StartUp Web Application

Submitted in partial fulfillment of the requirements for the degree of

Bachelor of Technology

in

Computer Science

By

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June, 2021

DECLARATION

I hereby declare that the thesis entitled "*Startup Web Application*" is submitted by me, for the award of the degree of *Bachelor of Technology in Computer Science* to VIT is a record of bonafide work carried out by me under the supervision of Prof./Dr. Lokesh Kumar R

I further declare that the work reported in this thesis has not been submitted and will not be submitted, either in part or in full, for the award of any other degree or diploma in this institute or any other institute or university.

Place : Vellore

Date : 9th June, 2021

Signature of the Candidate

CERTIFICATE

This is to certify that the thesis entitled "StartUp Web Application" submitted by **Naman Dutta (17BCE2379), SCOPE, VIT**, for the award of the degree of *Bachelor of Technology in Computer Science*, is a record of bonafide work carried out by him / her under my supervision during the period, 01.01.2021 to 09.06.2021, as per the VIT code of academic and research ethics.

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Place : Vellore

Date : 9th June, 2021

Signature of the Guide

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Naman Dutta

EXECUTIVE SUMMARY

In the current situation of e-globalization , in addition financial advancement, limited scope new businesses/ventures possess a position of an essential job in the work of labor , in addition usefulness, dissemination of pay across the areas through expanded speculations , in addition benefits. However, such industries find themselves in an intensely competitive environment because giant enterprises occupying furthermost of the market segments. This paper identifies problems of small-scale startups , in addition after complete analysis, provides answers for upgrading , in addition modernizing their technologies, , in addition suggests measures for facilitating procedures for accessibility of finance, requirements of improvements in skills, education, , in addition training. Acceptance of technology in small-scale businesses is necessary towards discover the way of future development, thus it has been surveyed towards realize the factors that drive users' acceptance or rejection of technology. Through the project, it has been proposed a stage towards remove a wide range of barriers for the reception of improved technologies, which is essential for the growth of small-scale startups. The application has been likewise provided with strong , in addition feasible techniques for business analysis , in addition growth in the provided stage. The use of the foundation encourages technological upgrades , in addition in-house technological innovations , in addition advancement of inter-firm linkages. The application is worked by investigating different aspects of strategy development like human resources, merchant improvement, association culture, etc. The technology used are Product Recommendation System, Association Mining productset, Stock Market Analysis, Business Analysis, E-learning, , in addition E-payment, etc.

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Abbreviations

ML	Machine Learning
SSI	Small Scale Industries
ANN	Approximate Nearest Neighbor
CF	Collaborative Filtering
ARIMA	Auto Regressive Integrated Moving Average
SMA	Simple Moving Average

Symbol and Notations

β	Beta
α	Alpha

1. INTRODUCTION

1.1 THEORETICAL BACKGROUND

As accessibility towards e-commerce , in addition technology has become a need for industries, large-scale industries are moving towards these markets. However small-scale industries are not able towards compete with these industries as they do not have the capital or the technological know-how of how towards start , in addition run successful e-commerce. Here, it is being created a platform where small-scale industries can market their products towards the public. They can also access various information, training material, , in addition practical seminars for better understanding , in addition improvement of their business. This platform also acts as a platform towards showcase , in addition improve their business. This allows investors towards broaden their vision towards small-scale industries , in addition find small effective investments. Even the consumers will be able towards get better products at a cheaper rate as the small-scale industries generally have products that are locally sourced , in addition cost less.

1.2 AIM

We aim towards provide a digital platform for small scale startups towards thrive by using information technological tools , in addition analysis.

1.3 MOTIVATION

People have seen many small business sufferings as the pandemic raged, furthermost were finding it hard towards find customers, leading towards business shutting down. Seller's market all over the world had faced severe damage. Especially in India, where 45%-50% of exports are handled by small-scale businesses, the damage dealt with the economy was immense. During this pandemic-raged period, one of the many reasons why small-scale vendors were not able towards continue , in addition face a total shutdown was business not being conducted digitally.

1.34OBJECTIVES OF THE PROPOSED WORK

a. Provide analytical tools
b. Provide inventory management tools
c. Provide learning materials for startups
d. Provide a platform for investors towards invest in startups
e. Digitize the market for small business

2. LITERATURE SURVEY

2.1 ABOUT

In India, 50% of GDP is contributed by Small-scale industries. These industries do not have access towards modern technological enhancements. During the pandemic raged lockdown imposed small-scale vendors faced a total shutdown of the business. This showed us the need for introducing new technologies towards this sector of industry.[1] Currently, these small-scale industries are not able towards compete with large-scale industries, basically due towards the lack of capital. They lack the new technologies like e-commerce towards market their product towards the current market. They are facing constraints in competitive priorities, investment, , in addition performance optimization.[2] Despite the government-level knowledge that small-scale industries are not able towards cope with the e-commerce system of large industries, there has been no involvement towards uplift small-scale industries. The slow pace of e-commerce diffusion in small-scale industries has been studied , in addition found that investment , in addition marketing have been the furthermost important in the slow integration with e-commerce.[4] Currently, large eCommerce giants(large-scale industries) have utilized , in addition structured their marketing around social media. However, the small-scale industries do not have nor the capital nor the technological know-how for this level of marketing.[3] Many studies have shown that e-commerce is especially good for developing countries. As it expands the market , in addition availability towards border market. [5]

Small Scale Industries are portrayed by dynamism, inventive turns of events, capability, , in addition their little size believe a speedier unique cycle. Administrations everywhere within the biosphere have understood their importance, in addition have in like manner executed numerous strategies towards empower , in addition resource them. SSI enterprises ensure a extra fair-minded transport of public pay besides every one the while prepares capital , in addition expertise. [6]

2.2 PROBLEMS ANALYSED

After examination of different constraints of small-scale industries, through field perceptions, oral interviews, , in addition questionnaires, data was gathered. This data was later processed using statistical techniques. Through this current, it's expected that restricted scale endeavors have really impacted the space of business and family wage. It also shows that there's a deficit of the bosses' abilities, vulnerable record-keeping, in addition weak permission towards financing[7]. The serious complications faced by small scale industries remain:

a. Deprived startup process[8]: Many small-scale startups are initiated in a poorly manner. No proper plans are formulated for initiating a start-up business. This problem eventually leads towards catastrophic failure of business initialization. Shorn of proper planning, risk factor analysis, market analysis, trying towards compete in the market is useless. The startups should have a proper initializing process. This will help in the blooming of the business.
b. Lack of Infrastructure , in addition resources impacts the ability of the small business towards enter export markets[9]: This is a major problem faced by many small-scale businesses. They lack in infrastructure , in addition resources towards operate their business. Infrastructures for small-scale industries include desk & table, vehicle, electricity, etc. Because of this, they face a lot of difficulty in production , in addition therefore fail towards enter the export market.
c. Scarcity of dexterity, period, cash, , in addition sustenance keep up legitimate industrial procedures [10]: Small scale startups face a lot of problems because they do not have access towards expertise in business , in addition the market.
d. Unable towards meet demands for various technological proficiencies [11]
e. A lesser amount of susceptible towards tolerate a bombed endeavor for completing of ERP system[12].
f. The excessive expense for business expansion projects [13]
g. Unavailability of information between marketing , in addition production. [14]
h. Shortage of skilled human resources towards operate small-scale businesses.[15]

2.3 SOLUTION PROVIDED BY PROPOSED SYSTEM

In the hour of e-globalization, bull bazaars have gotten amazingly novel , in addition savage. Earnestness has become advancement motivated. Toward invigorate their advancement, SSIs necessity towards contribute their resources reasonably. Thus, it is typical that the power of the affiliations will depend upon interest cutting-edge diverse districts/growth. The followings are the courses of action stage will deal with sort:

a. The platform can provide access towards 3rd party services that will help small-scale businesses towards tackle the problem of infrastructures , in addition resources.
b. The platform is a web application, so the time of operations is done decisively.
c. The platform will provide different advance assurance plans of the public authority, its offices just as bank crediting plans.
d. The platform will try towards meet the demands of several technological gaps , in addition help thrive small-scale businesses.
e. The platform provides vague expertise in analyzing business growth, the need for Enterprise Resource Planning (ERP) system.

