OCD: On-Demand Food Delivery via Online Crowdsourcing

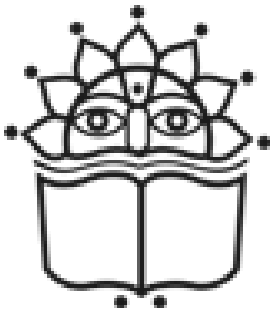
The
Project Report
Submitted by

Ms. Ashwini Babar	**2141002**
Ms. Pragati Kangude	**2141032**
Ms. Prerana Raykar	**2141055**
Ms. Saima Shaikh	**2141057**

Bachelor of Computer Engineering

Under the guidance of

Prof. P.M. Paithane



"Department of Computer Engineering"

Vidya Pratishthan's Kamalnayan Bajaj Institute of Engineering and Technology

Bhigawan Road, Vidyanagari

Baramati-413133

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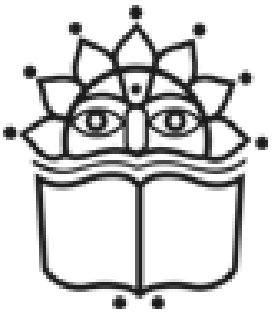

Vidya Pratishthan's
Kamalnayan Bajaj Institute of Engineering and Technology, Baramati
"Department of Computer Engineering"

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This certificate is to certify that following student :

Ms. Ashwini Babar	**2141002**
Ms. Pragati Kangude	**2141032**
Ms. Prerana Raykar	**2141055**
Ms. Saima Shaikh	**2141057**

are bonafide students of this establishment and the work has been conveyed out by him/her under the management of Prof. P.M. Paithane and it is supported for the incomplete satisfaction of the necessity of Savitribai Phule Pune University, for the honor of the level of

Bachelor of Computer Engineering.

Project Guide
(Prof. P.M. Paithane)

HoD Dept. of Comp. Engg.
(Dr. C.S. Kulkarni)

Principal
(**Dr. R. S. Bichkar)**

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Ms. Ashwini Babar
Ms. Pragati Kangude
Ms. Prerana Raykar
Ms. Saima Shaikh

Abstract

Now a days the ability of clients to buys items on the web or through phone increments, and afterward the bought things to be conveyed securely to his/her location is extending rapidly. In on-request food conveyance, where clients put in the food requests on the web and riders convey those orders is becoming well known. This original metropolitan food application requires exceptionally productive and versatile continuous conveyance administrations. Be that as it may, it is hard to enroll sufficient food bundles and course them to working with such food requesting frameworks. This article presents a web-based publicly supported conveyance approach for on-request food. Worked with by IOT(Internet-of-Things) and 3G or 4G or 5G advancements, public riders can be drawn to go about as publicly supported riders conveying the food with the assistance of shared bikes or electric vehicle. The publicly supported riders are progressively divided between various food suppliers for food conveyance. This exploration fosters an internet based food requesting framework and applies Heuristic calculation to address the Traveling Salesman Problem(TSP) in steering advancement. The framework additionally utilizes Global-Positioning-System Technology(GPS) in Android-supported mobile-device and exploits Google-Maps for co-ordinates to plan arrangement. Recreated limited scope and certifiable enormous scope on-request food conveyance occurrences are utilized to assess the presentation of proposed approach.

Keywords: Adaptive Large Neighborhood Search (ALNS),Crowd Sourcing, Heuristic-algorithm, Hybrid Optimization On-demand food-delivery,Tabu Search (TS), Urban Logistic

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Introduction

1.1 Overview

Recent decades have seen the rise of mobile Internet, enabling the use of smart phones for ordering and delivering online (e.g. Domino's deliveries). The provider can increase customer loyalty by improving customer satisfaction. To improve it, you can have a dynamic online food-delivery system which enables users to buy things without physically visiting the provider, but rather by mobile device or web, and then can have them delivered safely and in proper situation to the users address. Through the OCD service, users could order online and have take-out food delivered by the restaurant staff. With the on-demand food business, small-scale catering businesses, users and riders can receive all-over, scalable, and affordable food service. OCD framework allows catering shops(providers) to accept food orders placed by users through mobile device or computers and then prepare personalized delivery items.

Online Crowd-sourcing is an appropriate approach to take advantage of collaboration among stakeholders to co-operatively complete tasks assigned to them. This system framework presents an internet based publicly supported conveyance online crowd-sourced-delivery (OCD) approach for food that oblige among providers, clients and publicly supported riders.

1.2 Motivation

- Now a days joblessness is rising issue, this framework is proposed to determine that. Evidently it'll assist with decreasing traffic issues in urban areas.
- To fulfill client needs in terms of delivery speed and accessibility. A speedy and moderately simple method for dispatching on request conveyance and impromptu conveyance.

- Few out of every odd eatery stand to recruit workers for food conveyance, this framework will settle that issue also.

1.3 Objectives

- Online crowd-sourced (OCD) approach restaurants,customers and riders.
- System minimizes the total travel cost for rider and to reduce both traffic issues and constant emission of harmful gases.
- On-demand food needs for the fast,on-time and accurate food delivery services.
- The time priorities of the users and crowd-sourced riders.

