the customers in an application are making order, food review, order history, restaurant profile, profile setting, order status, and track order.

The features that are needed in website for restaurant are: restaurant profile, order (incoming, dispatched), menu (modification, availability), and courier [3].

2. Related work

The journey of food delivery services came when the term ‘Dabbawalas’ was used to service where lunches were packed and sent through rail or bicycle to the working professionals in Mumbai, India. Then, with the development in technology and in the world of mobile phones and internet, the first food delivery service was given in 1995 by “World Wide waiter” (Waiter.com) in northern California where the restaurants had partnered with the services to take their offline menus in online world. Now, most of the countries have their own online food ordering applications which connect small restaurants to the consumers sitting at home and either they do not have the time or the transport to go to these restaurants. Also, some people just avoid going out to these crowded places and prefer eating at home. The past work present discussed the use of mobile application with internet of things, and cloud computing for different purposes which also includes food delivery. In this system, application focuses on targeted audience, and the users enter their data through login, then the data is processed, and the users utilize the facilities available [4]. These mobile applications are made by developers using different platforms, languages: Java, and SQL, for developing front end: Android Studio Development Kit, and back end: MySQL Server, Wamp Server [5].

The food delivery platforms are reviewed by the consumers on the basis of star rating [6] which depends on various factors like customer satisfaction, timely delivery, and the customers intention to use it again in future [7]. A study in [8] compares the popularity of online food delivery apps- Zomato, Swiggy and uber eats based on the delivery services provided. It is not necessary that a particular application is popular worldwide, popularity changes with the location, and perception of the consumers [9]. The paper [8] concluded that Zomato is the most successful online food delivery platform in Ludhiana, India. E-payment is also an important factor deciding the user’s preference of choosing a platform over many other platforms. The paper [10] tells all the important factors that affect the adoption of food delivery apps. The paper also surveys about the age group, gender, and the marital status of the customers that prefer ordering food at home and concludes that around 59% of the people like eating at home rather than dining out. The paper [11] builds a food ordering application for Tom Yum Thai Oy, a Thai restaurant in Vaasa.

The table below has different food delivery platforms used in different countries:

Table 1. Different Food Delivery Apps

S. No	Fooddelivery services	Year of foundation	Country of origin	Reference
1	Zomato	2008	Delhi, India	12
2	Swiggy	2014	Bangalore, India	13
3	Uber eats	2014	San Francisco, California, U.S.	14
4	Food Panda	2012	Singapore	15
5	GoFood	2018	Indonesia	16

6	GrabFood	2012	Singapore	17
7	GrubHub	2004	Chicago, Illinois	18
8	Faasos	2011	Pune, India	19
9	DoorDash	2013	Palo Alto, California, U.S.	20
10	Super meal	2012	Birmingham, UK	21
11	Seamless	1999	New York, U.S.	22
12	Deliveroo	2013	London, England, UK	23
13	Dunzo	2014	Bengaluru, India	24
14	Potafo	2017	Kozhikode, India	25
15	Postmates	2011	San Francisco, California, U.S.	26
16	Just eat	2001	Kolding, Denmark	27
17	Square Eats	2020	Botswana, Africa	28
18	Ele.me	2008	China	29
19	iFood	2011	São Paulo, State of São Paulo, Brazil	30
20	Demae-Can	1999	Japan	31

3. Objective

The main objective of the paper is to provide an online food delivery app “FOODIE” which can serve the society with an added advantage by ordering from two or more places if in the same route or within 5-6 km range, and the customer can only register once using Aadhar verification and secure log-in, it makes the web portal safe for transactions. Also, to eliminate the wait time, the users can book a table at the restaurant of their choice with just a few taps.

The purpose of this invention is to provide profit in terms of Stakeholders [32], easy in terms of the app user, diverse options for ordering food, improvising in Delivery mechanism to solve the hectic situation created by single place, single order criteria.

The app is very much easy to use as all it requires is an internet connection, just log in to the web-portal/app and the user can order from multiple locations and can also order for more than one location in one time. With the services, responsibilities come hand-in-hand, it is very important to know the satisfaction of the customers in terms of using the services, timely delivery, their intention to use the app again. So, our paper includes “the satisfaction of customers” which also makes the business profitable as customer satisfaction is directly proportional to the recommendation a restaurant gets every time a customer checks the reviews. If the previous customer is satisfied and gives good reviews then only the next customer thinks of ordering from the same, if not the customer has

many other options to go to. So, it is very important to satisfy the customers to make one's name in the market.