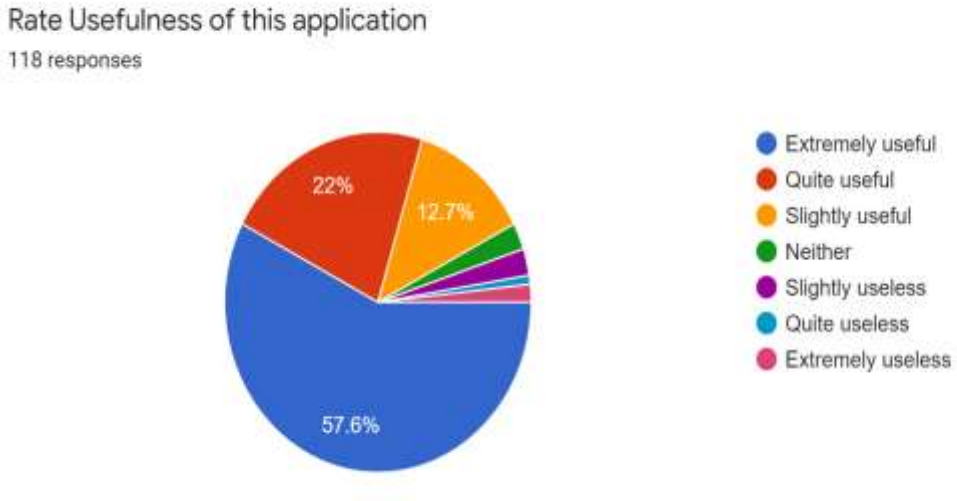
2.4 TECHNOLOGY ACCEPTANCE MODEL , in addition SURVEY RESULT

TAM, represents Technology Acceptance Model, expresses that the achievement of selection of any new-fangled innovation depends arranged elevating viewpoints in the view of twofold significant measures:

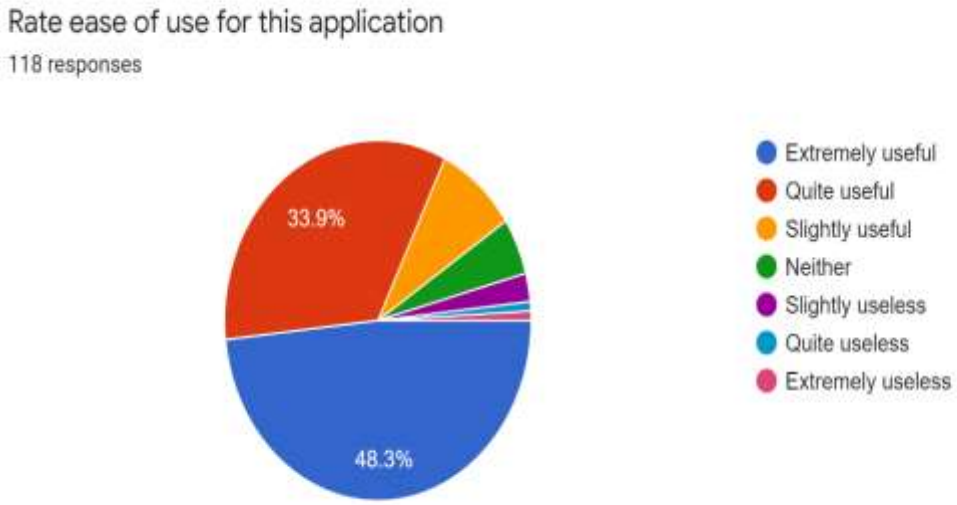
a. Discerned worth
b. Discerned luxury of usage

Variations of the model have additionally been made towards address the fluctuation in people's expectation towards utilize the new-fangled innovation framework. It is significant towards note that recognition , in addition acceptance by Small scale startups towards use Information Technology are critical for further development of business. In general, acceptance can be defined as a positive choice towards utilize innovation. It is a common question why do firms adopt new technologies. Answering this question will help many practitioners , in addition researchers towards improve , in addition improvise methods for designing, evaluating, , in addition planning the new technologies for firms.

A survey was taken for Technology Acceptance Model:

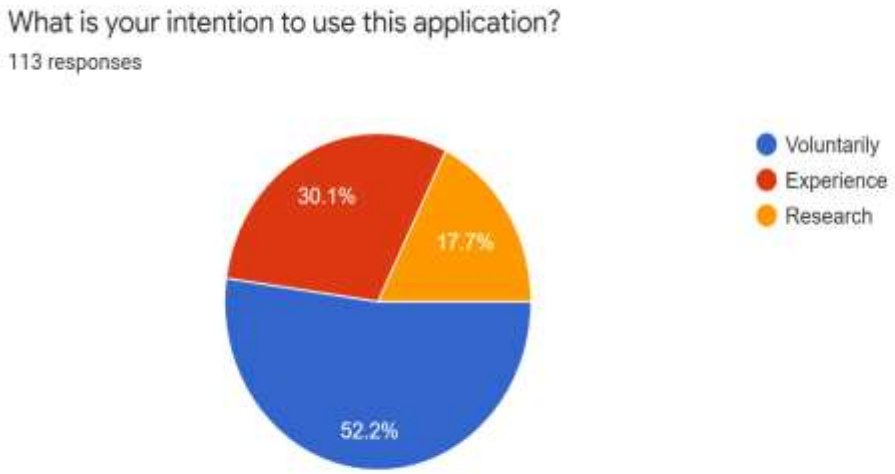


Through this survey, it has been analyzed that users have rated the usefulness of this application with positivity greater than 90% with extremely useful as 57.6%, Quite useful as 22%, Slightly useful as 12.7%. 2.5% of the users have rated the product as Neither, neutral response. 2.5% of other users have rated Slightly useless. 0.8% of the users have rated Quite useless , in addition 1.7% have rated the product as extremely useless.

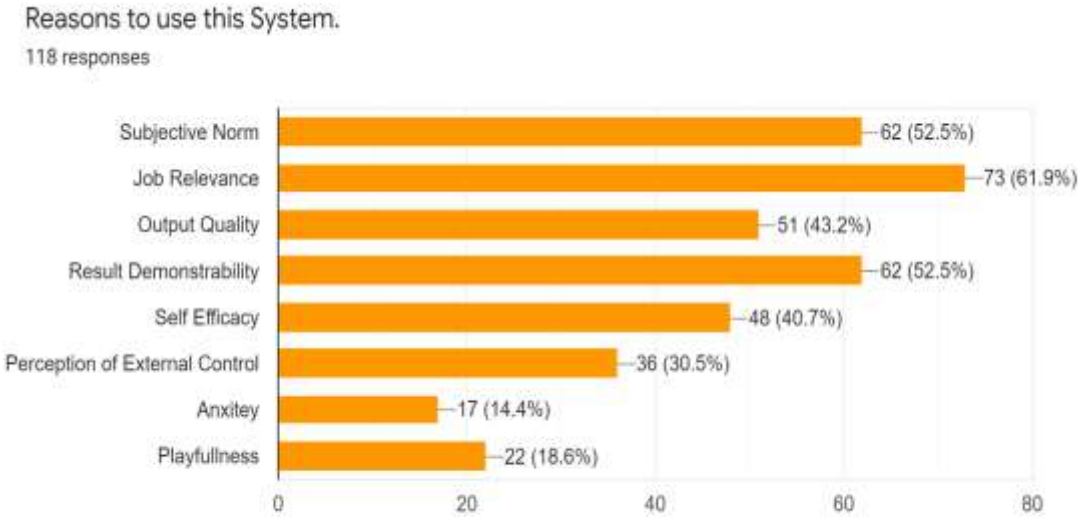


Through this survey it has been analyzed that users have rated the ease of use for this application with positivity greater than 85% with extremely useful as 48.3%, Quite useful as 33.9%, Slightly

useful as 8.5%. 5.1% of the users have rated ease of use for the product as a Neither, neutral response. 2.5% of other users have rated Slightly useless. 0.8% of the users have rated ease of use for the product as Quite useless , in addition 0.8% have rated ease of use for the product as extremely useless.



Through this survey it has been analyzed that 52.2% of the users used this application voluntarily. 30.1% of users used the application for gaining some experience. 17.7% of users used the application for research purposes.



Through this survey it has been analyzed that users' responses towards using this System. 52.5% of the users have responded Subjective Norm, 61.9% of the users have responded Job Relevance, 43.2% of the users have responded towards Output quality, 52.5% of the users have provided a response as Result Demonstrability, 40.7% of the users have provided a response as Self Efficacy, 30.5% of the users have responded towards Perception of External Control, 14.4% of the users have responded Anxiety, , in addition 18.6% of the users have responded Playfulness.

Through the survey, it has been analyzed the following Technology Acceptance Model:

