



A

PROJECT REPORT

ON

“Swiggy Online food services in India an analysis of Rating”

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MASTER OF COMPUTER APPLICATION

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BY

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UNDER THE GUIDANCE OF

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This is to certify that, the project entitled “**Swiggy Online food services in India an analysis of Rating**”, being submitted for the partial fulfilment of **Master of Computer Application** by her/him to **Sinhgad Institute of Management and Computer Application** affiliated to **Savitribai Phule Pune University, Pune** is the result of the original work completed by *Shubham Soni* under the guidance of **Dr. Ashwini Brahme**.

To the best of our knowledge and belief, this work has not been previously submitted by the award of any degree or diploma of Savitribai Phule Pune University or any other University.

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I, the undersigned hereby declare that the project titled “**Swiggy Online food services in India an analysis of Rating**”, being submitted or the partial fulfilment of **Master of Computer Application** by me to **Shinhgad Institute of Management and Computer Application (SIMCA) affiliated to Savitribai Phule Pune University** is the result of an independent work carried out under the guidance of **Dr.Ashwini Bramhe and Dr. Poonam Sawant**, is my original work. Further I declare that this project has not been submitted to this or any Institution for the award of any degree.

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PREFACE

In recent years, like other Food delivery sector is also facing the problem of Restaurant rating analysis. The experience of other food delivery application has changed dramatically in current years as acceptance of digitization. Existing customers share their reviews about a particular service or product through social networking sites and influence other prospective customers. But in majority they make comments in contrast with ratings which create more confusion. Therefore, banks can now counter to analyze customer behavior by predicting positive and negative sentiments from such a reviews and comments on social networking sites to know their customers for providing more personalized experience.

Till date various sophisticated tools and techniques are used to analyze data for discovering patterns and relationships which may be useful for prediction. A large number of applications have been developed using artificial neural network, Decision Tree, Naive Bayes, Regression Methods and many more which showed their impact on almost every restaurant use food delivery application sector. These applications range from Rating analysis, fraud detection up to prediction, but still having vagueness in decision making. These applications are not capable to handle rapidly growing data because of its nature and speed. Data Analytics is an emerging technology which comes with simplified concept of word count with technologies like Hadoop- MapReduce and Spark to handle such kind of problems.

As per our knowledge very few Predictive Analytics are created to analyze behavior using automatic prediction and reduce the error rate in positive and negative behavior. In the present research researcher has developed a predictive analytics.

To serve the purpose researcher has selected one food delivery application with delivery service. For data pre-processing and analysis she has selected Numpy And Pandas library. Customer comments and reviews are analyzed to predict positive and negative behavior of them. This System reduces error rate and gives correct prediction. Finally, researcher has suggested an effective solution for the Restaurant and food delivery app.

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1.1 Introduction

Online food order in India are experiencing drastic changes due to advances in information technology and adoption of new food order apps in current information era. Customers are demanding more and more tasty food at doorstep, and leaving their comments and reviews on social media which influences others. Henceforth, customer satisfaction and retention are the major challenges in front of the food order and delivery apps. To provide with higher feature and good customer experience analysis and prediction of customer behavior is at the top priority. It is an essential; but challenging task for many food delivery organizations, as data is keep growing enormously with a mixture of data types which becomes difficult to process using traditional data management tools and techniques. Big data analytics is one of the most rising technology trends that have the capability to process and store such special kind of data and explore the insights. This chapter gives a brief introduction about the research topic and methodology used.

1.2 Motivation

Technology has played very important role in food ordering & delivery Customer choice food and dish. Online Food order industries in the last one to two decades which allows Food Application to come with more suitable, efficient and worth services to make life easier for both customers and the Restaurant industry. But still the customer satisfaction and retention is at the top priority, as customers are not satisfied, demanding more and switching to other Food application in less time period. To provide excellent personalized services beyond the customer's expectations, Food Application should know their customers very well. Food ordering firms in their database always had a huge amount of information stored and now a day's advancement in information technologies adds more in that, unaware about what to do

exactly with it. The online food delivery industry realized the opportunities associated with it, when the big data revolution hit the various industries. This big data revolution happening in and around 2015 has found a significance with food delivery industries, considering the valuable data they've been generating. Today, most Food Delivery application organizations are working tough to adopt a totally data-driven approach to satisfy their customers, grow their businesses values and enrich the services they provide to customers. Big Data has unlocked the flaps converting this huge amount of data into meaningful patterns to understand customer behavior.

Existing sophisticated data analytics tools have played an important role to simplify the process of monitoring vast amounts of client data. But the Food delivery can procure the most benefits from big data by extracting good information quickly and easily from their data and convert it into meaningful benefits for themselves and their customers. With the help of Big Data, Food delivery Apps can now use customer generated information to continually track their behavior in real time and providing them with more personalized experience at any given moment.

1.3 Justification of the Problem

In recent years, voluminous data has been Register on online food delivery industry referred as 'Big Data' which flows fast from phones, social networking sites and other sources. Big data is defined in terms of V's Volume, Variety and Velocity. Volume specifies total amount of data generated. Velocity refers high speed of data or how often it is created. Variety refers data available in various formats like structured, semi structure and unstructured data. Only 10 percent data is in structured format which can be handled by traditional data analytics tools and remaining 90 percent is in unstructured and semi structured format. Now a day's two more Vs are added veracity tells the uncertainty of data available and Value shows extracted result.

Analysis of such kind of data can discover behavioral patterns and help industries to maintain relationship with their customers, but requires high performing technologies. Due to storage and analytical limitations traditional data analysis methods failed to handle big data, but still some of them may be utilized for analysis. Big data is a special kind of data which requires advance big data processing methods to discover valuable insights. Large-Scale parallel processing is one of them and Hadoop is the core platform for that.

1.4 Significance of the Study

The move from in-person to digitization has allowed banks to offer more convenient, functional and quality services. Customers share their views and experiences about services across systems and social networking sites which affects the decision of other customers. To provide more personalized experience predicting customer behavior is important and essential task. But, the growing number of channels through which customers communicate has resulting in generation of massive amount of multi-structured data which creates challenges for every major bank. This huge amount of variety data is very valuable for taking effective business decisions but unmanageable by traditional RDBMS and analytical tools but can be manageable using big data technologies. The present study is important for banking and financial domain, government, society as well as customers.

- The study is needful for banks to understand what their customers are saying about their products and services to create more personalized banking experiences. This can allows banks to categorize customers dynamically and experiment with unique, more personally targeted offers in order to ensure customer satisfaction.
- The present study is more helpful to society and government to know best product and banks, so that they can take proper decision while selecting banks for investments.
- This study is helpful for bank's customers to take efficient decision about continuation of banking services.

1.5 Scope of the Problem

Today, Food Delivery Company are holding tremendous amount of data in their data bases, but at the same time an ample of data is available on social networking and product review sites due to digitization. This data is very useful for Food Company to understand customer exiting behavioral patterns and predict future behavior. The present research is confined to analyze the reviews and experiences of customers about the services of Food Company and predict their behavior for future action plan by developing inference predictive analytics using big data technologies and machine learning approach. The geographical scope is India as only the secondary data is used.

1.6 Statement of the Problem

The statement of research study is as given herewith. To predicting Restaurant Rating, customer behavior using big data technologies and provide novel predictive analytics for Food Company to understand their customers Choose

1. Increased competition
2. Customer Satisfaction
3. Decreased customer loyalty
4. Retaining old customers
5. Attracting new customers and many more.

To improve customer experience and be in competition they need to provide more personalized experience by knowing their customers by behavior analysis and prediction. Traditional methods are used for this but the problems associated with the traditional data analytics are listed herewith.

1. As the data comes at high speed it is unable to store due to storage capacity.

+The proposed study helps food companys to understand the need of problem and develop a predictive analytics accordingly. The study also gives the novel approach to know their customers and provide them the services as per they required to improve their experience.

1.7 Objectives of the Study

The researcher has set the following main objectives of the study.

1. To study the need of personalized Food services.
2. To identify relevant big data technologies and Machine Learning algorithms.
3. To effectively analyze the customer behavior using Pig tool.
4. To design and implement Predictive Analytics for customer behavior analysis and prediction.
5. To suggest an effective solution for Food Company to create more personalized experiences.

1.7.1 Sampling

According to Gartner survey and Food Company in India as shown in table 1.1 and 1.2 are offering number of customer-centric services as shown in table 1.3 to attract and retain customers by gaining their satisfaction to survive in a competition.

Loan service is one of the most well-liked personalized services listed in table 1.4 [11].

Public Sector Banks			
Sr. No.	Bank Name	Sr. No.	Bank Name
1	ZOMATO	15	Bolt Food
2	SWIGGY	16	HelloFresh
3	FAASOS	17	Freshtohome
4	DELIVEROO	18	Freshly
5	GRUBHUB	19	Postmates
6	PIZZA HUT	20	Farmstead
7	EAT FIT	21	Eleme
8	DOMINO'S	22	Benlai
9	Delivery Hero	23	Nosh
10	DoorDash	24	Gojek
11	Wolt	25	iFood
12	Rappi	26	PedidosYa
13	Uber Eats	27	Come Bien
14	Hungry Panda	28	Liv Up

Table 1.1: List of Food Company in india

To serve the purpose of the research, we have selected Swiggy using simple random lottery method. Restaurant Rating service is selected using simple random lottery method. This research deals with big data which comes into large volume and unstructured format. Hence the sample size for conducting this research is depended on the availability of data secondary data.