4. Technology Used

In a food ordering mobile application different algorithm are used for different purposes. All the data related to the customers, meals, list of restaurants are processed using machine learning algorithms. With help of AI and machine learning: Gradient Boosting Decision Trees, the sequence in which the notification of the orders sent to the delivery person is improved. The decision tree algorithm and the random forest algorithms helps by classifying the restaurant into different groups based on the reviews obtained by the customers on the basis of the services provided [33]. Also, AI and ML helps connect the customers to the right restaurants without letting them roam around for the perfect meal and increase the efficiency of the food delivery operations. Therefore, AI & ML implementation can foster Real-time, micro-optimization of dynamic demand-supply, millions of times every day which can result in grow in online delivery business in order value by 200%. Some AI-driven kiosks apps use Facial recognition to give a personalised experience to customers, speeds up selection and ordering process and decreases wait time.

Machine learning is used in 3 main areas on the food delivery business:

1. Route planning for deliveries
 2. Sales forecasts and amount to food to be prepared (avoid waste)
 3. Product suggestion
- Route Planning's ML applications goal is to achieve reduced delivery times and costs. Usually, neural networks that work with past data as input and suggest best fit scenarios for new routes.
 - Sales forecasts ML applications goal is to reduce costs and inefficiencies in the supply chain level. It uses as input sell-in and sell-out information, price, price elasticity, market demand data proxies to generate production and stock quantity suggestions to maximize sell-out while reducing cost and avoiding food waste.
 - Product suggestion ML applications goal is, well, to suggest food that you might like to order based on preferences, on-site navigation, previously ordered items and more. The final goal of these applications of course is to sell more.

Cloud computing can also play vital role in food industry in areas like Customer Relationship Management, Customer Service and Supply Chain Management [34]. By using cloud computing, the food service providers ensure the delivery of the right product in the right place at the right time as it connects people and companies in real-time and for making food service provider's work easier.

Apart from these technologies, the food delivery application is developed using different platforms, for both front and back end. For front end, programming languages like C++, Java is used for android/apple mobile phones. To make work easy some cross platform applications are developed using different frameworks to help make apps that can work on different platforms. Some of the framework's present are PhoneGap, jQuery Mobile, AngularJS, and Ajax. These frameworks help in improving the app quality, the cost for app development is comparatively low, and the targeted audience is large as it combines multiple platforms [35].

After the development of the application, one of the factors which plays a very important role in the success of the online food delivery application is different payment methods [36]. Customer Convenience, secured payment architecture, Strategy for referral coupon, different Payment preference of the customers, and various Discount by Portals all comes under e-payment systems and result in increase in volume in sale.

Table 2. Technologies used

Programming Languages	Objective C Swift Java Kotlin
Frameworks	PhoneGap jQuery Mobile AngularJS Ajax
Web development	HTML5 CSS3 JavaScript XML
Data scripting	PHP MySQL
IDE	Xcode Android Studio
Cloud Storage	Amazon S3
Database	Mongo DB Redis
Utilities	Google Analytics Visual Website Optimizer
Analytics	Mixpanel Google Analytics Keen.io
Email	Gmail AWS
Deployment platforms	Cloud iOS Android
Data Encryption	MD5 encryption (Message Digest algorithm 5) SSL (secure socket layer)

5. Customer Satisfaction

With the covid-19 outbreak, lockdown restrictions do not allow people to enjoy dine- in services in the restaurants which affected the world's economy and restaurant sales [37][38] but online food delivery services provided non- contact delivery prepared food

and thus enabled the food providers to keep operating. The online ordering of food has greatly influenced and changed the way of people's eating habits and preferences while ordering food online [39]. Every customer has their own preference, for some timely delivery is important, for others payment options or quality of food is important. The main factors influencing the consumers to order food online are: short delivery time, convenient, easy accessibility, very flexible, different mode of payments, and promotions/offers [40].