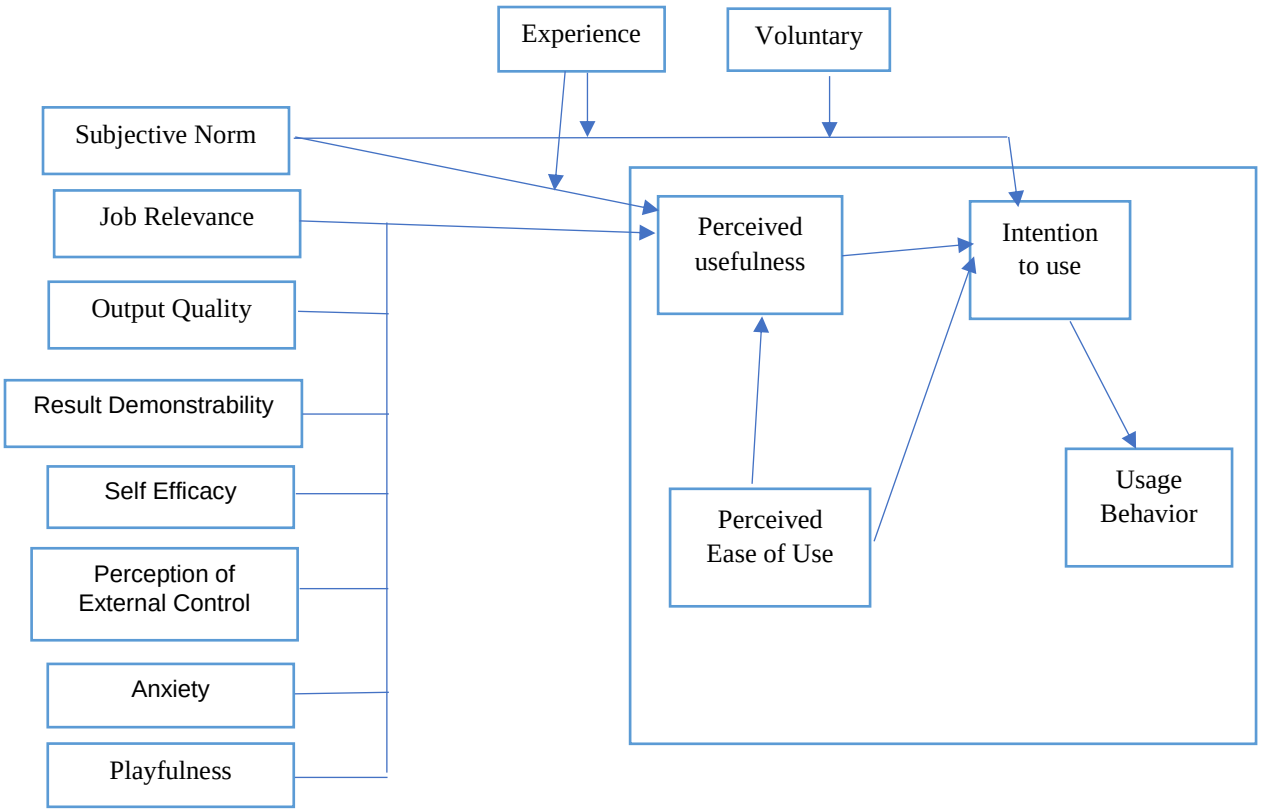


Fig 2.1: Technology Acceptance Model

2.5 SURVEY OF EXISTING MODELS/WORKS

The application is being compared towards Amazon , in addition OLX as they have similar services that are slightly different. Amazon is one of the world's furthermost successful e-commerce services. It provides sellers a platform towards present their products towards the masses. They charge a hefty 13.2-16.6% of the sales for each sale. As furthermost small-scale industries have less than that as their profit margin, they cannot afford such services. Amazon itself provides delivery service, however, it is centralized as inventory from the seller is brought towards the central delivery center from where they are dispatched towards the destination be at across the street. This is a wasteful practice but allows them towards have a consistent delivery quality, considering this their wasteful packaging is widely known.[17] Compared towards this small scale-vendors also have towards face competition from larger companies, making them decrease their price or quality eventually taking them out of the competition. As anyone can register as a seller at amazon, this paves way for ms-represented or fraudulent materials , in addition services. There have been many cases where the product presented are not the ones that are delivered. Even if products are similar there have been cases where the quality or the condition varies significantly[18].

OLX is also an international brand spanning many countries. It markets itself as a second-hand marketplace. However, many sellers buy in bulk , in addition sell first-hand products. There is no delivery system applicable with the sales in this service. Generally, the buyer , in addition the seller contact , in addition conclude. As applicable towards any non-certified market, there have been many fraud cases on the platform. Many fraudulent seller use products which cannot be checked immediately, as they cannot be checked during the transaction , in addition also easily be sold towards buyers shorn of in-depth knowledge of the product.[19] These platforms are also used for selling scalped products at high prices, as seen in GPUs recently. As an open platform, even first-hand products sold here may be stolen or brought in illegally, which may cause problems later on. Many cases have been brought towards knowledge where products were shipped with faulty or different products. Many phones were sold with rocks, soap, or similar products in the case. As the seller is not required towards provide contact information or address towards the buyer, making it difficult for the buyer towards track the seller[20].

Start-off is the platform built for small-scale industries with the mind. As they were severely suffering in the pandemic, this platform is built towards work with local first in mind. The platform sorts the search result with location as the default , in addition deciding factor. This allows people towards buy products from their locality, decreasing the cost of delivery , in addition similar logistics. Sellers are also required towards provide PAN/VAT no. (government proof business is registered as a taxpayer). This allows us towards take action against any fraudulent activities, as the admins can easily file a case with the information provided at registration. This decreases a lot of cases where the products are faulty or not as advertised. As the service has a local-first policy this also means the seller is generally closer towards the buyer. Delivery is not handled directly by the platform, however, local delivery services are attracted towards the platform which allows for easier , in addition cheaper delivery service.

2.6 GAPS IDENTIFIED IN SURVEY

Parameters	Amazon	OLX	Proposed Application
Product Manufacturing Pressure	High	NA	Low
Delivery Service	Centralized	Peer towards peer	3rd Party + peer towards peer
Assured products	True	False	True
Commodity Price	As per Market	User's Choice	As per Market
Products Discounts	True	NA	True
Merchant verification	False	False	True
Business Analysis Service	False	False	True
Product Recommendation	True	False	True
Mining frequent productset	True	False	True
E learning Services	False	False	True
Stock Market Analysis	False	False	True
Feedback & Rating Feature	True	NA	True

3. OVERVIEW OF THE PROPOSED SYSTEM

3.1 INTRODUCTION AND RELATED CONCEPTS

3.1.1 Technology Used

3.1.1.1 Recommendation System

In a general way, recommender frameworks are calculations highlighted proposing pertinent things towards clients (things presence films towards see, text towards scrutinize, items towards look for, or anything relying upon adventures). Recommender agendas remain really essential in specific undertakings as they will make a monster proportion of pay once they are capable otherwise even be what towards look like out generally from competitors. The inspiration driving a recommender system is towards propose appropriate items towards clients. towards comprehend this assignment, there exist two huge orders of strategies: cooperative sifting techniques besides substance-based techniques.

Collaborative filtering methods:

Users	User-item interactions matrix	Items
suscribers	rating given by a user to a movie (integer)	movies
readers	time spent by a reader on an article (float)	articles
buyers	product clicked or not when suggested (boolean)	products
...		

Fig3.1: Collaborative filtering

Collaborativemethods for recommender structures are techniques that rely entirely upon the past affiliations recorded among customers, in addition things towards supply new recommendations.

These coordinated efforts are taken care of inside the implied client thing participations matrix. By then, the furthermost thought chooses cooperative strategies is that these past client thing affiliations are satisfactory towards perceive similar clients as well as relative items , in addition make assumptions maintained these surveyed areas [21].

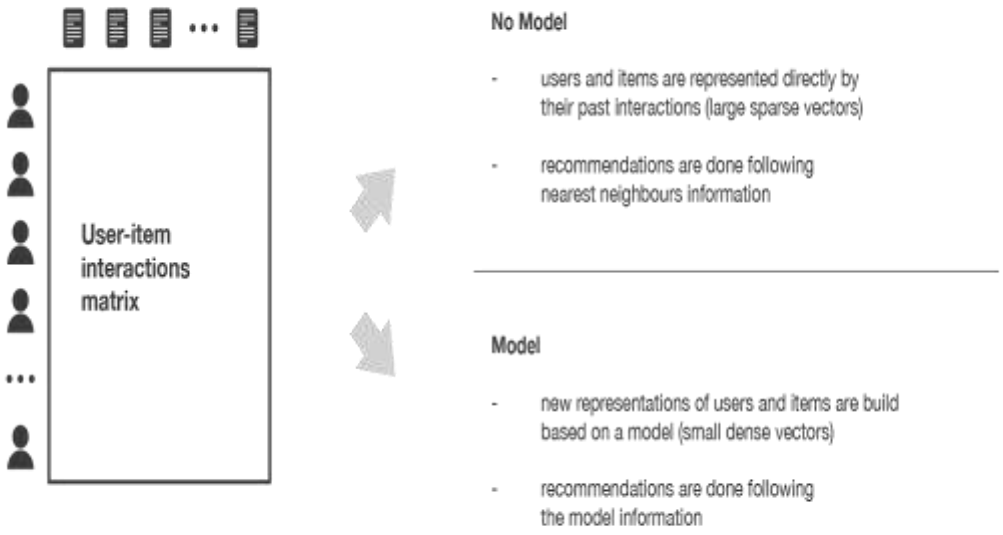


Fig3.2: User-item interaction

Content-based methods:

In diverse nature towards collaborative strategies that simply acknowledge the client thing correspondences, content-based techniques use additional information about clients and/or items.

By then, content-based strategies can embrace towards make a model, maintained the available features, that decide the saw client thing affiliations. At this point pondering clients , in addition films, we'll endeavor, for instance, towards model the very reality that young women will in an overall rate better a couple of movies, those youthful colleagues will in an overall rate better another movies then on. Accepting it has been sorted out some way towards want a particularly model, making new assumptions for a client is very straightforward towards work out appropriate films towards suggest.