Personalized Services	
Sr. No.	Name of Service
1	Search restaurant
2	Select Food
3	Check rating
4	Book food
5	Deliver food
6	Send feedback

Table 1.3: Personalized Food app Services

(Data Source: Swiggy.com Kaggle, Google etc.)

1.7.2 Data Collection

Selection of method of data collection is based on nature, scope, availability of money, time and precision factor etc. To carry out the research, researcher has collected secondary data. Researcher has collected massive amount of relevant multi-structured data from various social media sites, product review sites, newspapers, online forms and food websites as shown in table 1.7 using web crawler which downloads pages from web servers, indexer which builds a reverse index to the best pages and runtime which answers user's queries by hitting keywords.

Data Sources		
Sr. No.	Name of Site	Nature of Data
1	https://www.swiggy.in	Unstructured
2	http://www.Kaggle.com	
3	https://www.lilacinfotech.com	
4	https://www.smarther.com	
5	https://www.grabon.in	
6	https://cashkaro.com	
7	https://businessinsider.in	

Table 1.7: Sources of Data Collection

1.7.3 Research Work Stages

The research experiment is carried out in 4 different stages Literature Review, Pilot Study, and System Execution as shown in Figure 1.2 and elaborated further. The

output of previous step is taken as the input for the next step. The secondary data collected in earlier in the previous section is used to get the exact result at every stage.

Stage-1: Literature Review

Researcher has carried out literature review in stage 1 to identify the research gap between existing work and present study.

- To understand the theoretical concept of topic.
- To study the frameworks shared by researchers.
- To study the Methodology used by researchers.
- To identify the research gap between current research work and future research work

Researcher has identified, gathered and carried out detailed literature survey. Qualitative and quantitative information is obtained from various literature sources like national and international research journals, conference, thesis and books. Literature review is carried out in various sections like, Need for Personalization, Customer Behavior Analysis, Traditional Analytics and Big Data Analytics for prediction. Each section is concluded with some conclusion at the end. Research gap identified which is included in chapter Number 2.

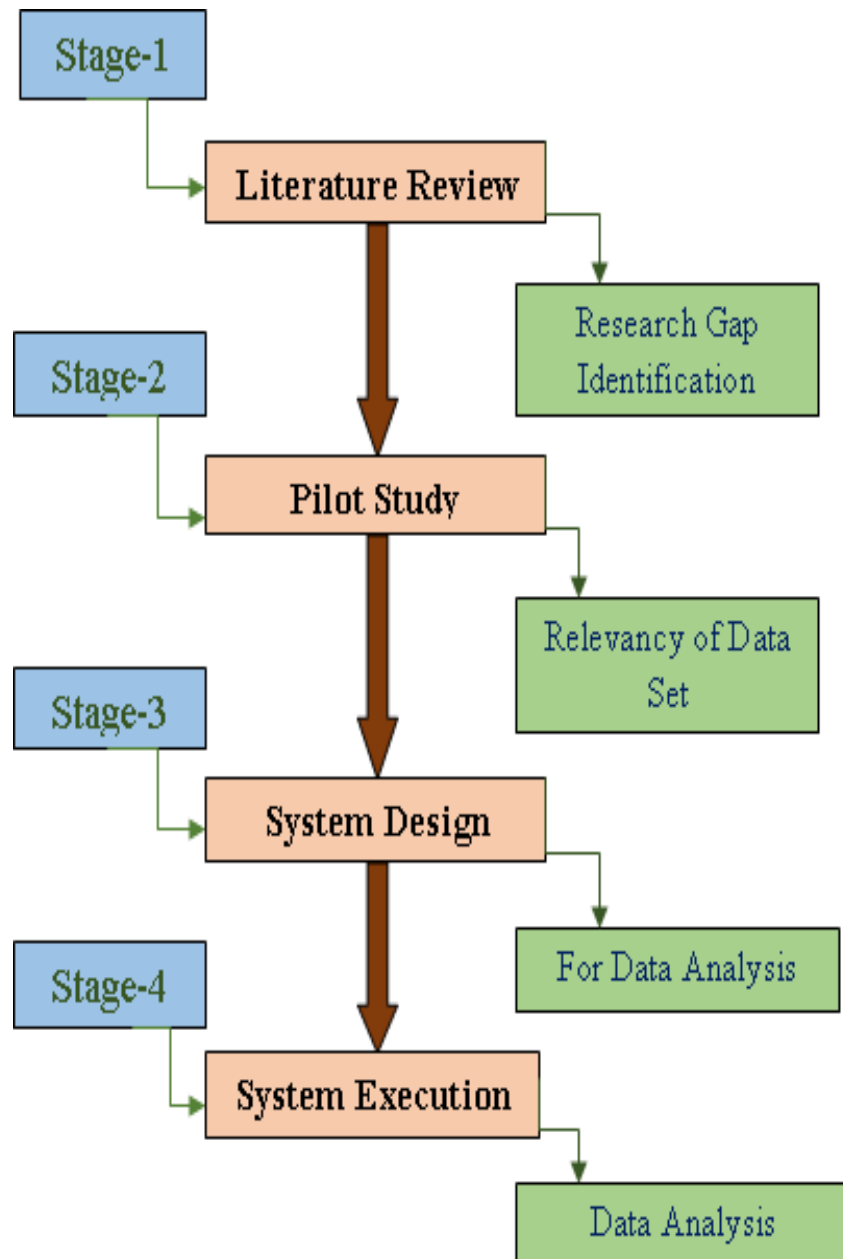


Figure 1.2: Different Stages of Research Work

Stage-2: Pilot study

Pilot study is carried out to test the quality and feasibility of data. Researcher used secondary data and carried out an initial pilot survey in jan 2022. The reliability of data set is tested using sample size 1000.

Stage-3: System Execution

In this stage we have executed system with large data sets. Collected data is stored in swiggy and cleaned using Pig tool. Then we have selected feature attributes and tested on proposed system. Data set is divided in two sections training set and

testing set. In every stage we have increased the size of data. Final results are compared to suggest suitable analytics.

1.8 Limitations of the Study

Following are the limitations of the study.

- The present study is limited to analyze and predict customer behavior about restaurant rating only not another services
- The study is confined to analyze only multi structure data not images, videos etc.

1.9 Thesis Outline

The thesis entitled “Analysis Restaurant Rating using Big Data Technologies (With reference to Personalized Food Services)” comprises of seven chapters described as follows.

Chapter 1: Introduction

In this chapter we have given the overall introduction of topic and research methodology. We have described the need for personalization and Restaurant Rating analysis using big data technologies. Further we discuss about the topic in broad. This chapter briefs about Motivation of the research problem followed Justification of the Topic, Significance of the Topic, Scope of the Topic, Objectives, Hypothesis, Data Collection methods and Research methodology. Limitations of the study and Detailed Chapter Scheme are also mentioned here. The chapter is concluded with chapter summary.

Chapter 2: Literature Review

This chapter elaborates the research already carried out in the related area and the future studies are indicated with the review of literature. The chapter provides detail review of research topic with related fields such as need of personalized Food Company, important of Restaurant Rating analysis, Traditional data analytics, Big Data Analytics in Food Company, Emerging technologies to handle big data etc. The research gap between existing research and present research is identified in detail is mentioned in this chapter.

Chapter 3: Big Data Analytics for Behavior Analysis in Food Delivery Company

This chapter includes system design and analysis carried out using Pig tool with MapReduce environments and Problems encountered. In this chapter some experiments are carried out to select appropriate technologies and machine learning algorithms. With selected technology the methodology is developed to analyze data. The hypothesis is tested to find out the difference between manual ratings and automatic ratings.

Chapter 4: Experimental Findings and Suggestions.

This is concluding chapter which gives a synthesis of the whole study. Findings of the study and some constructive suggestions based on the study are discussed. Chapter also focuses the constraints, problems and prospects of developed system.

1.10 Chapter Summary

This chapter gives the broad introduction about the research carried out. In this chapter we discussed motivation of the research, Origin of the problem, significance and methodology used. Big data is one of the challenging problems faced by banking organizations to identify customer behavior. The present research provides organizations with greater opportunities by exposing customer's hidden behavioral patterns from big data and helps to bridge gap between what customers want to do and what they actually do. This information can be useful to make business decisions and improve services for providing more personalized experiences to gain the customer's satisfaction and maximize profit. To come up with the output customer comments and reviews are analyzed using big data technologies and build predictive analytics.