6. Proposed System

The app, FOODIE focuses only on delivery, so that the registered restaurants can promote their offers and meals without bothering the delivery of the orders as Foodie will not take any 'MINIMUM ORDER' tag on offer or meal as they are fulfilling the end consumers demand by delivering food from the local restaurants, whereas in apps like 'Food Panda' the restaurants decide 'minimum order amount' to order as they have to deliver the order to the end consumer by their own-selves or a customer has to go and pick up the food once it's prepared at the restaurant.

The application charges a certain amount of fee from the restaurateurs to get their restaurants listed on the mobile app for promotion or new meals or new nearby options. When the user places an order, a notification is sent to the restaurateur, the nearest delivery person, and the platform owner. By collaborating at every stage with a powerful algorithm, all the three stakeholders: The Restaurant Owners, The Platform Owner, and The Delivery Professionals maintain the smooth functioning of the platform for the users.

The app Foodie will not own any restaurant or chain of delivery services. It coordinates with the third party to plan supply for the demand that arises.

6.1. Features

- Food ordering: Allowing the users to order their food on-the-go from two different restaurants.
- No minimum order: The customer does not have to a minimum amount to order from a restaurant.
- Table Booking: Enables the users to book a table at the listed restaurant of their choice with just a few taps and the wait time at the restaurant is eliminated.
- Explore Places: Offering the discovery and guide to the user for exploring nearby restaurants with pictures, reviews and map locations.
- One Many Schemes: Ordering from two places at the same time and with the powerful algorithm of Single Source Shortest Path will include the Pickups as Red and If all pickups are done than the order is ready to go and will not find out the single source path from that node to Delivery location
- Time-saving, the invention is capable of reducing the processing time to half of the existing rate with diverse options for food, as food ordering not limited to just one restaurant at a time.
- Online payments, online payments facilitate the flow of the money in the right direction, a step forward to corruption-free India.
- Eco-friendly, the process proposed saves unnecessary wastage of paper of making every document digitally.
- A user-friendly interface makes it easy to clear all doubts at one doorstep.
- Aadhar verification and secure log in the password makes the web portal safe to use in terms of online tractions and fund transfer.

- Less use of the renewable source of energy and have a big task performed in lesser time.

Table 2. Existing Applications

S.no	Existing state of art	Drawbacks in existing state of art	Overcome
1	Food Panda	Min Order	No Min Order
2	Zomato	Single restaurant ordering mechanism, one user can register multiple times using multiple numbers, User Interface not good	Can order from two places or more if in the same route OR within 5-6 km range, a user can register only once, User-friendly User Interface
3	Uber eats	Fake complaints leading to loss of the company, one user can register multiple times using multiple numbers	Complaint registration with proper proof, user can register only once

6.2. Advantages

- Opened 24/7
- Save time and money
- Reduce costs
- Hits the target market
- Online delivery mechanism
- Food can be ordered from multiple sources
- Paper wastage is reduced
- Route optimization is attained
- Multiple payment methods- cash on delivery, credit/debit cards, google pay
- Helps in building up a social community for new food joints
- Live tracking available
- A win-win situation for all stakeholders