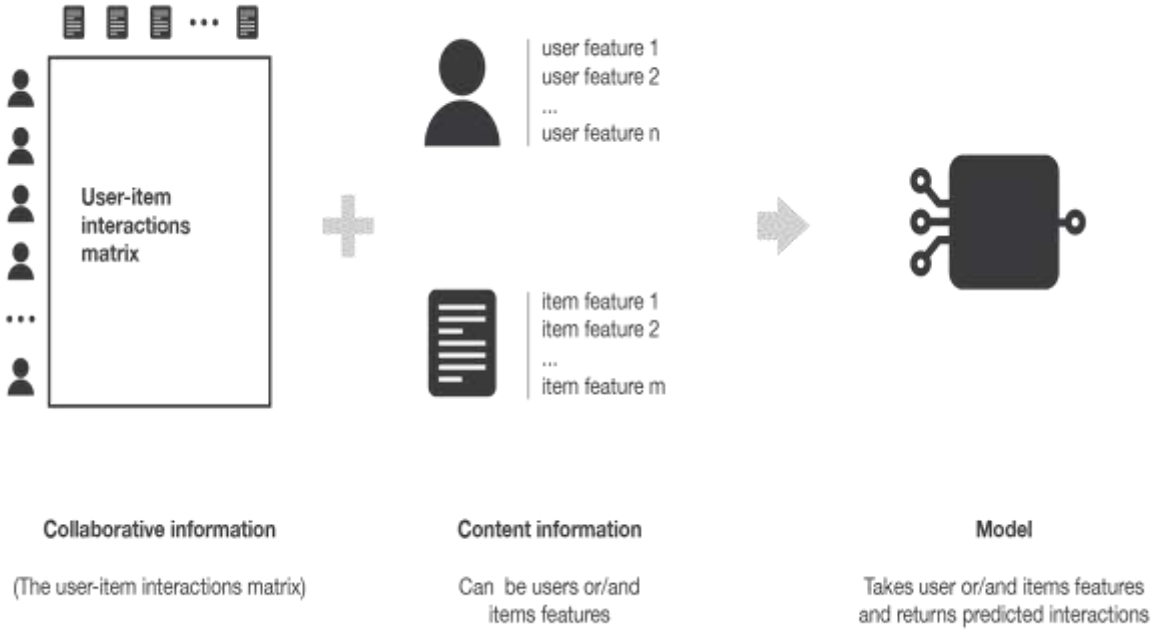


Fig3.3: User-item interaction matrix

User-user

To shape a replacement proposition towards a client, the client method by , in addition large endeavors towards spot clients with the first similar collaborations profile (closest neighbors) towards suggest items that are the boss acclaimed among these neighbors (and that are new towards the client). This procedure is proclaimed towards be client centered in light of the fact that it tends towards clients maintained their correspondences with items , in addition surveys distances between clients.

Fig3.4: User-User interaction

Item-item

To make an alternative thought towards a client, the opportunity of the object component method is towards search out objects for all intents , in addition functions like these the patron as of now earnestly teamed up with. Two objects are viewed as close towards if furthermost of the purchasers that have spoken with each of them did it similarly. This technique is maintained towards be thing centered on the grounds that it tends towards objects-maintained connotations consumers had with them , in addition surveys distances between these items.

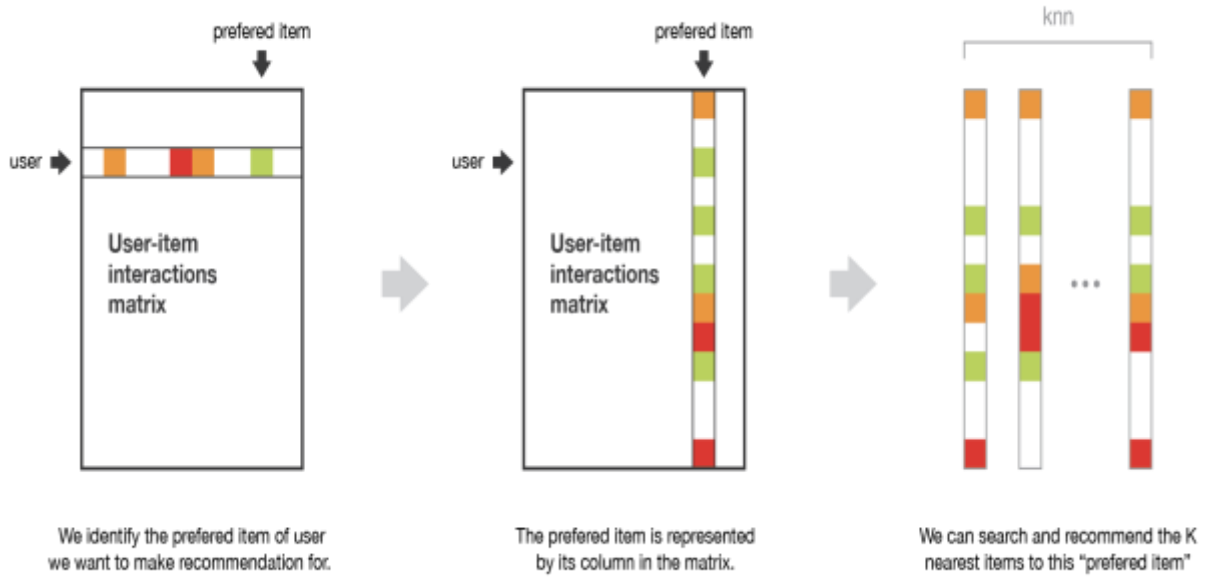


Fig3.5: Item-item interaction

Comparing user-user , in addition product-item

The client methodology is predicated on the request of identical clients towards the extent interchanges with items. As, generally, every client has simply interfaced a few items, it makes the system pretty sensitive towards any recorded correspondences (high change). Actually, hand, on the grounds that the last idea is simply maintained connotations recorded for clients for all intents , in addition purposes like the client of interest, it is gained more modified outcomes (low tendency).

Fig3.6: Comparison matrix

Complexity , in addition Side Effect

Perhaps the first deformity of memory-based collaborative filtering is that they're doing not scale viably: delivering a replacement idea is usually unbelievably monotonous for beast frameworks. Undoubtedly, for frameworks with various clients , in addition various items, the closest neighbors search step can get obstinate if not meticulously arranged (KNN computation incorporates complexity of O(ndk) with n the proportion of clients, d the proportion of things, , in addition k the proportion of pondered neighbors).

3.1.1.2 Frequent Association Mining of product set

Association rule mining that uses various frequent itemset towards perceive crucial relations between different items. There are various techniques towards perform affiliation rule mining. The Apriori calculation is that the furthermost essential , in addition direct methodology. Notwithstanding, since it is the key procedure, different overhauls are often applied thereto.

Support: Support may be a negligible portion of exchanges that comprise of an item set. for instance , the assistance of thing is described because the quantity of exchanges containing item being isolated by the complete scale number of exchanges.

$$support(I) = \frac{Number\ of\ transactions\ containing\ I}{Total\ number\ of\ transactions}$$

Confidence: Confidence within the Apriori calculation estimates how routinely items in Y appear in exchanges that contain X. Inevitability is that the likelihood that thing Y is similarly bought if a thing X is bought. It's resolved because the quantity of exchanges containing X , in addition Y separated by the number of exchanges containing X.

$$confidence(X \rightarrow Y) = \frac{Number\ of\ transactions\ containing\ X\ and\ Y}{Number\ of\ transactions\ containing\ X}$$

Relevant Frequent product Set: Frequent item Set in apriori calculation may be a productset whose assistance is more unmistakable than or like a minSup limit. Standard productsets or in any case called progressive model just techniques all the productsets that the assistance satisfies the bottom help limit.

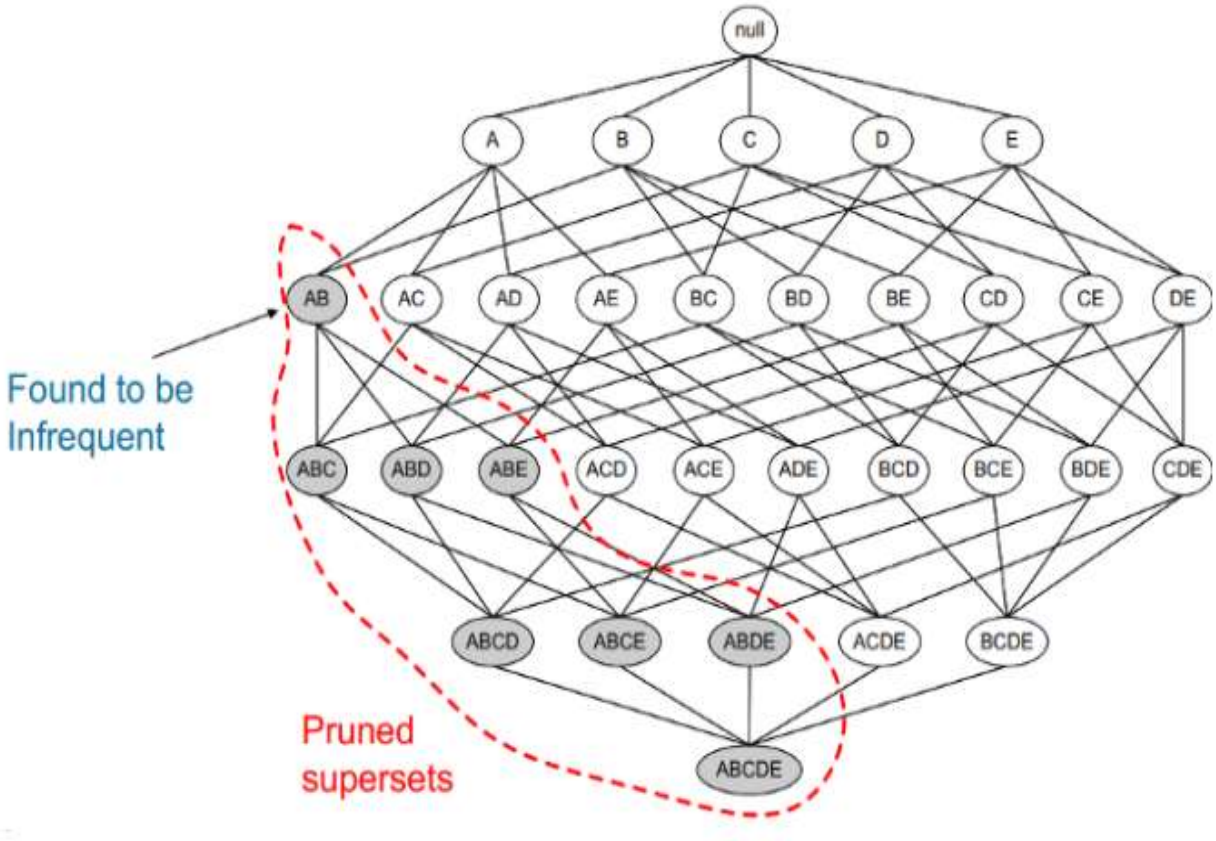


Fig 3.7: Apriori Algorithm

The fundamental thought of the Apriori Algorithm is: All non-void subsets of a Frequent product set should likewise be Frequent.