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Risk Identification

- **Technical Risk:** Glitches in data-set (null values/absent value)
- **Schedule Risk:** Due to COVID-19, the discussion and indeed working on the complete project is virtual and it's difficult to make out the things.
- **Operational Risk:** We are not familiar with data mining concept and this might risk at using other libraries.
- **Business Risk:** We need to make sure that our project is unique and creates no plagiarism. Also, copyright is need.

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Literature Survey

1. **"R.D. H. Tobing, "A food ordering system with delivery routing optimization using global positioning system (GPS) technology and google maps": 2016"**
   Proposed system is mainly focused on the routing optimization during delivery service. To overcome that, proposed system explains an online food delivery system using Heuristic-Algorithm approach which basically resolves Travelling Sales Problem while routing optimization. Along with that system supports Global-Position-Systems (GPS) technology which leads to coordinate map solution.

2. **"O.F. Aydin, Ilgin Gokasar, Onur Kalan,"Matching algorithm for improving ride-sharing by incorporating route splits and social factors": 2020".**
   Now-a-days increased traffic problems and development in technologies has led to growth of alternative delivery modes such as dynamic ride-sharing and so on. This sort of delivery mode focuses to establish ride matches between rider with similar routes. This proposed system framework highlights on development of an algorithm for improving matches on the basis of user prerequisites. The matching algorithm likewise splits unmatched routes of rider and retries to find additional matches using remaining unmatched rider-providers and users.

3. **"Di Chen, Ye Yuan, Wenjin Du, Yurong Cheng, Guoren Wang, Northeastern University, China Beijing Institute of Technology, "Online Route Planning over Time-Dependent Road Networks": 2021"**
   Mentioned proposed system is to calculate the minimum total travel time path from the initial point following the nodes that appear dynamically over time to the final point, which referred to as the online-route-planning. Therefore, this system is focused on online-route-planning over time-dependent road networks (i.e., ORPTD), this problem is NP-complete. To resolve this problem heuristic-algorithm is implemented.

4. **"Y. Liu, B. Guo, C. Chen, H. Du, Z. Yu, D. Zhang, and H. Ma, "Foodnet: Toward an optimized food delivery network based on spatial crowdsourcing," IEEE Transactions on Mobile Computing, pp. 1–1 : 2018".**
   This proposed system is based on implementation of Food Delivery Network (i.e., FoodNet) using technique called crowd-sourcing. Basically, it has took reference from urban taxis which supports to on demand delivery of food by means of ride-sharing. It focuses on minimization of the number of riders and to minimize total traveling path to reduce the final cost. For that it uses construction algorithm and Adaptive Large Neighbourhood Search(ALNS) algorithm.

5. **"Zhiwen Yu, Huang Xu, Z. Yang, and Bin Guo," Personalized Travel Package With Multi-Point-of-Interest Recommendation Based on Crowdsourced User Footprints": 2015".**
   The LBSN (i.e., Location Based Social Networks) gives interface for client to share their areas/locations and share reviews about attractive places, which forms crowd-sourced digital network of users. This proposed system explains an method for customized travel package recommendation for users to finalize their travel plans. Recommendations are generated according to user preference, a heuristic search-based travel route optimization algorithm is used for the same.

6. **"J. Wang, Yasha Wang, D. Zhang, Feng Wang, Haoyi Xiong, Chao Chen, Qin Lv, Zhaopeng Qiu, "Multi- Task Allocation in Mobile Crowd Sensing with Individual Task Quality Assurance": 2018".**
   This proposed framework is centered around multi-task allocation issues happening during mobile crowd-sensing. To determine those issues, framework re-distinguishes task allocation problem by using task specification based detecting quality thresholds, and accomplishes motivation of appointing an appropriate set of activities to each worker so that the overall framework compatibility should be expanded.

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Software Requirement Specification

4.1 Problem Definition

To develop a speedier model for picking an appropriate number of couriers and routing them in order to facilitate food-ordering frameworks by matching riders and providers, as well as to solve routing issues.

4.2 Project Scope

- A crowd-sourced food delivery approach is addressed for on demand food delivery service. The on demand food business focuses the need for fast and appropriate food-delivery services.
- The Online dynamic-optimization system framework is produced to address the time priorities of the users and crowd-sourced riders.

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Functional Requirements

- Food-Cloud: There will be list of all types of food, the provider is dealing with the available themes.
- Record Order-Details: User can select food-items from menu table and can add the ideal food things to the cart. Also, user can place the order and will get the confirmation about that order in the form of order ID.
- View Order-Details: Admin can take view of placed orders.
- Crowd-sourced riders: Will have to Log-in into the OCD framework, then accept the provided delivery activity, report to the providers, get the delivery items and deliver them to the appropriate user.
- This system minimizes the overall travel path for the riders while traveling to the providers.
- Rider will check shortest route to place that order.