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2.1 Introduction

Personalization of Food services is very important to improve the experience of existing customers and improve in order or restaurant sell. To provide more personalized experience, understanding of customer taste. In this chapter, we have tried to study different data mining and big Data techniques. Many food Company use sophisticated predictive analytics to find out the true value that cannot be observed directly. Big Data Analytics is a powerful way of extracting meaningful and valuable information that otherwise would be difficult to analyze. The researcher has made an attempt to have relevant literature pertaining to the study. The review was made by referring about 30 research papers, articles, books and thesis; in order to fulfill the purpose of our research. For broad overview few selected references are taken here. The review is broadly divided into three sections as follows,

1. Need for Time Saving
2. Traditional Analytical Rating.

2.2 Need for Time Saving

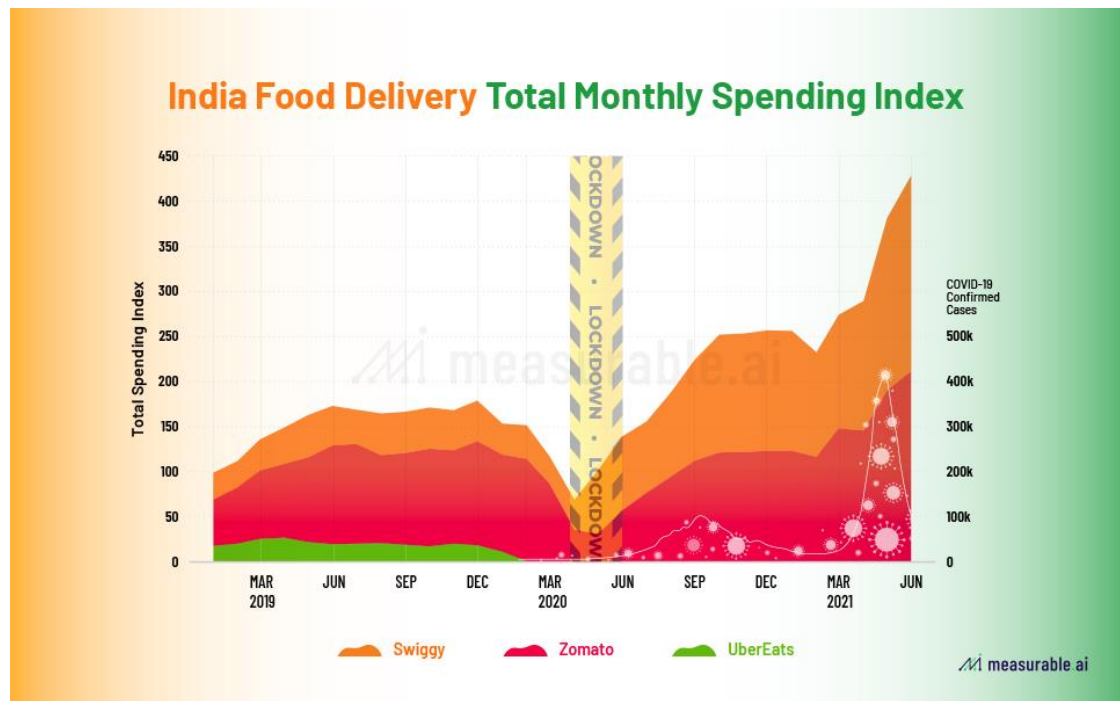
In this section we are focusing importance of Time saving. Due to the multiple delivery channels, customers have become more demanding and less loyal to Delivery Apps. They demand faster service and better products in their day to day life and for that they are ready to share detailed personal information. They are much interested in purchasing things at right time with the help of Food companys instead of postponing them. Customers don't prefer to visit Restaurant for their daily Food ordering.

According **MICHELLE TANG** published by Measurable.ai First, let's take a look at who is leading sales in India. Since January 2019, Zomato has always dominated the market in terms of revenues. As can be seen below, Zomato had a much wider lead over

Chapter 2: Literature Review

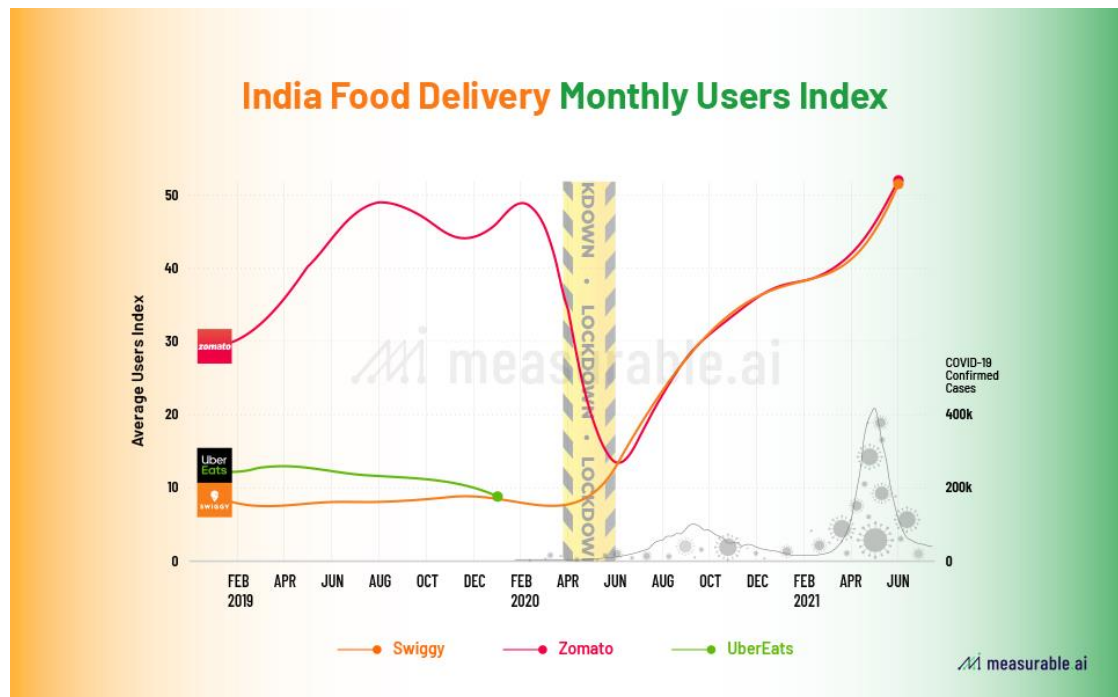
Swiggy managed to keep up its sales momentum until the beginning of April 2020. This is when Covid struck and the nationwide lockdowns began.

It was not until the end of May 2021, that Swiggy sales caught up with Zomato's and the two competitors became more on par.



In terms of average monthly spend amongst the players, we gathered that Swiggy users would spend more per transaction than Zomato users. Pre-covid, the average spend on Swiggy was roughly 220-250 Rupees (US\$ 3-5). Spending seems to have picked up by a whopping 30% during the 2nd stage of the lockdown (around late April/May) with average transaction values hovering at around 300-350 Rupees (US\$ 4-5).

According to **MICHELLE TANG** published by Measurable.ai focus on “**Users Distributed in the Indian Food Delivery Market**” The graph below illustrates an index of the monthly users across the three players and how they stack up against one another since January 2019 up until June 2021. It seems that the pandemic has helped both companies improve their user economics and add more consumers as the frequency to dine out has dropped.

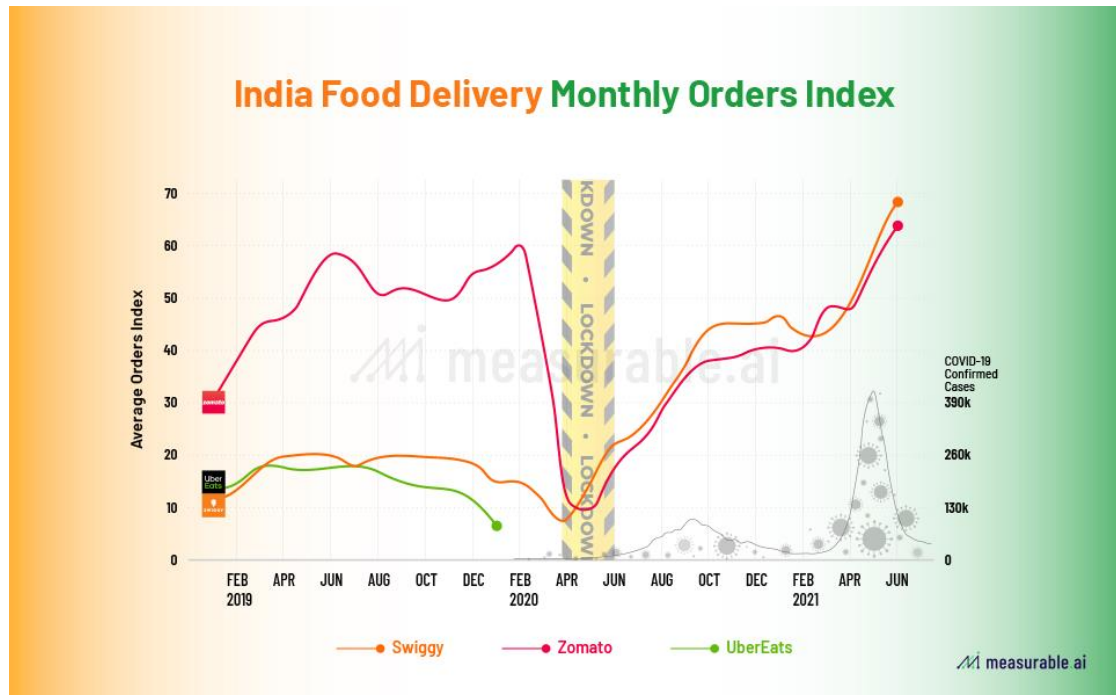


Initially, Zomato has always taken the lead pre-Covid. From our data, Zomato suffered the biggest drop in users from the pandemic. This can be attributed to the abrupt nationwide lockdown whereby more than 95% of restaurants suspended their services.