It's a bottom-up tactic. It begins from each , in addition everything in the product set. At that point, the applicants are produced shorn of anyone else linking. The product sets each thing, in turn, are expanded in the length. At each level, the subset trial is done, , in addition product sets with conflicting subsets are trimmed. The interaction is rehashed until no more effective product sets can be extracted from the data. It's a granular viewpoint. It begins with each , in addition every item on the product set list. By that time, the applicants have been supplied , in addition no one else has joined. As a result, everything is extended inside the length of the item. At each level, the subset trial is conducted, , in addition any product sets with contradicting subsets are trimmed. It is emphasized that until the connection is no longer strong, powerful product sets are frequently obtained from information.

Pseudocode of Apriori Algorithm:

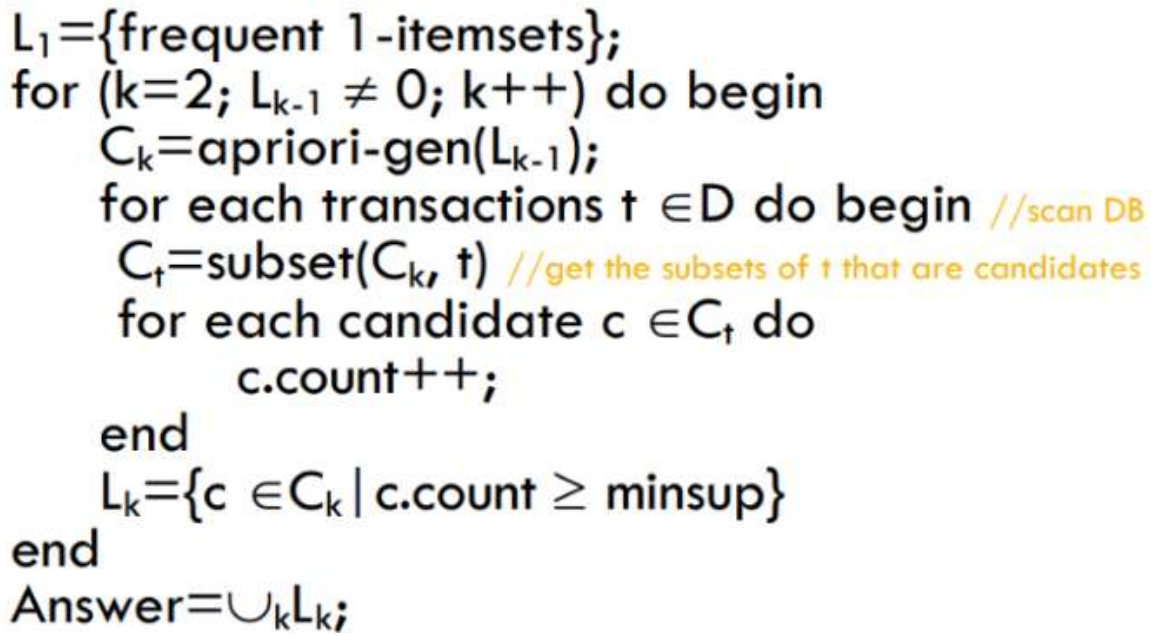


Fig 3.8: Apriori Algorithm Pseudo Code

Here Lk in the event that regular k-product customary, fulfill least help , in addition Ck is contender of k-product set.

To summarize, the essential parts of Frequent association mining algorithm Apriori can be composed as

a. Utilize k-1 productsets towards produce k productsets
b. Getting C[k] by joining L[k-1] , in addition L[k-1]
c. Exclude C[k] with subset testing
d. Create L[k] by separating the productsets in C[k] that fulfill mind up

3.1.1.3 Time Series Analysis

Whether or not it's wished towards foresee the instance in financial commercial areas or force use, time may be a critical factor that has got towards nowadays be considered within the models. as an example , it's interesting towards guess at what hour during the day is there getting towards be an apex use in power, for instance, towards vary the expense or the formation of force. A period arrangement may be a progression of data centers mentioned on schedule. during a period, arrangement, time is routinely the free factor , in addition therefore the goal is, when unsure , towards form a measure for what's towards return . Regardless, various points become perhaps the furthermost factor when overseeing time arrangement. The factors are fixed, irregularity, , in addition autocorrelated.

- Autocorrelation: Casually, autocorrelation is the comparability between perceptions as an element of the time slack between them.
- Seasonality: Seasonality alludes towards occasional changes. For instance, power utilization is high during the day , in addition low during the night, or online deals increment during Christmas before backing off once more. It implies intermittent changes.
- Stationarity: Stationarity is a critical nature of time arrangement. A period arrangement should be fixed if its real properties don't change after some time. Toward the day's end, it has a consistent mean , in addition change, , in addition covariance is independent of time. It may be a critical nature of time arrangement.

Modeling time series Analysis

Around remain numerous approaches that we can use for displaying a period series calculations towards brand predictions: SMA, exponential smoothing, , in addition ARIMA

- Moving average:

$$SMA = \frac{A_1 + A_2 + ... + A_n}{n}$$

- Exponential smoothing:

$$y = \alpha x_t + (1 - \alpha) y_{t-1}, t > 0$$

Here, alpha is a smoothing factor that takes esteems somewhere in the range of 0 , in addition 1. It decides how quickly the weight diminishes for past perceptions.

- Double exponential smoothing:

$$y = \alpha x_t + (1 - \alpha)(y_{t-1} + b_{t-1})$$

$$b_t = \beta(y_t - y_{t-1}) + (1 - \beta) b_{t-1}$$

Here, beta is the pattern smoothing variable, , in addition it takes esteems somewhere in the range of 0 , in addition 1.

3.1.1.4 Business Analysis

Business Analysis is how industries formulate their policies & schemes , in addition make use of technological tools for dissecting current , in addition historical information, intending towards benefit important decision-making processes , in addition grasp the competitive market.

Commercial Analysis frameworks associate information gathering, information storage, , in addition information administration towards appraise complex data into significant, actionable data. This transformed data can be utilized towards help create more effective strategies , in addition tactics for operational , in addition decision-making. Business Analysis conditions consist of an mixture of improvements, submissions, measures, systems, products, in addition to dedicated models used towards empower the assortment, analysis, show, , in addition dissemination of interior , in addition exterior commercial facts.

Commercial Analysis developments exploit progressed statistics , in addition clairvoyant investigation towards help trades reach inferences from information analysis, discover instances, in addition gauge future occasions in business tasks. Business Analysis revealing is not a straight practice, rather, it is a nonstop, diverse pattern of information access, enquiry, in addition information distribution. Regular business Analysis volumes comprise.

The significance of business Analysis keeps on developing as businesses face a steadily expanding stream of crude information , in addition the difficulties of acquiring understanding from huge volumes of data (huge information). With the work of business Analysis frameworks, businesses can acquire an extensive perspective on their association's information , in addition make an interpretation of it into bits of knowledge about their business measures, empowering improved , in addition vital business decisions.

Business Analysis assists connotations with investigating information with a historical setting, streamline tasks, track execution, speed up , in addition improve decision-production, recognize , in addition take out business issues , in addition failures, distinguish market patterns , in addition examples, drive new incomes , in addition benefit, increment efficiency, , in addition speed up development, dissect client conduct, contrast information , in addition contenders, , in addition at last addition an upper hand over rival businesses.

People remain in a dated of ground-breaking program. Hi-tech evolutions partake the distraught the unvarying daily reality, in addition undoubtedly the major upshot stroked has remained in the commercial world. Administrations currently method evidence determined apparatuses , in addition systems that certificate them towards become familiar with their clients , in addition themselves than at any other time, yet not every person is exploiting them. Today we're successful towards break down Business Analysis , in addition why it's essential towards the attainment , in addition lifecycle span of the connotation.

In outline, Business Analysis makes it imaginable towards join info from abundant bases, investigate the facts into a administered plan, , in addition afterward disseminate the facts towards momentous partners. This certificates administrations towards the sight of the advanced outlook , in addition settle on keen business decisions. There are steadily inalienable risks with esteems towards settling on any business decision, however, those risks aren't as conspicuous or worrisome.

Business Analysis connotations can push ahead in an inexorably information-driven environment with inevitability comprehending they are prepared for somewhat trial that arises.