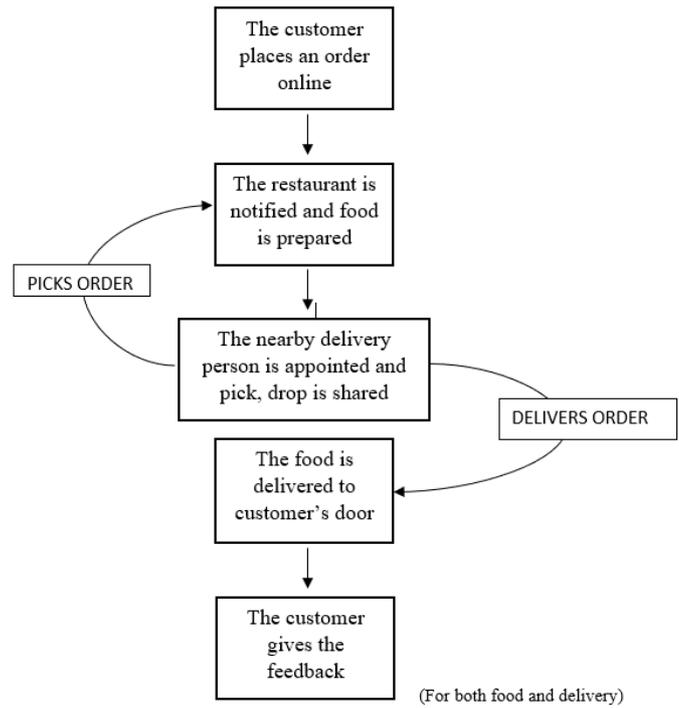


Figure 1. Working of food delivery apps

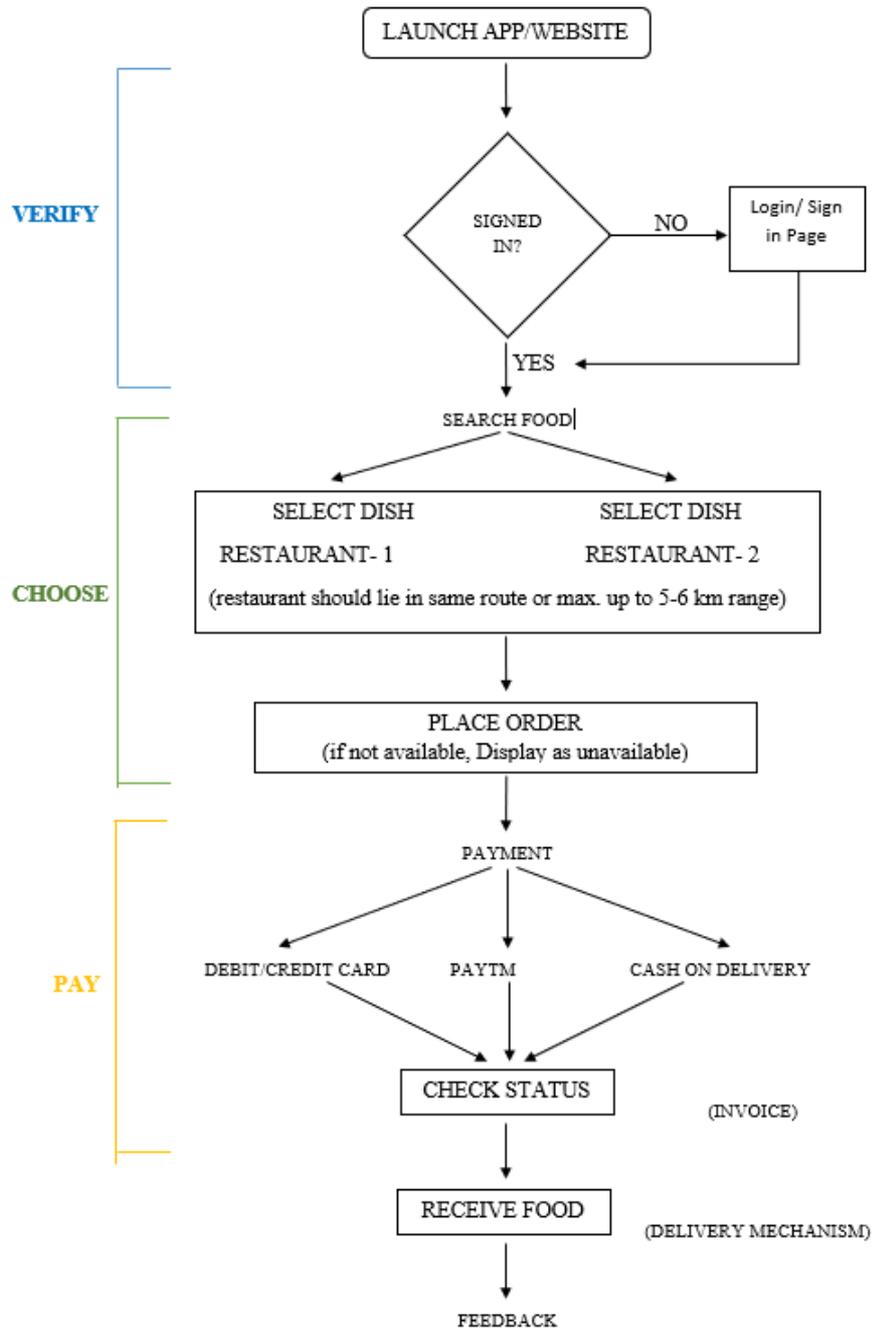


Figure 2. The mechanism from user end

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