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Non-functional Requirements

- **High Speed:** Framework should process referenced task in parallel for various action to give quick response then framework-system must wait till completion of task.
- **Accuracy:** Framework ought to precisely execute interaction and afterward show the outcome likewise. Framework result ought to be in client required arrangement.
- **Interoperability:** Framework structure ought to can trade information and speak with inward and outer applications and frameworks. It should be capable trade data both inside and remotely.
- **Response Time:** The response time of framework should be deterministic consistently and exceptionally low, i.e it should fulfill each time constraint/deadline. Accordingly, the framework will work in real time.

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Interface Requirements

7.1 Hardware Interface

- System: Intel core i3 2GHz
- Memory: 4 GB RAM
- Hard Disk: 40 GB
- Android: Mobile: 1.2 Quad core Processor or higher

7.2 Software Interface

- Python
- MySQL
- Anaconda(Jupiter Notebook)
- Google API

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Methodology

8.1 Algorithms

1. Rider-Provider Matching
2. Insertion Heuristic Algorithm

8.2 Pseudo Code

- **Rider-Provider Matching**
  new-order -> update database
  sort announcement-time
  select unmatched-rider -> early announcement-time
  select temporary-feasible-provider -> early announcement-time
  match(capacity and time and route-feasibility) -> (rider and provider)
  if provider is feasible for rider
  add pair to feasible-match-list
  if unchecked-provider -> go to step 3
  end if
  select provider -> feasible-match-list and match(provider with rider)

- **Insertion Heuristic Algorithm :**
  Rider = initial-point (current vertex position)
  for(i = Rider; i<total-vertices; i++)
  if(edge-weight < current-vertex and unvisited-vertex (v))
  set v = current-vertex
  update v = visited-vertex
  end if
  end for
  return to initial-point

8.3 Advantages

- Makes managing orders simpler and increases accuracy.
- Easy to keep the track of orders, delivery and payments.
- Guaranty of on-time delivery and easy to configure routes in case of delay.
- Can have complete analysis of framework.
- Feedback system will help to improve customer satisfaction.

8.4 Dis-advantages

- Mismatch data of customers,orders and riders in case of any glitch.
- Chances of technical problems in the system.
- Traffic or other environmental factors can be real time problem.
- Stable network requirement is must to use system efficiently.