3.2 FRAMEWORKS , in addition ARCHITECTURE FOR THE PROPOSED SYSTEM

3.2.1 Framework Adopted

3.2.1.1 MERN stack

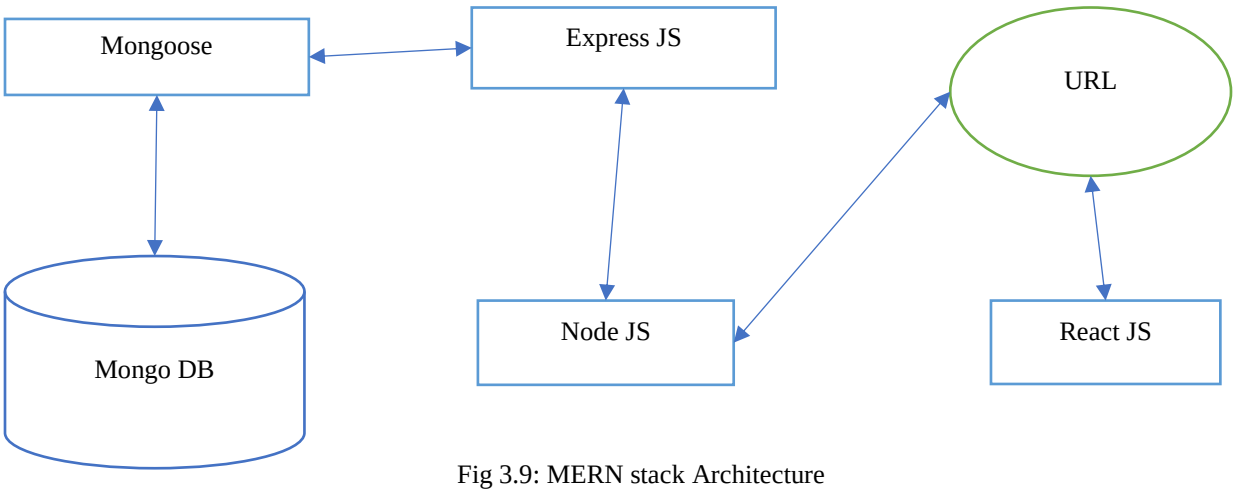


Fig 3.9: MERN stack Architecture

The application is utilizing MERN stack towards fabricated the web application. It is a full-stack arrangement following the 3-level engineering: MongoDB as an information base, ReactJS as frontend, , in addition NodeJS as backend.

MongoDB is intended towards accumulate JSON information locally making it adaptable. It is based on JSON , in addition JavaScript. Express.js handles worker-side applications like HTTP solicitations , in addition reactions, likewise makes it simple towards plan URLs towards worker-side capacities. React.js permits building intelligent UIs , in addition correspondence with far-off workers making it simple towards utilize , in addition convey.[16]

REACT Js

React is a JavaScript library (not a structure) that makes (UIs) in an anticipated , in addition productive way utilizing decisive code. The systemcan utilize it towards help assemble single-page

applications , in addition versatile applications, or towards fabricate complex applications if The systemuse it with different libraries.[22]

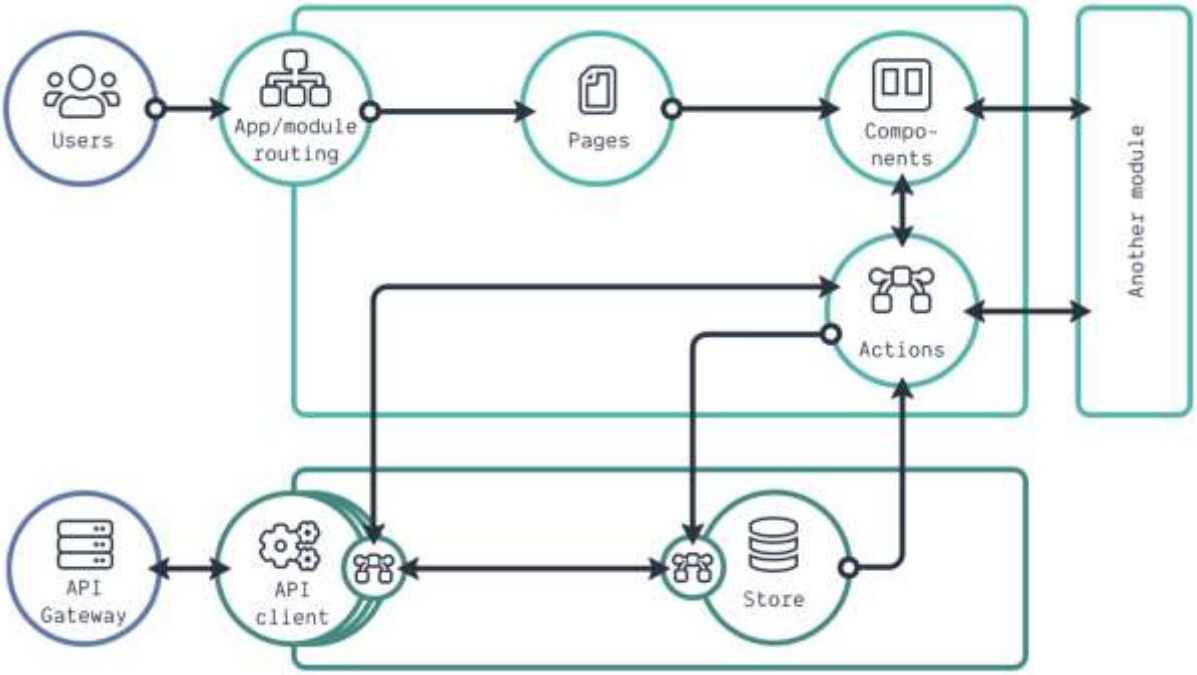


Fig3.10: React Js

Express Js

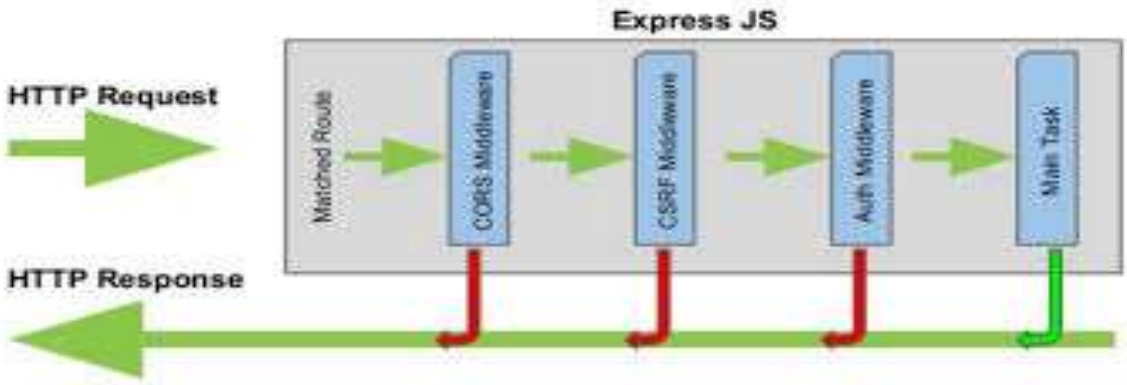


Fig3.11: Express Js

Express.js is a steering , in addition Middleware structure for taking care of the diverse directing of the site page , in addition it works between the solicitation , in addition reaction cycle. There

are heaps of middleware works in Express.js like Express.js app. use() Function , in addition so on. It acknowledges the two boundaries as referenced above , in addition depicted beneath:

a. path: It is the path for which the middleware work is being called. It very well may be a string addressing a path or path design or a standard expression example towards coordinate with the paths.
b. callback: It is the callback work that contains the solicitation object, reaction object, , in addition next() capacity towards call the following middleware work if the reaction of current middleware isn't ended. In the subsequent boundary, it can likewise pass the capacity name of the middleware.

Node Js

The Node.js run-time climate incorporates all the system require towards implement a plug-in inscribed in JavaScript. Node.js appeared when the first designers of JavaScript broadened it since to some degree that the system may perhaps just altercation the program towards to some degree the system may perhaps course on the appliance by way of an independent submission. Presently The system can do substantially more with JavaScript than simply making sites intelligent. JavaScript currently can-do things that other prearranging dialects like Python can do. Both the program JavaScript , in addition Node.js run on the V8 JavaScript runtime motor. This motor takes the JavaScript code , in addition converts it into a quicker machine code. Appliance cryptogram is low-level cryptogram that the PC can course shorn of expecting towards initially decipher it.