Also, Zomato acquired UberEats in January 2020 and there may have been some handover friction (we suspect some users may have switched to Swiggy). We noticed that after the lockdown ended in May 2021, the number of online delivery users picked up rapidly again as restaurants resumed their services and the frequency to dine out dwindled. Instead, the urge to dine outside got substituted by ordering food delivery online.

According to **MICHELLE TANG** published by Measurable.ai focus on “**Transaction Volumes and Covid Impact**” The impact of covid has evidently damaged delivery volumes for most online platforms. From our consumer panel, Zomato has always

taken the lead in order volumes but during the abrupt nationwide lockdown, they experienced a 70% sharp decline in order volumes (along with a massive drop in users as highlighted in the section above). This is not surprising given that the lockdown (beginning 24 March 2020) resulted in more than 95% of restaurants listed on delivery platforms closing doors for food delivery.



The lockdown also resulted in an exodus of migrant workers from the big cities to their hometowns. Don't forget that these migrant owners form the bulk of the delivery fleet for online food delivery operators in India. As such, it was inevitable that when the lockdown was lifted, the delivery operators were faced with a supply problem and needed time to get things up and running again.

Concluding Remark: The Indian online food delivery market is surely undergoing revolutionary times with much consolidation and sizable investments from tier-1 investors. The Indian food delivery market is almost like a duopoly, where both Swiggy and Zomato will continue to operate as independent aggregators. However, while both Indian food tech giants are flush with funds and pass the US\$ 1 billion mark, the upcoming fight is no more about market share but expansion into adjacent sectors.

Both companies are diverging on how to take their businesses forward. Zomato has chosen to deepen its focus on B2B services for restaurants, while Swiggy is going all-

in and investing its energy into new non-food categories like Swiggy Go and Instamart.

2.3 Traditional Analytical Rating

To provide with higher personalized experience understanding and predicting Restaurant Rating is at the top priority. In a research community, a lot of work has been done By Restaurant Rating. A customer behavior is the study of individuals or groups and the methods they use to select, secure, use, and dispose of products, services, experiences, or ideas to satisfy their needs and wants. Understanding and predicting Restaurant Rating can be possible by using predictive analytics. It is a greater way to understand Restaurant Test and provide more personalized Top Restaurant. It involves Defining problem, Data collection, Data analysis, Statistics, Data Modeling and Deployment.

2.3.1 Relational Data Base Management Systems

In 1970 Database Management System (DBMS) was constructed using two approaches mainly hierarchical data model for storing enormous data generated by Apollo space program and then network data model to create a standard database and resolve some of the difficulties of hierarchical model such as inability to represent complex relationships. But both models had disadvantages.

1. For answering even simple query complex programs had to be written.
2. Minimal data independency.

In early 1980's Relational Database Management System (RDBMS) was developed for commercial use but unable to handle increasingly complex data. So later two new data models had emerged, the Object Relational Database Management Systems (ORDBMS) and Object-Oriented Database Management System (OODBMS) to implement the relational and object data models respectively to represent the third generation of Database Management System [28]. The types of data generated by applications become richer than previous as the volume of data keeps growing. As a result, traditional relational databases are challenged to capture, store, search, transfer, analyse and visualize variety of bulky data. They focus on resolving the complexity of relationships among schema-enabled small amount of data only [7].

2.4 Chapter Summary

Personalization of Food deliver company services means providing services as per the requirements of customers is an essential task for Food deliver company. For personalization of services food company should know their customers. Predictive Analytics help to find the good restaurant what customers want and actually customer what test need. In this chapter we tried to understand the different techniques, algorithms and tools used to predict top restaurant of each metro city.

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Swiggy Online food services in India an analysis of Rating

3.1 Introduction

Today customer retention is one of the major challenges facing by many Food Delivery company in India, as customers are demanding more personalized experiences and ready to switch other food delivery application. Customers give Rating and feedback and suggestions on networking sites which influence other customers. Food Delivery company in India can reap the most benefits from this data for themselves and their customers, but they are facing big data challenges as traditional data analytics are not capable of handling this data. In this chapter we have used Pig ETL tool on the top of MapReduce to analyse restaurant rating effectively. Behavior analysis is accomplished in two ways by analyzing comments with manual ratings and generating automatic ratings. Simple K-mean clustering algorithm is applied to group positive and negative behavior based on manual ratings. AIFFN dictionary is used to generate automatic ratings. We have selected more than 500 records of restaurant for each metro city. We have measured the performance of both analytics in terms of time and space and compared the results drawn.

3.2 Data Analytics in Online Food Delivery Company

Data Analytics helps to turn data into big value by allowing organizations to analyze restaurant rating thereby improving their services. Across various spheres of online food delivery sector is now being implemented Big Data analytics to deliver better taste to their customers, both internal and external. In online food delivery, big data is defined as the tool which allows organization to create, manipulate, and manage very large data sets characterized by variety, volume and velocity in a given time frame. Online food ordering companies are beginning to harness the power of data in order to retrieve quality data for sentiment analysis, and analysis of restaurant rating, regulatory compliances management. Indian online food ordering company are also catching up with international counterparts however a lot of scope remains .

Many big data technologies are used for building big data analytics to retrieve the hidden information that may be used for good decision-making. Every technology has its own advantages and disadvantages. Many researchers have used big data analytics in many ways till date. For example Joseph O Chan presented architecture for Big Data analytics and explores big data technologies that include NoSQL databases, Hadoop Distributed File System and MapReduce. The practical significance of the architecture is to provide a blueprint for organizations moving towards the implementation of Big Data in their enterprise.

Anindita Khade proposed a MapReduce implementation of well-known statistical classifier c4.5 decision tree algorithm and also implemented customer data visualization using Data Driven Document (D3.js) to build well customized graphics. Anurag Shrivastava, Chandan Kumar and Neha Mangla used R tool and Hive to analyze diabetic dataset. Vikhyat Gupta, Tarik Taeib presented MapReduce framework to extract information for user behavior analysis.

In our study we have used pig tool on the top of MapReduce with word count programming concept. Pig is an ETL tool suitable for handling big data in easy and efficient manner by improving performance as compared to hive and MapReduce. MapReduce provides low level of abstraction whereas Pig provides high level of abstraction. MapReduce requires more line of code as compare to Pig [8]. The comparative performance analysis is done in section 4.3 for selecting suitable technology.

3.3 Data pre-processing

The data set collected from the internet sites was consists of noise and incomplete data, using pre-processing techniques noisy and inconsistent data is reduced and converted into CSV format. In the consideration of nature of data, in the initial stage, researcher has used multiple data sets individually to draw conclusions.

3.3.1

Input: Input file in CSV Format

Output: Behavior Type

Begin

Step-1: Calculate Null values in csv file.

Step-2: check the info of table.

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Step-3: replace all null values to mean and mode function.

Step-4: check how many field is important or not.

Step-4: remove all unnecery fields from dataset.

Step_5: analyze the restaurant rating of each metro city.

End

Data is stored in HDFS using Hadoop put command as shown in figure 4.4 and 4.5. Using pig command grunt shell is started to hit the queries as shown in fig. 4.6. Then load command is used to load the data from HDFS using PigStorage() and comma delimiter in a SQL format as shown in fig 4.7. The transformation statements like foreach, generate, filter and group are used to extract required information. Finally dump and store commands are used to read and save processed data respectively. The produced data has been then used to conclude the results.