8.5 Time-line Chart

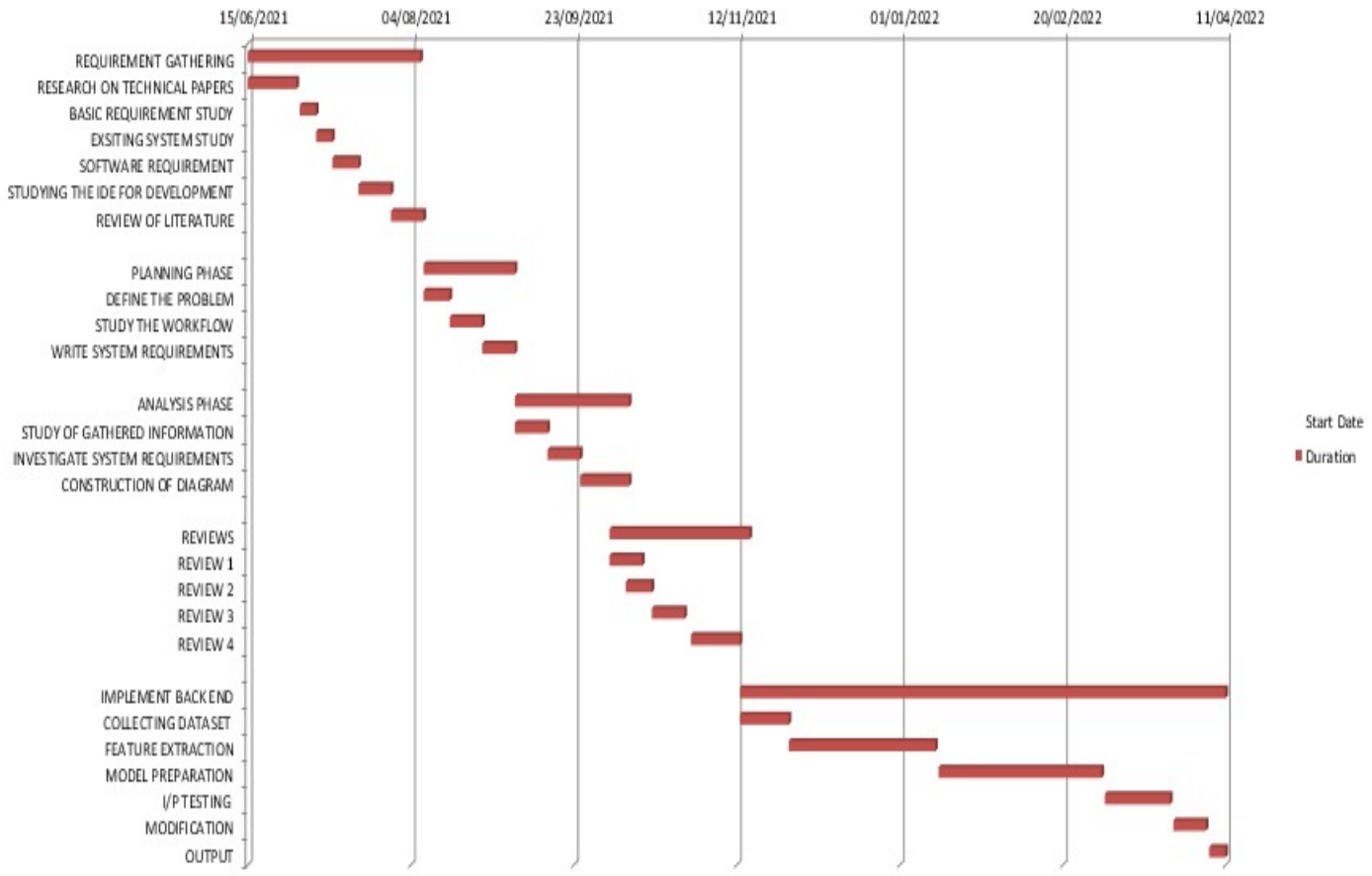

Figure: 8.5 Time-line Chart

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System Design

9.1 System Architecture

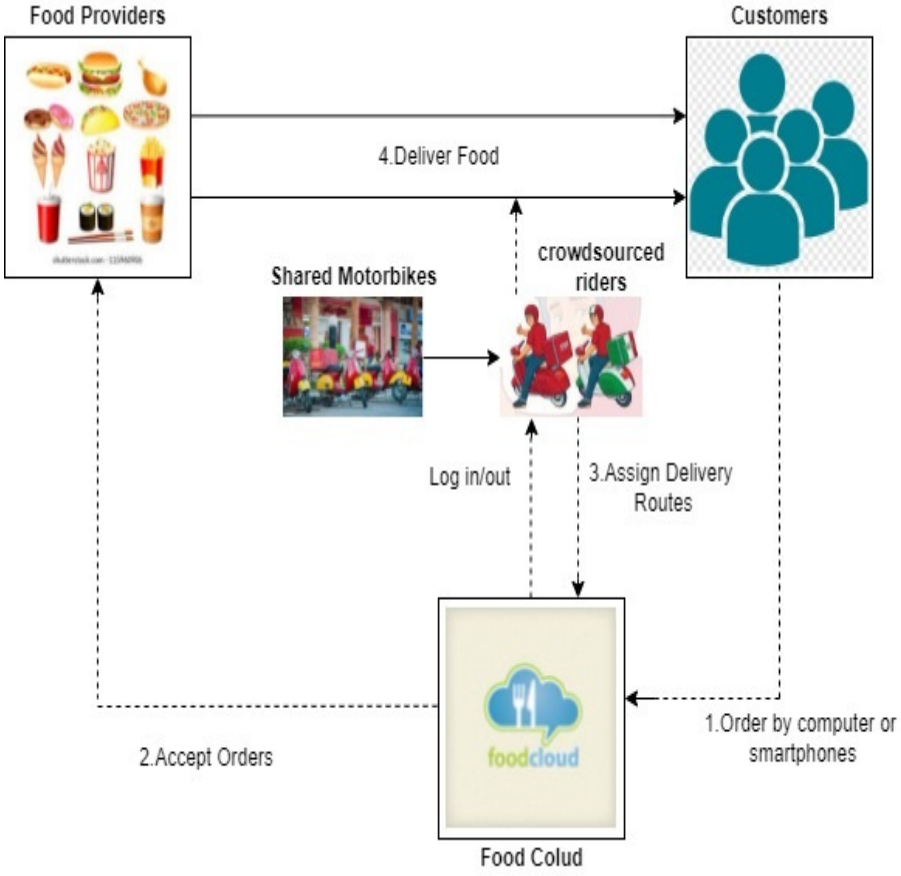

Figure: 9.1 System Architecture

- **The crowd-sourced delivery distribution** is presented for on-demand food service. As long as we could possibly know, this is the primary review to apply the crowd-sourcing principle logic in the on-demand food delivery domain.
- **An online dynamic optimization framework** is developed to address the time inclinations of the users and crowd-sourced rider person. The introduced structure is elastic and robust therefore, it is able to facilitate on-demand food delivery in a real-time manner.
- **The hybrid solution method** is introduced to address the toughness of the OCD issue. The ALNS and TS techniques are customized to equalize search intensification furthermore distributed to accomplish improved routing performance of framework.
- **An intensive experiment** is used to simulate small-scale to medium-scale and real-world large-scale food delivery approach is applied for performance assessment. The conclusion suggests that the proposed approach is better than traditionally used logistics and baseline algorithms.