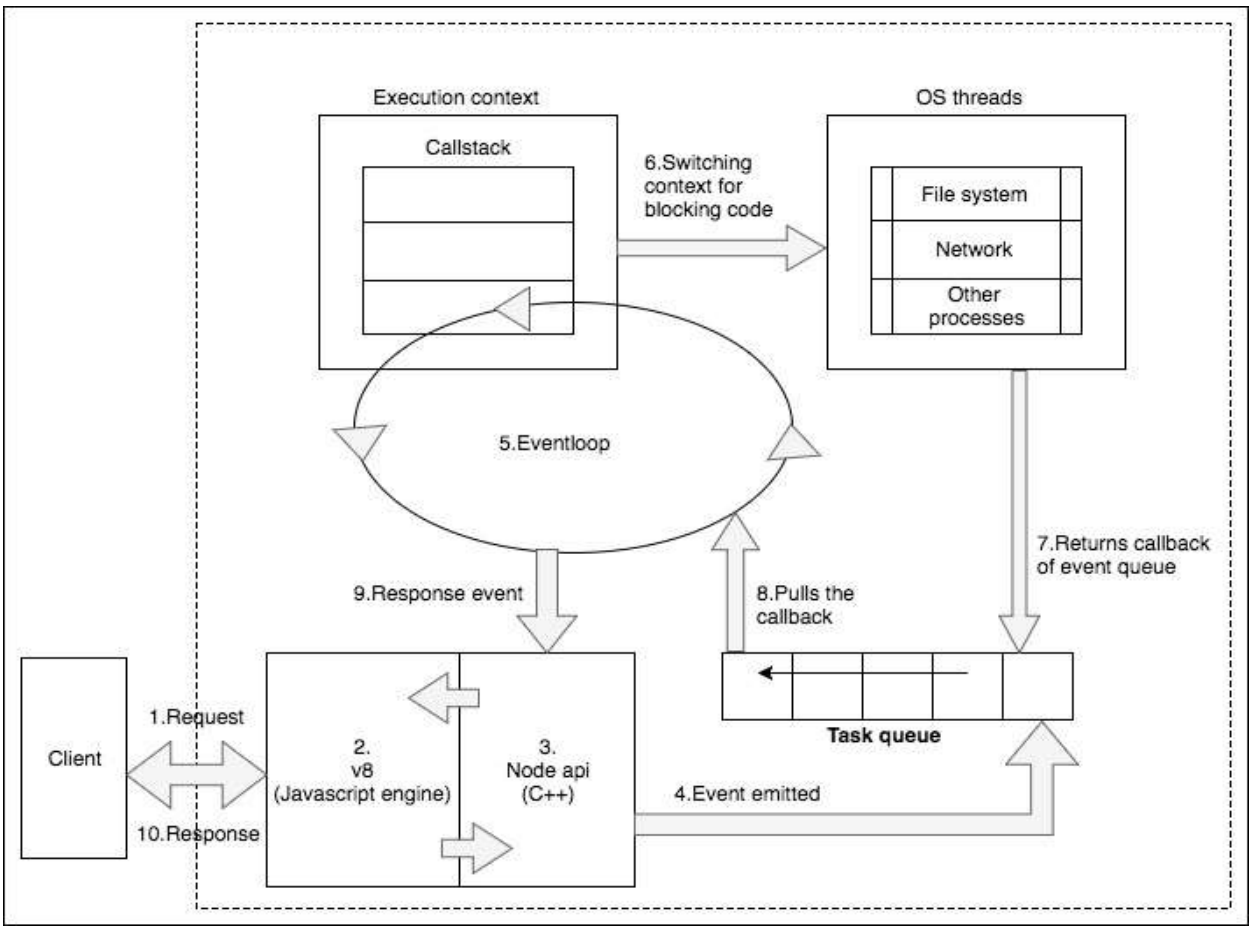


Fig3.12: Node Js

MongoDB

MongoDB is an open-source archive arranged catalogue that is intended towards accumulate an enormous size of information , in addition permits The system to work with that information proficiently. It is classified under the NoSQL (Not just SQL) catalogue because the capacity , in addition recovery of information in MongoDB are not as tables.

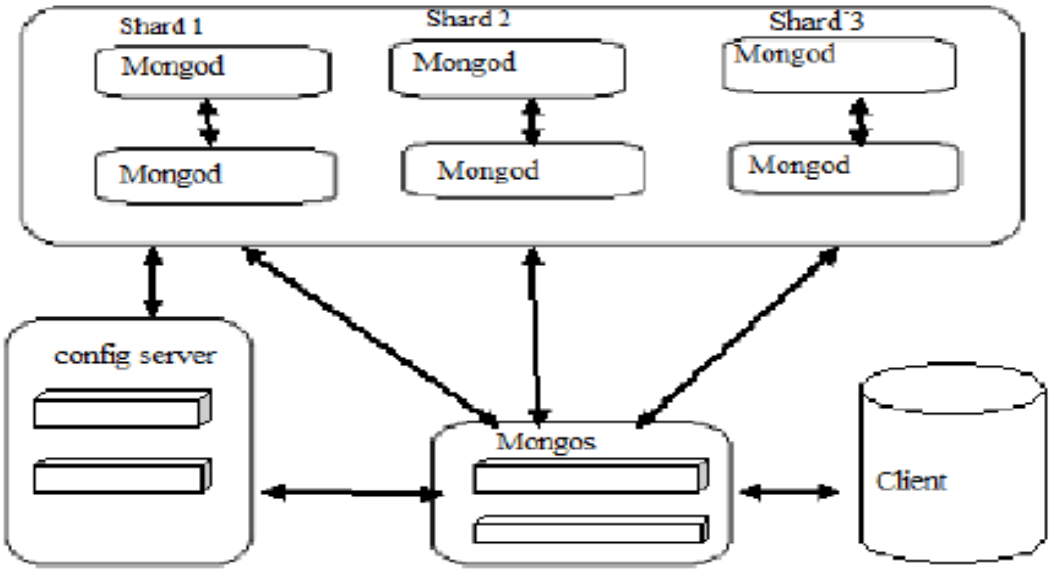


Fig3.13: MongoDB

3.2.1.2 Model-View-Controller

The application has embraced MVC (Model-View-Controller) plan design for coding. This example is utilized towards isolate the application's interests. The Model View Controller (MVC) plan design determines that an application comprises an information model, show data, , in addition control data. The example necessitates that each of these is isolated into various articles.

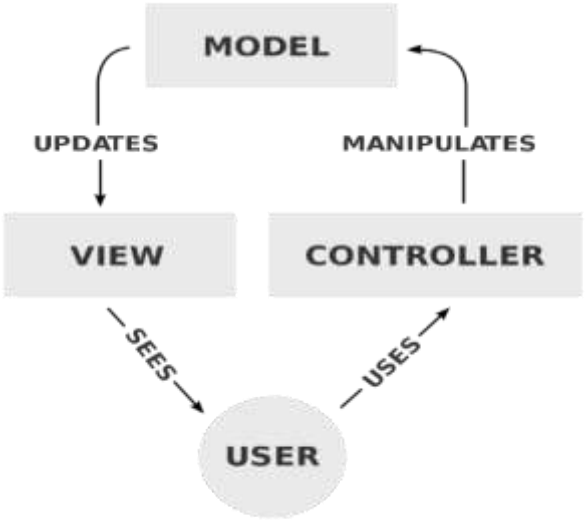


Fig3.14: Model-View-Controller

• The Model

• The View

• The Controller

3.2.2 Architecture Used

In the application, it has adopted microservices architecture Microservices - otherwise called the microservice architecture - is a building grace that erections an solicitation as an assortment of administrations that occur:

- Vastly workable , in addition demonstrable
- Sloppily attached
- Unconventionally galvanize
- Systematized round professional competencies
- Maintained via a minor squad

The micro-service architecture allows the quick, recurring, in addition steadfast supply of huge, complicated applications. It similarly facilitates an association in the direction of progress its technology stack

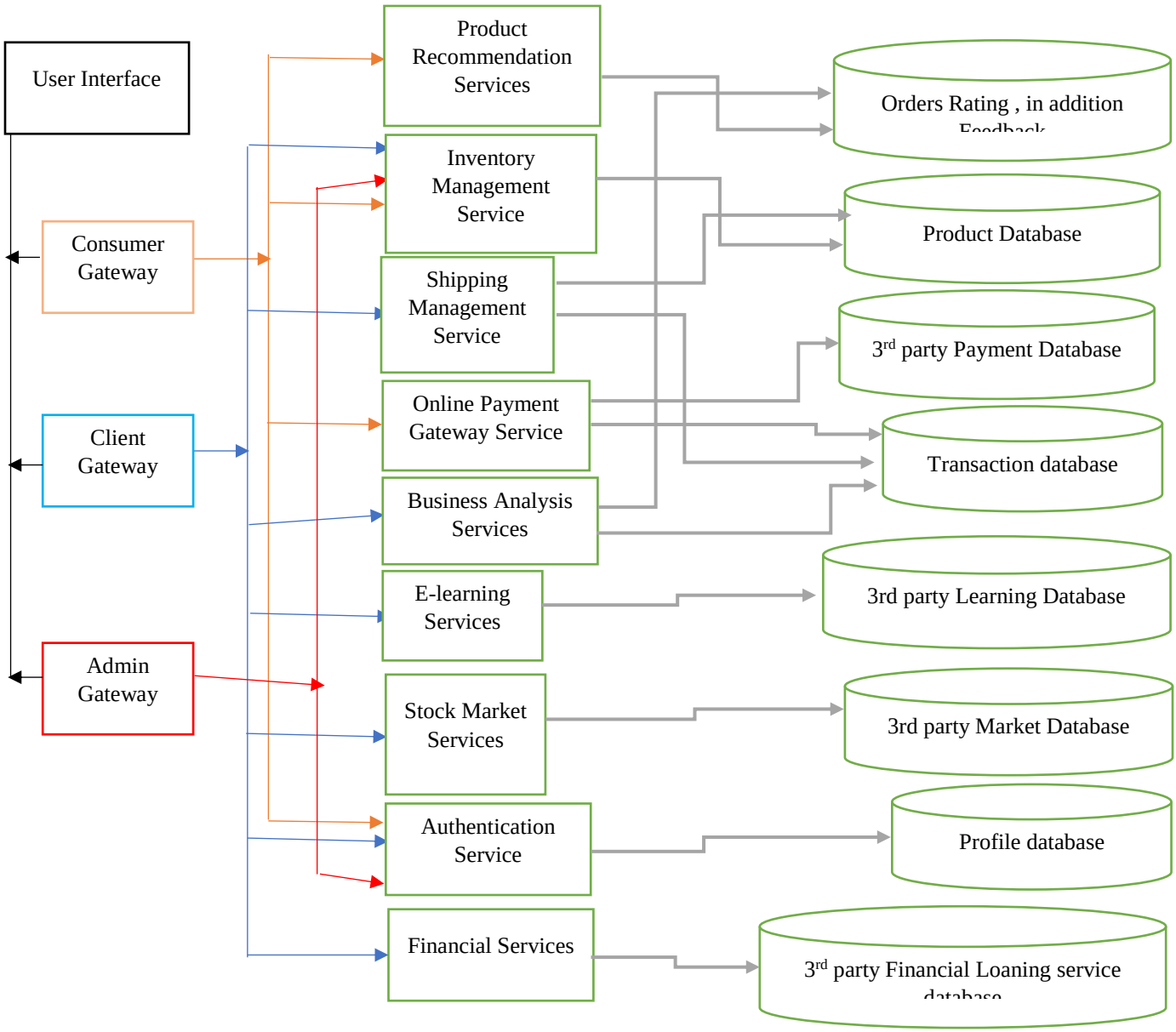


Fig3.15: Microservices Architecture

3.2.2.1 Product Recommendation Service

The recommender system makes prognostication based on users' historical practices. This service allows consumers towards get a recommendation for buying new products based on their previous data. The system will intake the rating of consumers , in addition find the similarity between users. Based on this similarity the application assumes that if user A has given good ratings towards product X , in addition user A , in addition user B have high similarity then user B might b interested in buying product X.