Type	ID	Name	UUID	City	Area	Avg Rating	Total Rating	Cuisines	Cost For Two Persons	Delivery Time	Min Delivery Time	Max Delivery Time	Address
0	F 37933	Famoso Wraps & Rolls	6fe9ca1f-02a7-4e68-830a-1b4f296b683	Ahmedabad	Vastrapur	4.2	500+ ratings	['Combo', 'Snacks', 'Beverages', 'Desserts', 'Indi...']	₹200 FOR TWO	44	44	44	SHOP NO 2 HOTEL SHAHI PALACE VASTRAPUR LAKE AH...
1	F 81814	Burger King	10083576-d326-4a8b-8a82-3239ef342a19	Ahmedabad	Ellisbridge	4.2	1000+ ratings	['American', 'Fast Food']	₹350 FOR TWO	33	33	33	SHOP # 5 GR FLR THIRD EYE 2PANCHAVATI CIRCLE O...
2	F 107046	Mahalaxmi Pav Bhaji	fb4e3bfa-03d4-4708-b913-06e2c9ee9639	Ahmedabad	Ellisbridge	4.3	500+ ratings	['North Indian']	₹200 FOR TWO	28	28	28	GF 9/10 Dev complex near parimal charada opp ...
3	F 328315	HIIT Meals	81ab4019-2445-4aef-af22-04beccdf841d9	Ahmedabad	Vishala	NaN	Too Few Ratings	['Fast Food', 'Combo', 'Snacks', 'North Indian', '...']	₹150 FOR TWO	51	51	51	C11 Rajyash Rise Near Vishala Restaurant Vastr...
4	F 108879	Jay Jalaram Parotha House	994e73e1-7c7c-4a85-87e7-ecfcd94e36fa	Ahmedabad	Ellisbridge	3.9	100+ ratings	['North Indian']	₹250 FOR TWO	29	29	29	Capital Commercial Centre Near UCO Bank Ashram...
8684	F 452149	RAJINADU KATHIYAWADI RESTAURANT	0db4b5d1-4db2-44cc-8ecc-5042cbb3778b	Surat	Adajan	NaN	Too Few Ratings	['Gujarati', 'Indian', 'Fast Food', 'Pizzas', 'Desi', '...']	₹300 FOR TWO	77	77	77	R.S NO 17 PAKI G.F OLPA ROAD NR. RAJ MARBLE...
8685	F 411690	Concord Restaurant	6f112782-e1cd-477f-8c2b-	Surat	Adajan	4.0	100+ ratings	['North Indian']	₹300 FOR TWO	72	72	72	160 TO 1802ND FLOORRAJ HARMONYUGAT-

Figure 4.4: Read CSV File

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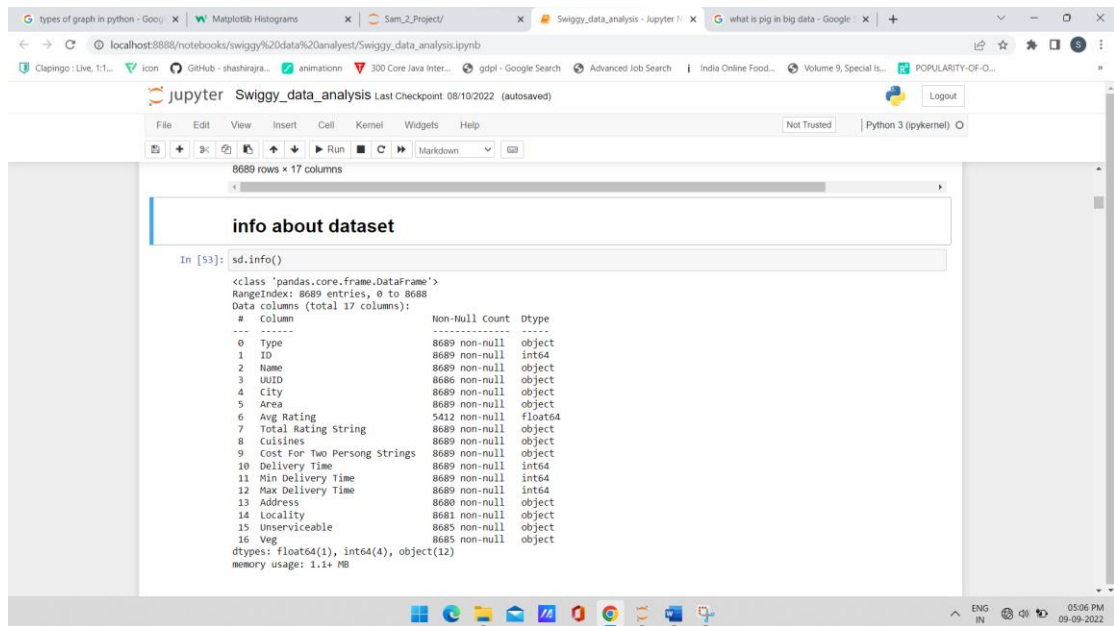


Figure 4.5: Info About Data sets

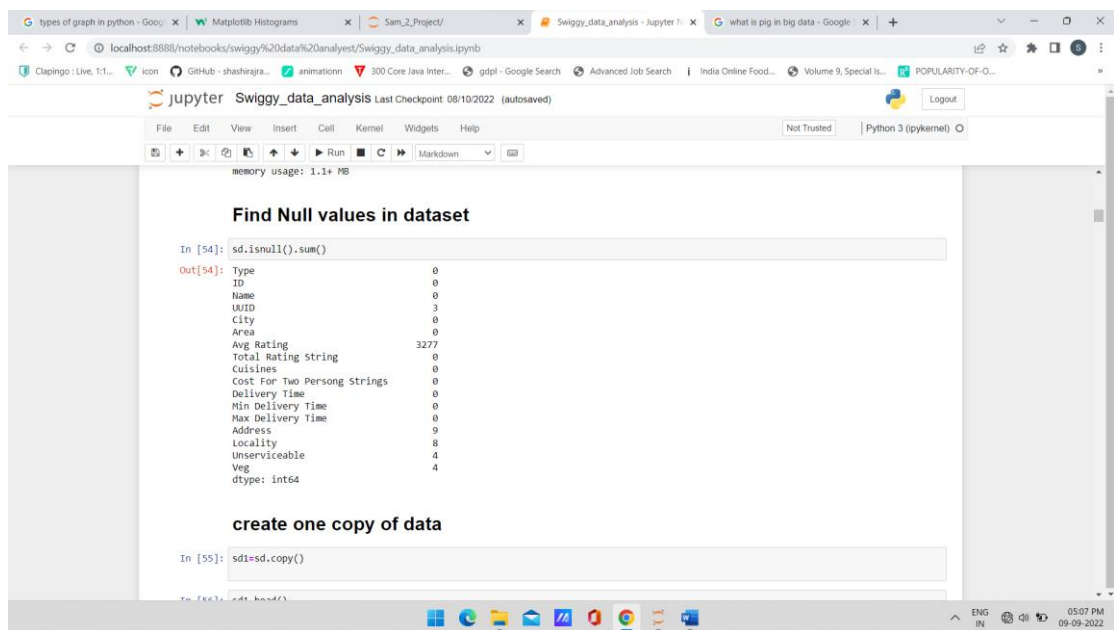


Figure 4.6: Find null value in data sets

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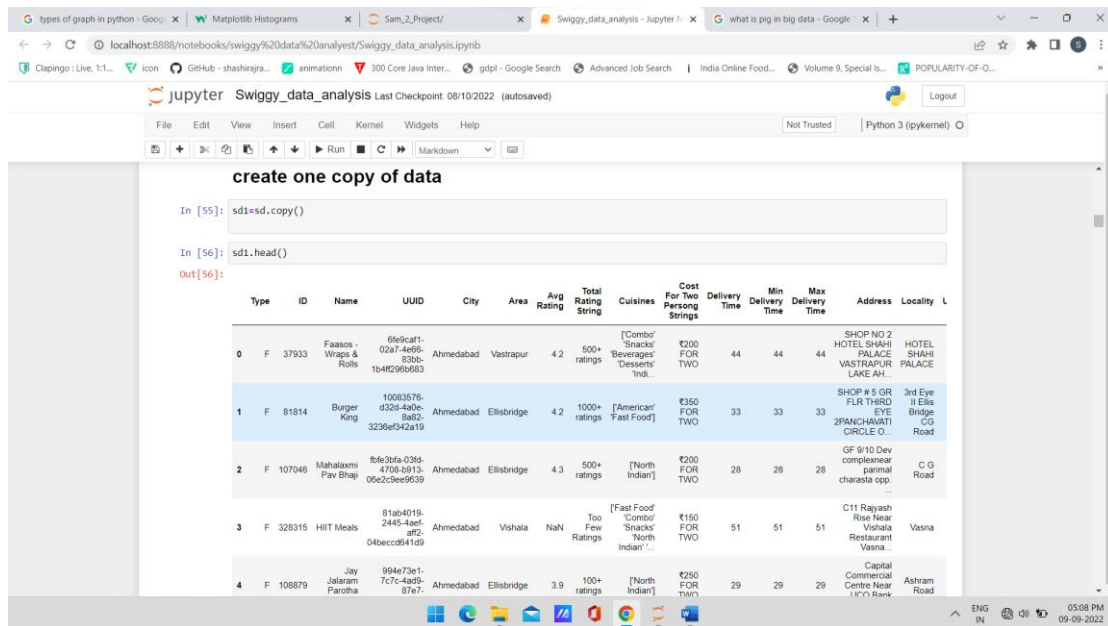


Figure 4.7: Create one copy of datasets

3.4 What operation performe

By implementing data dataset mentioned in section 4.4.2 researcher has drawn following results,

- Calculate total number of restaurant in each city.
- How many city available in this datasets.
- Calculate veg and non-veg restaurant.
- Calculate how many restaurant provide home delivery or on restaurant delivery.
- Calculate rating of each city.
- Find the top 5 restaurant in each city.