9.2 Flow Diagram

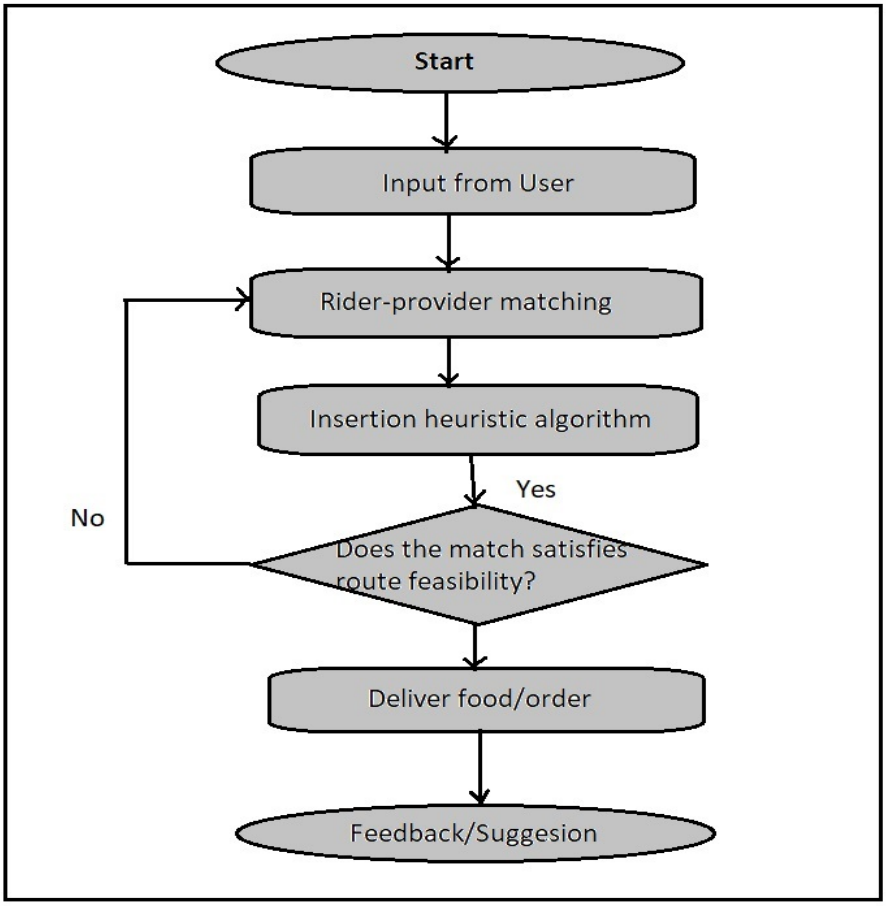

Figure: 9.2 Flow Diagram

9.3 DFD Level- 0 Diagram

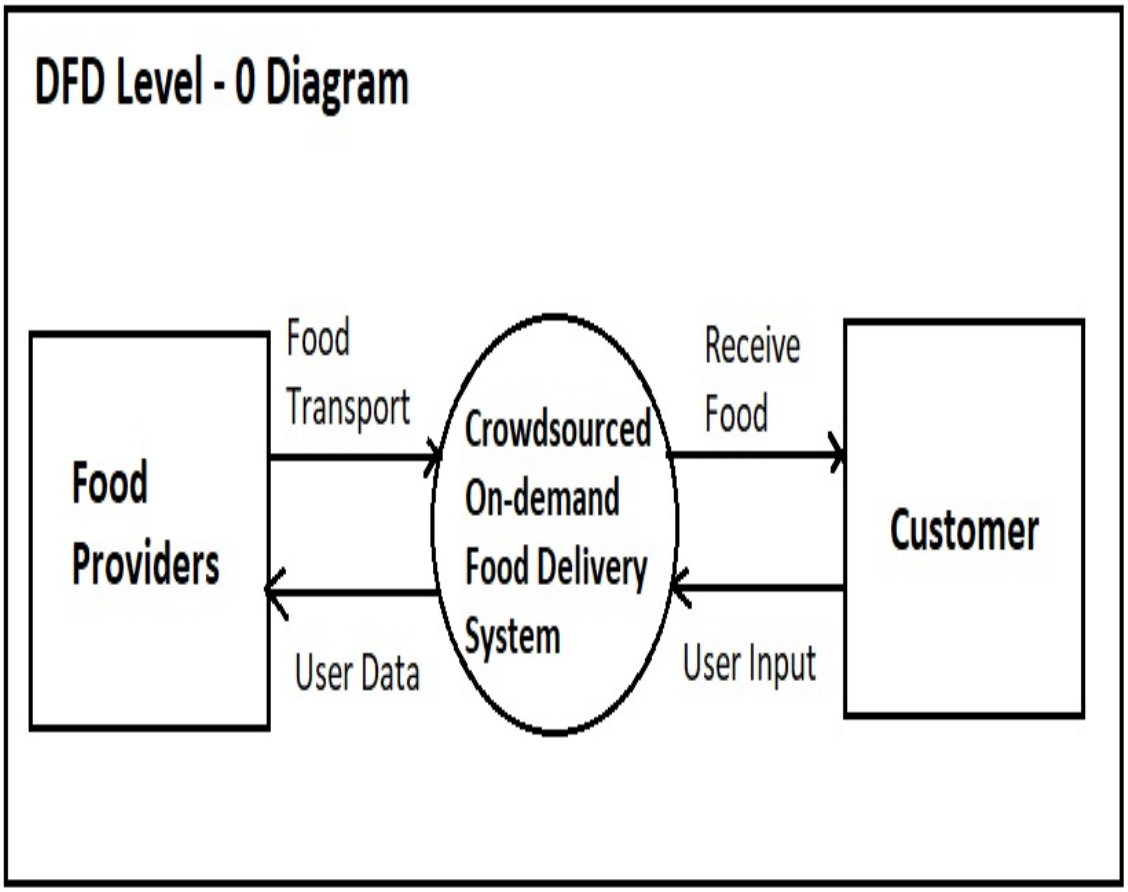

Figure: 9.3 DFD Level-0 Diagram

9.4 DFD Level- 1 Diagram

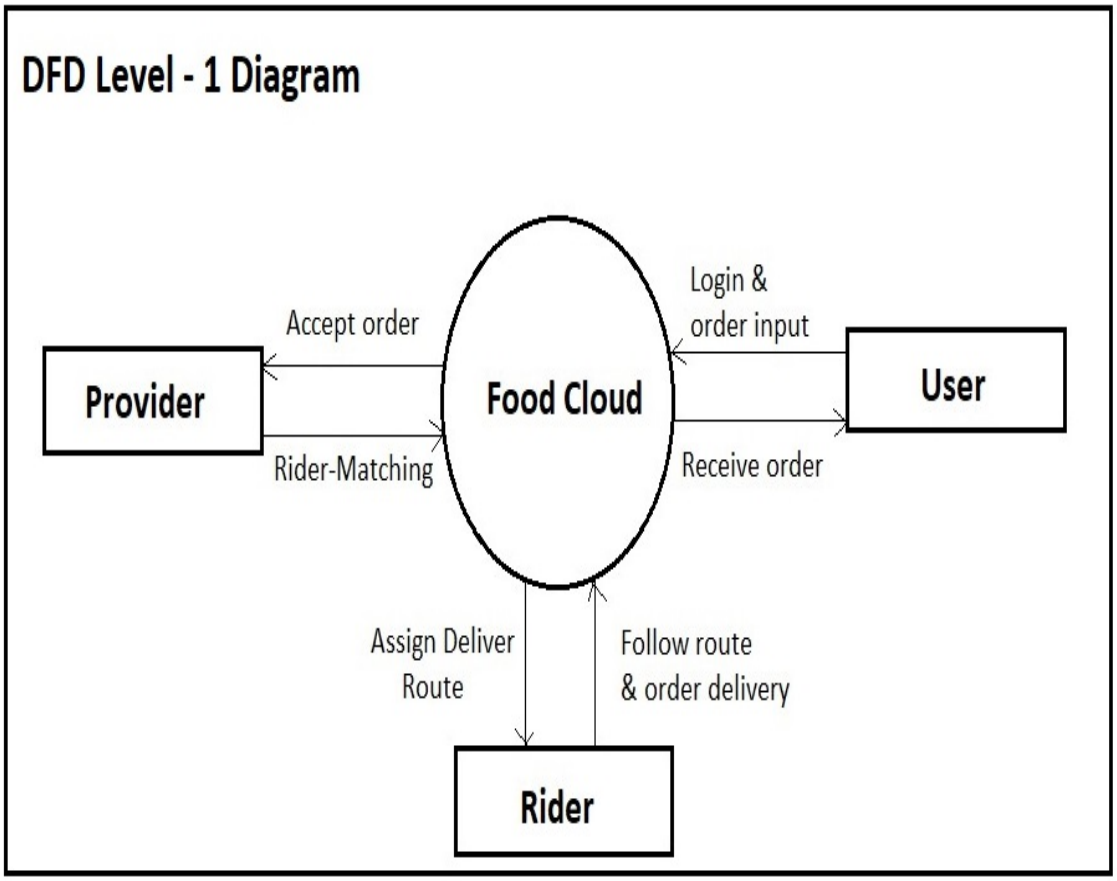

Figure: 9.4 DFD Level-0 Diagram

9.5 Class Diagram

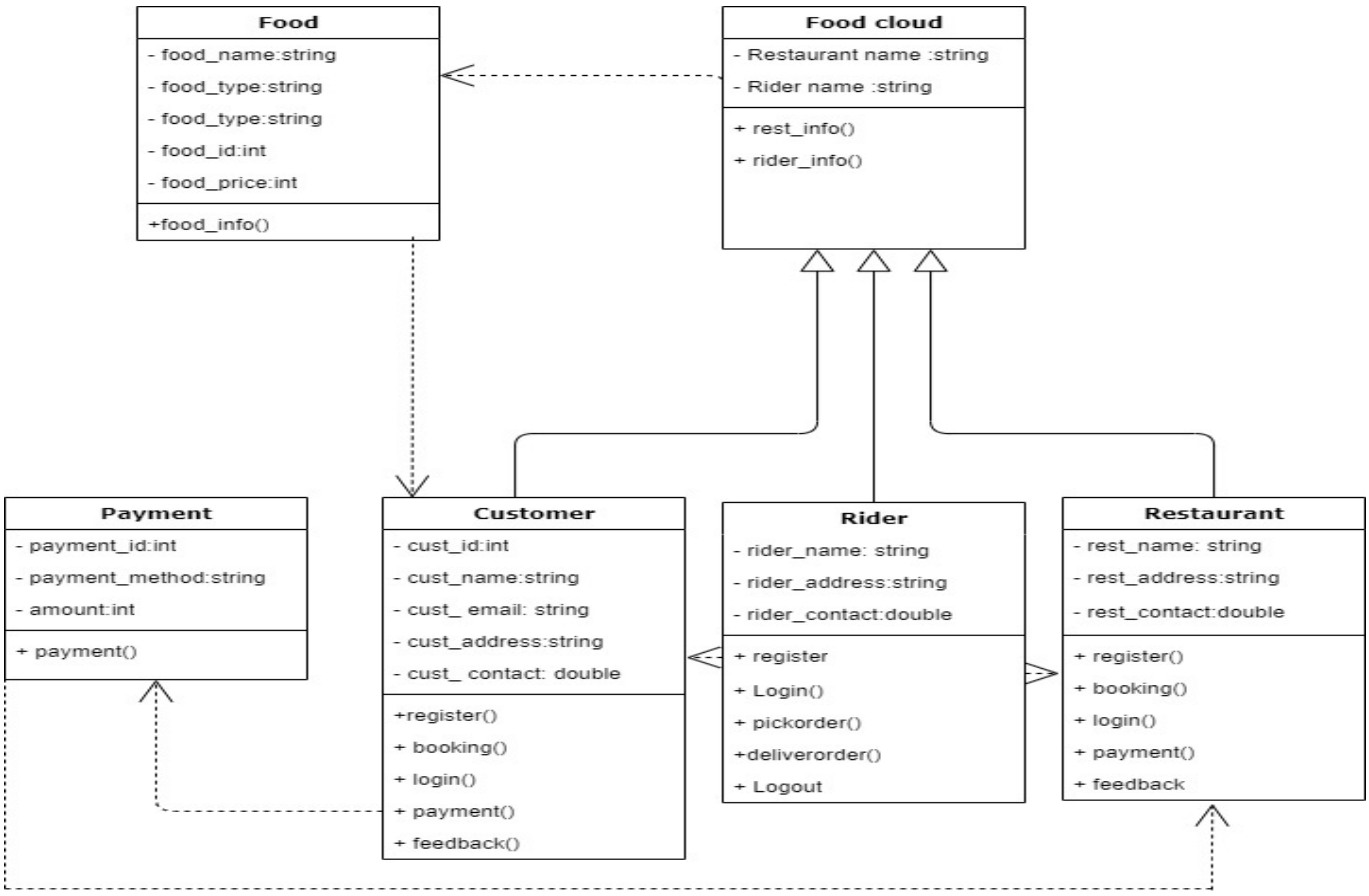

Figure: 9.5 Class Diagram

9.6 Sequence Diagram

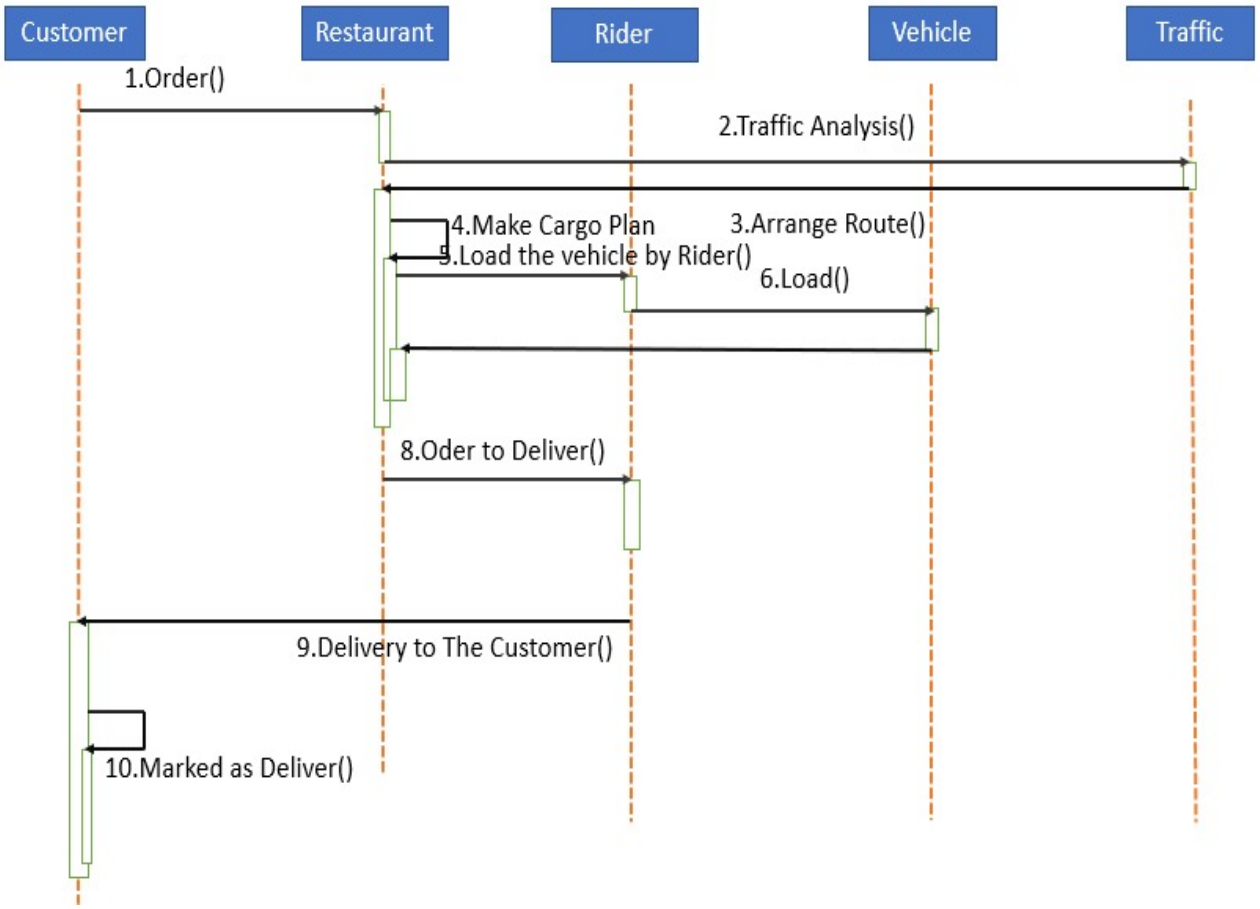