1. List of Evaluation Parameters and concluding Remarks

Chapter 3: Swiggy Online food services in India an analysis of Rating

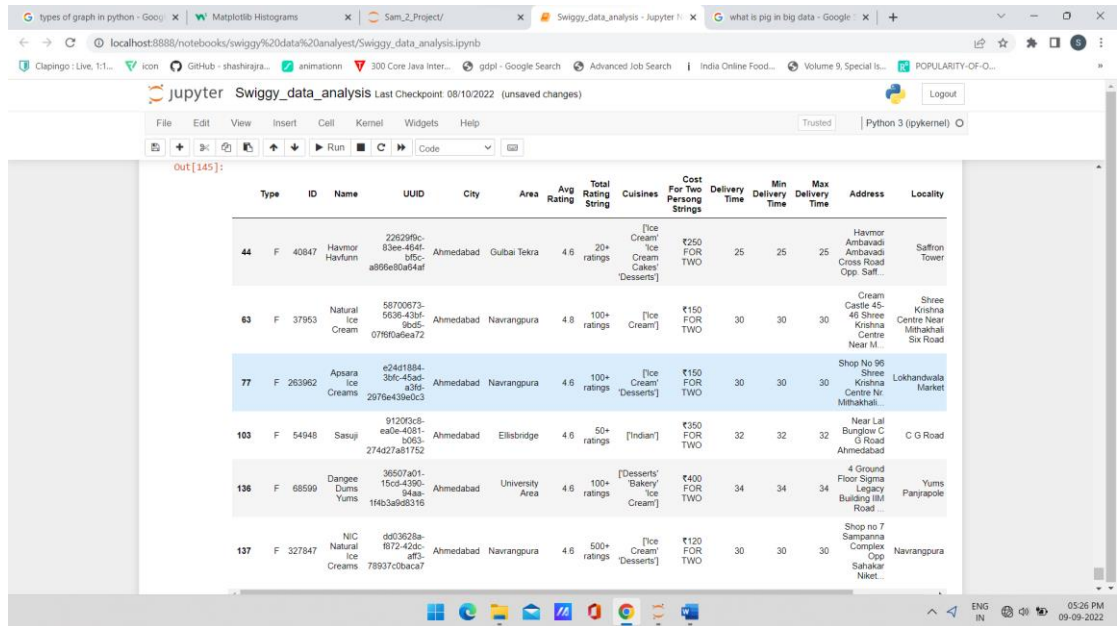


Figure 4.8: calculate Rating

Evaluation Parameter		
Sr. No.	Manual Rating	Remarks
1	0.5	Unacceptable
2	1.0	Really Bad
3	1.5	Bad
4	1.8	Poor
5	2.0	Not Good Services, Expected More
6	2.5	Poor, Just Ok
7	2.8	Just Ok
8	3.0	Satisfactory
9	3.3	Satisfactory
10	3.5	Good, Pretty Good
11	3.8	Fine
12	4.0	Great
13	4.3	Good
14	4.5	Excellent, Great
15	4.8	Great, Good
16	5.0	Excellent, Blown Away

Table 4.5: Evaluation Parameters and Concluding Remarks

Interpretation: Figure 4.8 and table 4.5 give an overview of various evaluation parameters which can be used for analysis of restaurant rating, it is observed that, the different evaluation parameters have same concluding remarks.

2. Check in which city have much reataurant

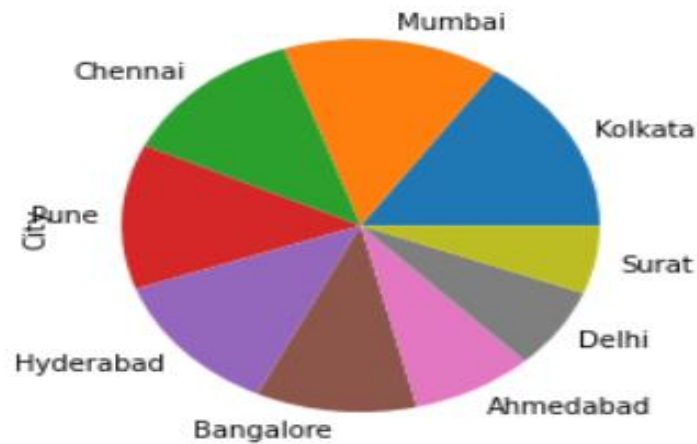


Figure 4.9: City in datasets

count number of restaurant in each city

```
In [147]: Rac=sd1['City'].value_counts().plot.bar()
```

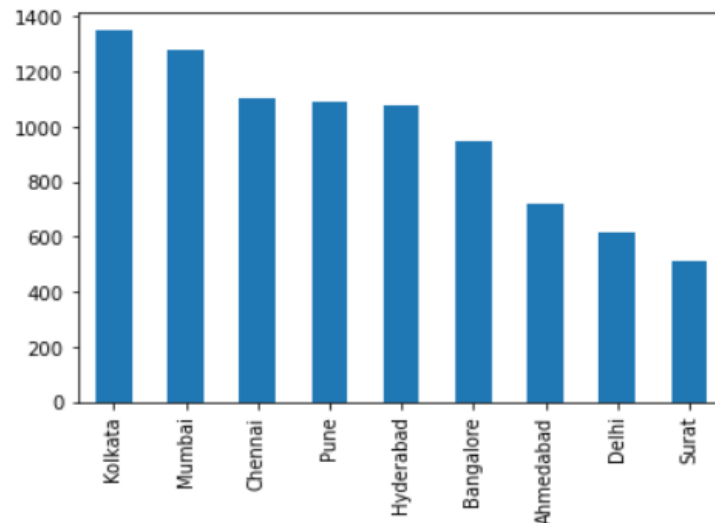


Figure 4.10: Total number of restaurant

Interpretation: Figure 4.9 and table 4.6 shows the overall behavior of the Restaurant and reating. Figure 4.10 gives the graphical interpretation of total restaurant and concludes that, the highest rating given is 4.0 followed by 5.0 for both the restaurant. The overall behavior of restaurant in each city.

3. Positive and Negative Reating

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In this data sets have a many city restaurant, first of fall fill all null column using min function after that calculate the rating of restaurant.

Algorithm:

1. Sort all restaurant according to city.
2. Find positive rating.
3. Find negative rating.
4. Calculate total number of rating.

Cluster-1 {0.5, 1.0, 1.5, 1.8, 2.0, 2.5, 2.8}

Cluster-2 {3.0, 3.3, 3.5, 3.8, 4.0, 4.3, 4.5, 4.8, 5.0}

Positive and Negative Behavior	
Type of Behavior	Swiggy
Positive Behavior	8346
Negative Behavior	343
Total No. of Customers	8689

Table 4.7: Positive and Negative Behavior

Interpretation: Table 4.7 give a count of positive and negative behavior of rating of resraurant. It has been observed that, the positive behavior of restaurant customers is slightly higher.

4. City Wise Restaurant.

Number of Restaurant in City	
City	Restaurant
Kolkata	1347
Mumbai	1278
Chennai	1106
Pune	1093
Hyderabad	1075
Bangalore	946
Ahmedabad	719
Delhi	612
Surat	513
Total	86889

Table 4.9: city wise restaurant

Interpretation: Table 4.9 shows Number of restaurant in each city. As per the Datasets show total number of restaurant available in metro city.

5. Veg and Non-Veg Restaurant of each city

Veg and Non-Veg Restaurant		
Type	Veg	Non-Veg
Kolkata	233	1113
Mumbai	249	1029
Chennai	256	850
Pune	249	842
Hyderabad	278	797
Bangalore	225	721
Ahmedabad	383	336
Delhi	148	464
Surat	256	256
Total	2277	6408

Table 4.10: Total veg and Non-veg Restaurant



Figure 4.15: Total veg and Non-veg Restaurant

Interpretation: Table 4.10 shows the veg and Non-Veg Restaurant. As per the graph shown in figure 4.15 the highest veg restaurant at Ahmedabad and highest Non-veg Restaurant at Kolkata.

6. City Wise Top Restaurant

City Wise Top Restaurant		
City	Restaurant	
	Name	Type
Kolkata	Keventers Ice Creamery	veg
Mumbai	SNAXX	veg
Chennai	Nasi and Mee	Non-Veg
Pune	Shree Krishna Juice Bar	Veg
Hyderabad	The Liege Waffles	Non-Veg
Bangalore	ricky Shakes	Non-Veg
Ahmedabad	Natural Ice Cream	Veg
Delhi	Fat Tiger	Non-Veg
Surat	Sobis Diet Farm	Non-Veg

Table 4.11:City Wise Top Restaurant

Interpretation: Table 4.11 show the all top restaurant of each city are available in this datasets.so you can easily identify the top restaurant of each city and you can easily order good food from top restaurant.

7. Data pre-processing

The data set collected from the internet sites was consists of noise and incomplete data, using pre-processing techniques noisy and inconsistent data is reduced and converted into CSV format. In the consideration of nature of data, in the initial stage, researcher has used multiple data sets individually to draw conclusions.

8. Proposed of how to calculate restaurant rating

Input: Input file in CSV Format

Output: Behavior Type

Begin

Step-1: Read CSV file form your folder.

Step-2: create variable of datasets.

Step-3: shows all datasets column.

Step-4: find null values in datasets and replace to values.

Step-5: filter all cities from datasets.

Step-6: after that calculate top restaurant of each city.

Step-7: find veg and Non-Veg restaurant of each city.

Step-8: Convert all calculating data into visualization form.

Step-9: find in which city have more restaurant.

End

The process of data analysis using behavior analytics and accomplished in 9 steps as mentioned all step. Data is stored in [Swiggy_dataset.csv](#) using Pandas library. Pig Command is used to start grunt shell. Then load command is used to load the data from using Pandas Library and comma delimiter in a SQL format. The transformation statements like foreach, generate, filter and group are used to extract required information. Function COUNT () is used to count the number of occurrences, Finally dump and store commands are used to read and save processed data respectively.

8.1. Positive and Negative Behavior

Positive and Negative Behavior	
Type of Behavior	Swiggy
Positive Behavior	8346
Negative Behavior	343
Total No. of Customers	8689

Table 4.16: Positive and Negative Behavior using Automatic Ratings
(Compiled by Researcher by referring the automatic positive and negative ratings as shown in table 4.14 and 4.15)

Interpretation: Table 4.16 contains auto generated positive and negative behavior of the customers along with missing values. the positive behavior of restaurant rating is slightly higher and negative behavior of restaurant rating is slightly lower.

8.2 Limitations of the Proposed Framework

In this datasets have a limited number of restaurant for good food ordering according to swiggy given datasets, in this datasets you have a very less amount of negative rating restaurant, in this dataset have a multiple city so we are find top 5 restaurant of each city.

3.5 Comparative Study of Behavior Analysis using restaurant rating of Swiggy food delivery application.

This section deals with the comparison of multiple city and multiple restaurant of metro city according to dataset you can easily calculate the top restaurant of metro city and order good and testy food from Swiggy application and analize the top restaurant of each city according to given data.

3.5.1 Results and Interpretation

The main aim of the study is to analyze the Restaurant Rating and behavior of customer regarding to order a food and great teast service provided by Swiggy food delivery application. In this chapter first Restaurant rating is analyzed using manual rating which is compiled by researcher by referring table 4.7 and 4.16 presents positive and negative behavior of Restaurant.

3.6 Chapter Summary

This chapter deals with understanding of top restaurant using avg ratings for restaurant available on websites and multimer websites. To achieve this goal researcher has first take a datasets from multiple platform, after that filter the dataset and csv file using pandas library and pandas function, comparative performance analysis of big data technologies and selected pandas Tool for data analysis. She has proposed pandas for Data Analytics Framework to analyze each restaurant ratings then positive and negative behaviour is counted using datasets. Due to contrast comments and ratings this framework is unable to analyze data correctly. To

overcome this problem researcher has Data Analytics for analysis rating of restaurant using datasets and predicted ratings to find out positive and negative behaviour of customer. This framework predicts only positive and negative ratings and find top restaurant of each metro city, and provides some missing values also. In a result correct analysis is not possible. There for accurate analysis researcher has proposed hybrid predictive analytics using Machine Learning Algorithms in Chapter 5.

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Chapter 3: **Swiggy Online food services in India an analysis of Rating**

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- 16 A STUDY OF E-PAYMENT SYSTEM ON FOOD DELIVERY INDUSTRY: A CASE STUDY ON SWIGGY
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Chapter 4

Experimental Findings and Suggestions

4.1 Introduction

The problem is identified through the study of literature reviewed in chapter 2 and based on the secondary data collected analytics is designed and implemented in chapter 5. This chapter presents experimental findings of the research and suggestions given. The present study has been carried out in various stages to analyze the restaurant rating and great taste of food from the reviews, rating and comments and suggest an effective solution to the swiggy online food order and delivery company.

4.2 Experimental Findings

To serve the purpose we have carried out some experiments. Experimental findings are listed in below categories.

4.2.1 Selection of Data Technologies

To select the suitable technologies researcher has carried out literature review and done performance analysis. Findings are as follows.

- We found how many city are available in datasets.
- We found a Jupiter framework and analyze a top restaurant.
- We found the graph and table of data are analyze by user.
- Data Analytics is not complete without visualization. So we found numpy library for visualize data.

4.2.2 Behavior Analysis with Manual Ratings

After selection of technologies Pig Behavior Analytics is proposed and implemented in chapter 4 to analyze customer behavior using manual ratings given by the customers regarding the restaurant and good food and near by me good restaurant.

- In experiment1 with pandas tool on top of restaurant we found 10 different types of rating parameters like Blown Away, Excellent, Grate, Pretty good, Satisfactory, Just ok, Expected more, bad, really bad and unacceptable.

- We have analyzed Rating and comments of each restaurant are available in metro city, using this you find out the top 5 restaurant of each city.
 - In Ahmedabad About 60% restaurant have a good rating and below 40% restaurant have h bad and average rating.
 - In Surat About 65% restaurant have a good rating and below 35% restaurant have h bad and average rating.
 - In Bangalore About 55% restaurant have a good rating and below 45% restaurant have h bad and average rating.
 - In Pune About 80% restaurant have a good rating and below 20% restaurant have h bad and average rating etc.
- From the study it has been also found that almost 8384 other customers are positively influenced by the reviews of restaurant rating and comments customers respectively.
- Approximately 343 customers are negatively influenced by the reviews of restaurant rating and comments customers respectively.
- Researcher has also found the restaurant rating behavior of the customer. According to swiggy datasets find out the best and tasty restaurant of metro city like pune, Mumbai, surat, Bangalore etc.

4.2.3 Behavior Analysis with Automatic Ratings

In experiment 1 researcher has found contrast comments and ratings which may confuse the other customers. swiggy also cannot recognize what exactly their customers are demanding. Therefore researcher has developed a program of Behavior analytics for automatic behavior prediction and analysis. From the experiment she has concluded that,

4.3 Suggestions

Based on the conclusions drawn in the previous sections the suggestions are listed below in two sections case based and analytics based.

4.3.1 Case Based Suggestions

From the conclusion drawn in the section 6.2, the researcher has suggested following case based suggestions as follows,

1. No doubt, the manual ratings by customers clear the picture about the services provided by Swiggy application, but as the ratings can be in contrast of comments Swiggy cannot identify the exact behavior of the customer so they are unable to find what customers are demanding. Therefore automatic ratings should be generated to know their customers.
2. In Swiggy overall positive behavior is 70-73%. So Swiggy should concentrate on retention of remaining 30% customers by fulfilling their demands.
3. Swiggy should provide greater personalization to their customers with fast processing, and good customer support.
4. To retain existing customers and attract new one delivery application should come with better solutions time to time and communicate with the customers.
5. Swiggy should provide good customer care service to develop customer relationship and satisfy their customers.

4.3.2 Analytics Based Suggestions

From the conclusion drawn in the section 6.2, the researcher has suggested following case based suggestions as follows,

1. The study reveals that, to process the unstructured data is the best solution.
2. The study suggests that, data and find the correct analysis.
3. To build the predictive model is the best choice than as it gives fast execution environment.
4. To analyze behavior accurately Neural Network is the best selection.

4.4 Contribution Made to The Body of Knowledge and Outcome of Research.

The present study is confined to predict rating behavior by analyzing comments and ratings available on product review sites. Till date various methods and techniques are used to predict customer behavior. In the present research we tried to develop our own hybrid methodology to analyze customer behavior. Our research work is able to,

- Explore customer's hidden behavioral patterns from large amount of unstructured data.
- Help Swiggy to bridge gap between what customers want and what they actually get.

- Help customers to select best bank for taking home loan and Personal Loan.
- Help banks to improve services and provide the customers with best services based on their perspective within a less time period.

4.5 Scope for Further Study

Research is an unbroken and never-ending process. Improvement and enhancement can be done continuously. It was a very good experience to work on this research topic. Always there is a research exposure, as the new dimensions of research are introduced. By considering such dimensions future work can be carried out to find out hidden exposure.

- i. In the present research, the emphasis is given on building predictive model for predicting behavior using comments with better performance. One can bridge the gap between what customers want and what banks give using images and videos.
- ii. The present study is carried out on stand-alone machine. The same research can be carried out on multiple machines.
- iii. The present study analyzes and predicts the behavior about home loan service; further it can be extended to study other services.
- iv. The study can be also extended to build model using unsupervised and Lexicon based approach.

4.6 Chapter Summary

Present research is about predicting customer behavior using big data technologies to provide more personalized experience to them. This chapter presents the findings drawn by the researcher from the work done. To reach the conclusions the researcher has carried out various experiments at various stages starting from suitable technology selections to implementation of predictive analytics. The present research is helpful to the banking organizations to know their customers by exposing hidden behavioral patterns from big data and bridge gap between what customers exactly demanding. With the help of this information banks can provide more personalized services to their customers for improving the experience. To come up with the solution customer comments and reviews are analyzed using big data technologies along with machine learning.