Figure: 9.6 Sequence Diagram

9.7 Use-Case Diagram

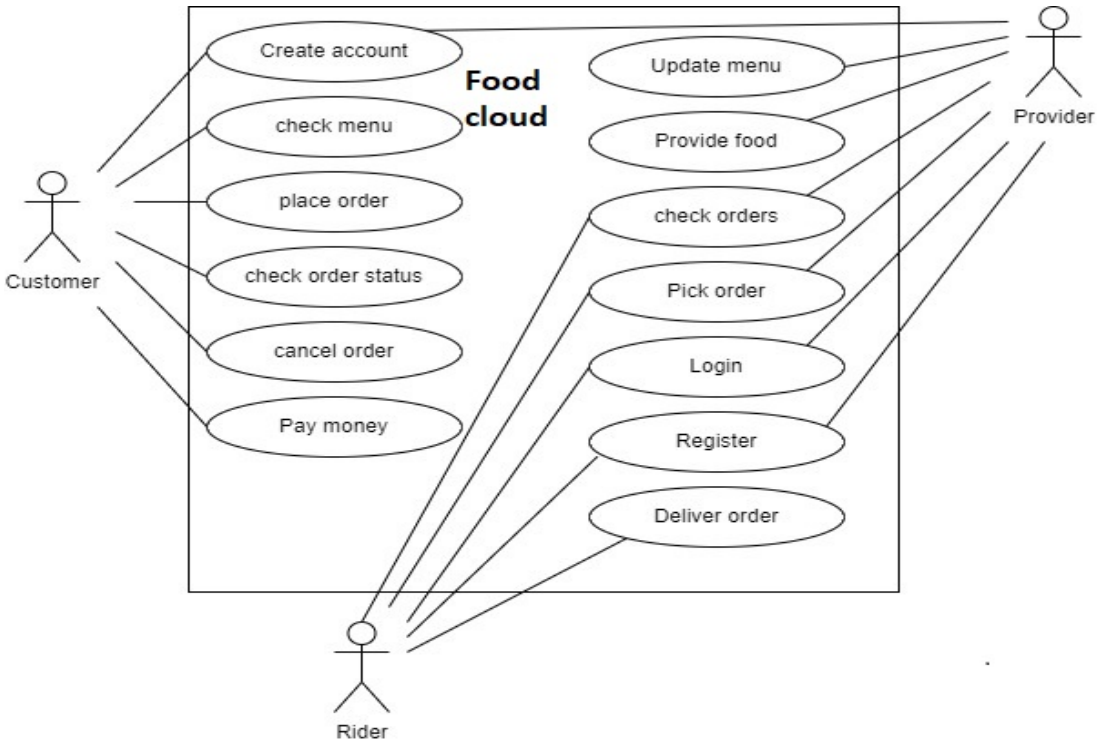

Figure: 9.7 Use Case Diagram

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Conclusion

- The on-demand nourishment industry underscores the significance of speedy and proficient food delivery administrations. This investigate presents a strategy for assembly real-time food desires that's based on OCD.
- Unlike Crowd-sourced riders are powerfully selected to provide food to clients in commonplace urban co-ordinations. A energetic on the internet solution and optimization system with parallel order collection. It is shown how to generate and transmit information in a sequential manner.
- Food delivery that is almost instantaneous. When it comes to travel costs and time,To apportion food conveyance assignments to crowd sourced riders and plan them, the arrangement era strategy utilizes a crossover meta-heuristic that combines the ALNS and TS strategies.
- The riders' journey Small- and medium-scale simulations were also performed.As examples of large-scale on-demand meal delivery in the real world are offered in order to assess the proposed effectiveness approach.

11

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