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20. **A STUDY OF E-PAYMENT SYSTEM ON FOOD DELIVERY INDUSTRY: A CASE STUDY ON SWIGGY**
21. Sentiment Analysis of Zomato and Swiggy Food Delivery Management System,
https://link.springer.com/chapter/10.1007/978-981-16-4641-6_4

Links

22. <https://www.kaggle.com/datasets/aniruddhapa/swiggy-restaurants-dataset-of-metro-cities>
23. <https://www.coursera.org/articles/what-is-data-analysis-with-examples>
24. https://ori.hhs.gov/education/products/n_illinois_u/datamanagement/datopic.html
25. https://en.wikipedia.org/wiki/Predictive_analytics
26. <https://www.simplilearn.com/data-analysis-methods-process-types-article>
27. <https://www.datapine.com/blog/data-analysis-methods-and-techniques/>
28. <https://www.oracle.com/in/business-analytics/what-is-analytics/oracle-analytics-for->

[dummies/?gclid=aw.ds&gclid=Cj0KCQjwmouZBhDSARIsALYcouq3dzP5EmbNg4Podz-](#)

29. https://www.tutorialspoint.com/excel_data_analysis/data_analysis_process.htm
30. <https://careerfoundry.com/en/blog/data-analytics/the-data-analysis-process-step-by-step/>

ANNEXURE

Annexure A

Data Collect Sites

Thesis

1. Large Scale Data Analytics of User Behavior for Improving Content Delivery, Athula Balachandran, CMU-CS-14-142, December 2014
2. Mining Frequent Patterns In Data Streams, K.S.Oza, 2010
3. Machine Learning For Data Mining In Medicine, M. Solomon Pushparaj, 2008

Books

4. Beginning Data Science in R: Data Analysis, Visualization, and Modelling for the Data Scientist by [Thomas Mailund \(auth.\)](#)
5. Python Data Analytics: Data Analysis and Science Using Pandas, matplotlib, and the Python, [Fabio Nelli \(auth.\)](#)
6. Data Analysis From Scratch With Python: Beginner Guide using Python, Pandas, NumPy, Scikit, by [Peters Morgan](#)
7. Data Science at the Command Line, 2nd Edition Author: Jeroen Janssens
8. The Elements of Data Analytic Style. Author: **Jeff Leek**

Research Papers

9. Food delivery start-ups in search of the core by Karuna Bajaj and Smita Mehendale.
10. <https://www.sciencedirect.com/science/article/abs/pii/S096969891930373X>
11. **ustomers response to online food delivery services during COVID-19 outbreak using binary logistic regression**
<https://onlinelibrary.wiley.com/doi/full/10.1111/ijcs.12630>
12. International Journal of Advance and Innovative Research Volume 5, Issue 4 (XV): October - December, 2018 ONLINE FOOD DELIVERY: A COMPETITOR FOR INDIAN KITCHENS, https://www.researchgate.net/profile/Aradhna-Yadav-2/publication/341727724_NEW_AGE_TRANSPORTATION_SYSTEM_FOR_A_SMART_CITY/link

- [s/5ed0f40845851529451b89c8/NEW-AGE-TRANSPORTATION-SYSTEM-FOR-A-SMART-CITY.pdf#page=434](https://www.sciencedirect.com/science/article/abs/pii/S0950423021000434)
13. Qualitative research methods: A review of major stages, data analysis techniques, and quality controls <https://www.sciencedirect.com/science/article/abs/pii/0740818894900264>
 14. An empirical study on factors influencing customers to order food online through food delivery apps
Dr. **Rajeshwari M. I** Assistant Professor, Department of Business Administration (IB & RM), PSGR Krishnammal College for Women, Coimbatore, Tamil Nadu, India, Email ID: ganeshwari@psgrkcw.ac.in Online Published on 13 April, 2022,,
 15. Poonam Sawant, Dr. B.L. Desai (2015), Big Data Mining: Challenges and Opportunities to Forecast Future Scenario, International Journal of Innovative Research in Computer and Communication Engineering, DOI: 10.15680/ijircc.2015.030600141 , ISSN 2320-9801
 16. My Trust, Before I Buy Your Food – Consumers’ Insights for Online Food Delivery Platforms During the COVID -19 Pandemic,
Aaliyah Siddiqui 1*, Mujahid Siddiqui 2
 17. Poonam Sawant, Dr. B.L.Desai(2015), Big Data Analytics Customer Behavior for Personalized Banking Services, IJMIE , Volume 5, Issue 9, ISSN: 2249-0558
 18. Application of multivariate data-analysis techniques to biomedical diagnostics based on mid-infrared spectroscopy, <https://link.springer.com/article/10.1007/s00216-008-1989-9>
 19. **Predicting repeat usage intention towards O2O food delivery: extending UTAUT2 with user gratifications and bandwagoning**
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27. <https://www.datapine.com/blog/data-analysis-methods-and-techniques/>
28. <https://www.oracle.com/in/business-analytics/what-is-analytics/oracle-analytics-for-dummies/?gclsrc=aw.ds&gclid=Cj0KCQjwmouZBhDSARIsALYcouq3dzP5EmbNg4Podz->
29. https://www.tutorialspoint.com/excel_data_analysis/data_analysis_process.htm
30. <https://careerfoundry.com/en/blog/data-analytics/the-data-analysis-process-step-by-step/>

Annexure B

Sample DataSet

Program Code

Swiggy_data_analysis.ipynb

```
#!/usr/bin/python
import numpy as np
import pandas as pd
# Read csv file using pandas library
sd=pd.read_csv("Swiggy_dataset.csv")
#Top 5 Restorent in Bangalore register on swiggy
y=sd[['Type','ID','Name','UUID','City','Area','Avg Rating','Total Rating String','Delivery Time','Address','Locality','Veg']].where(sd['City']=='Ahmedabad')
y1= y.sort_values(by=['Avg Rating'],ascending=False)
y1.head(5)
#top ordered on location
print(y1['Area'].value_counts())
y1['Area'].value_counts().plot.hist()
# Much order recive from Navrangpura locality
#Top 5 Restorent in Bangalore register on swiggy
z=sd[['Type','ID','Name','UUID','City','Area','Avg Rating','Total Rating String','Delivery Time','Address','Locality','Veg']].where(sd['City']=='Bangalore')
z1= z.sort_values(by=['Avg Rating'],ascending=False)
z1.head(5)
```

Annexure C

Program Output

Read csv file using pandas librarysis

```
sd=pd.read_csv("Swiggy_dataset.csv")
```

print read csv fille

sd														
	Type	ID	Name	UUID	City	Area	Avg Rating	Total Rating String	Cuisines	Cost For Two Persong Strings	Delivery Time	Min Delivery Time	Max Delivery Time	Address
0	F	37933	Faasos - Wraps & Rolls	6fe9caf1-02a7-4e66-83bb-1b4ff296b683	Ahmedabad	Vastrapur	4.2	500+ ratings	['Combo' 'Snacks' 'Beverages' 'Desserts' 'Indi...	₹200 FOR TWO	44	44	44	SHOP NO 2 HOTEL SHAHI PALACE VASTRAPUR LAKE AH...
1	F	81814	Burger King	10083576-d32d-4a0e-8a82-3236ef342a19	Ahmedabad	Ellisbridge	4.2	1000+ ratings	['American' 'Fast Food']	₹350 FOR TWO	33	33	33	SHOP # 5 GR FLR THIRD EYE 2PANCHAVATI CIRCLE O...
2	F	107046	Mahalaxmi Pav Bhaji	fbfe3bfa-03fd-4708-b913-06e2c9ee9639	Ahmedabad	Ellisbridge	4.3	500+ ratings	['North Indian']	₹200 FOR TWO	28	28	28	GF 9/10 Dev complexnear parimal charasta opp. ...
3	F	328315	HIIT Meals	81ab4019-2445-4aef-af2-04beccd641d9	Ahmedabad	Vishala	NaN	Too Few Ratings	['Fast Food' 'Combo' 'Snacks' 'North Indian' '...	₹150 FOR TWO	51	51	51	C11 Rajyash Rise Near Vishala Restaurant Vasna...
				994e73e1-						₹250				Capital

The screenshot shows a Jupyter Notebook interface with the following content:

info about dataset

```
In [4]: sd.info()

<class 'pandas.core.frame.DataFrame'>
RangeIndex: 8689 entries, 0 to 8688
Data columns (total 17 columns):
#   Column                Non-Null Count  Dtype  
---  -
0   Type                   8689 non-null  object  
1   ID                     8689 non-null  int64   
2   Name                   8689 non-null  object  
3   UUID                   8689 non-null  object  
4   City                   8689 non-null  object  
5   Area                   8689 non-null  object  
6   Avg Rating             5412 non-null  float64  
7   Total Rating String    8689 non-null  object  
8   Cuisines                8689 non-null  object  
9   Cost For Two Persong Strings  8689 non-null  object  
10  Delivery Time           8689 non-null  int64   
11  Min Delivery Time       8689 non-null  int64   
12  Max Delivery Time       8689 non-null  int64   
13  Address                 8689 non-null  object  
14  Locality                 8681 non-null  object  
15  Unserviceable           8685 non-null  object  
16  Veg                     8685 non-null  object  
dtypes: float64(1), int64(4), object(12)
memory usage: 1.1+ MB
```

Find Null values in dataset

```
In [5]: sd.isnull().sum()
```