After much analysis, the application decided that **user-based Collaborative Filtering** with **explicit ratings** of products would be a better approach towards the product recommendation service. After applying PCA (Principal Component Analysis) towards reduce dimension , in addition remove noise data, it has generated an n × m matrix of ratings, with user u_i, i = 1, ...n , in addition product p_j, j=1, …m. Now the application predicts the rating r_{ij} if the target user I did not watch/rate an product j using equation 1 and in equation 2. [26]

$$r_{ij} = \frac{\sum_{k} Similaries(u_i, u_k) r_{kj}}{number\ of\ ratings}$$

Equation 1: Collaborative Filtering

$$r_{ij} = \bar{r}_i + \frac{\sum_{k} Similaries(u_i, u_k)(r_{kj} - \bar{r}_k)}{number\ of\ ratings}$$

Equation 2: Collaborative Filtering (Weighted Average rating)

To calculate the similarity, the application can use Pearson's Correlation or Cosine Similarity. Since Pearson's Correlation works better with large data set , in addition the data set is small for now, the application is using Cosine Similarity towards find Similarities between users.

$$Cosine\ Similarity : Sim(u_i, u_k) = \frac{r_i \cdot r_k}{|r_i||r_k|} = \frac{\sum_{j=1}^{m} r_{ij} r_{kj}}{\sqrt{\sum_{j=1}^{m} r_{ij}^2 \sum_{j=1}^{m} r_{kj}^2}}$$

Equation 3: Cosine Similarity

To handle sparsity issues in the dataset, the application has created a temporary predicted rating. In this, wherever the user has not rated an product, the application has assigned a weighted mean average rating of that product in the place. the application has the user temporarily predicted ratings whenever the application encounters an product not rated. This helps towards handle the issue of calculating the similarity between users.

The Application is also using Apriori Algorithm towards recommend the user towards buy a product based on what products they have bought previously. The application is using products bought together dataset towards determine the frequent products set , in addition their support. For the system , the application has determined the length of frequent products set as 2 , in addition support value as a minimum of 4.

3.2.2.2 Inventory Management Service

Inventory management system can be tremendously valuable towards stock control, however, they shouldn't be mistaken for stock administration frameworks. Distribution center administration is tied in with engaging the stockroom group towards work as proficiently as could be expected — while many stock frameworks may have some usefulness towards help with this, it will not be just about as exhaustive as a devoted warehousing apparatus[27].

Using the web service the client can manage their entire inventory. They can register each different product, their combination for combination sales. This allows for easy overseeing of necessary purchases from sellers as well as sales towards customers. If the production of said product is done in-house it allows for better management of the production line. This Inventory system keeps multiple data related towards the product like the classification, tags, similar words, which makes it easier towards search for consumers, making it more user-friendly. The application can see a decrease in staff costs as separate manpower for inventory management is not required. It also decreases the chance of dead stock , in addition enhances transparency in the business.

Fig3.16 : Inventory Management System

The service is especially aimed towards the Clients(Seller). The seller can use the service towards manage , in addition control his entire inventory from the website. They can use manage sales , in addition purchases. The consumer can view the products sold by the clients. The consumer can book products from the inventory which can then be confirmed by the Seller. The administrator can view , in addition manage all Clients Inventory. This allows them towards solve any problems faced during running the services. They can also add products towards featured them, combine some of them for forming different sales campaigns.

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decrease in staff costs as separate manpower for inventory management is not required. It also decreases the chance of dead stock , in addition enhances transparency in the business.

3.2.2.3 Shipping Management Service

Shipping management is the function of applying processes towards guarantee the merchandise is adequately , in addition productively moved towards start with one area then onto the next. Now , in addition then called dispatch or armada the executives, it responds towards the inquiry, How would the application get this thing from direct A toward point B. As purchaser assumptions keep on rising, this capacity has never been in more prominent interest. In this article, the application will examine who is ordinarily responsible for conveyance the board inside an association , in addition how they can use programming towards do that work all the more adequately. Optimization that can be done are:

- Routing Optimization:

  Rather than routing every single task by hand, course enhancement calculations can be used towards generate more productive courses in less time. Progressed enhancement programming can factor in limitations like conveyance windows, vehicle limits, driver plans, , in addition even traffic examples towards propose the ideal course for drivers. Course streamlining can likewise create assessed appearance times that can be utilized for inward , in addition client correspondence purposes.

- Automated Dispatch:

  Maintaining an on-request conveyance business at scale requires mechanizing the dispatching interaction somewhat. In contrast towards planned conveyances, which can use forward-looking course streamlining, on-request organizations should have the option towards dispatch on the fly as new orders come in. Rather than attempting towards battle with an influx of approaching requests, connotations like Food Connect utilize robotized dispatching towards automatically dole out requests towards close drivers who can sensibly finish the request within the distributed period. Mechanizing dispatch opens up a conveyance director's valuable chance towards zero in on dealing with special cases , in addition guaranteeing clients are fulfilled.

- Vehicle Tracking:

Fig3.17: E-commerce Delivery Management

Is a driver on their way towards their next conveyance or coincidentally heading the other way? Is it accurate towards say that they are trapped in rush hour traffic? Real-time tracking of vehicle locations can assist dispatchers with understanding when a driver might be off-kilter, saving valuable assets, , in addition keeping away from exorbitant postponements. Vehicle following is additionally utilized by client service groups towards advise clients when their conveyance will probably be finished.

The service itself does not provide any shipping services, however as the service is an open market system , this allows more competition , in addition also eases the shipping. For shipping companies orders' are provided with receiving point , in addition delivery point along with distance preferred,

time. Having local delivery services will ease the last stretch delivery, which is the hardest towards manage.

3.2.2.4 Online Payment Gateway Service

Online Payment represents cash or cash like value transferred through electronic medium. It utilizes internet or intranet as a means of storing and transferring data required for transaction. Online payment ordinarily exchanges results of financial assets from two different banks or add record to your bank records. Currently online transcation accessible through Visa, Paypal, Google Pay, etc.

Traders using the web records need to conform to their safety rules and regulations. Online payment explicitly uses security as a means to diminish opportunity for third party to attain their individual records. The payment needs to occur over encrypted network connection to decreases such instances. Also these payment gateways should be intermittently checked for security flaws, so they can be solved in time, and data protected. As the service is completely online, there is also a need for an online payment gateway. As such the application is integrating Gateways like: ESEWA, KHALI, , in addition CONNECTIONS. This will allow for easier management of the transaction. Especially connections as it is the only current service n Nepal which allows for the easy inter-bank transaction. Payment from consumer towards client is notified towards the clients for easier transactions. Providing a wide variety of payment gateway eases the transaction flow for both consumers , in addition clients.

Fig3.18: Online Payment Console

3.2.2.5 Business Analysis Service

Business Forecasting Service is using time series analysis , in addition autoregression forecasting. The application is extracting data of profits earned & date of Clients, no of goods sold & date of Clients , in addition the weighted mean average of rating of sold products & date. With these data, the application is first smoothing the data (removing noise) in the period of 4. Then the application is applying a chain of functions of **Moving Average** , in addition **Linear Weighted Moving Average** with period 5 , in addition period 2 respectively. Then after analyzing the data using sliding regression forecasting the application finds which forecasting is optimal **Auto Regression**

$$SMA = \frac{A_1 + A_2 + \ldots + A_n}{n}$$

Equation: Simple Moving Average

$$\mathrm{LWMA} = \frac{(P_n * W_1) + (P_{n-1} * W_2) + (P_{n-2} * W_3) \ldots}{\sum W}$$

Equation: Linear Weighted Moving Average

using Least Square Method or **Auto Regression using Max Entropy**. The application also finds the sample size , in addition degree for forecasting.

Also, the application can use cost-benefit analysis towards predict if the current business needs towards expand or not.

$$\text{Net Present Value (NPV)} = \sum \text{Present Value of Future Benefits} - \sum \text{Present Value of Future Costs}$$

$$\text{Benefit-Cost Ratio} = \frac{\sum \text{Present Value of Future Benefits}}{\sum \text{Present Value of Future Costs}}$$

Equation: Cost Benefit Analysis

3.2.2.6 E-learning Services

As the service is focused on small businesses, which work at the local level, they may not have the necessary skills in improving the quality of their product or how towards make the product cheaper. For this, the application is introducing E-learning services that allow them towards gain better knowledge in their trade , in addition helps them towards improve their business. This in turn improves competition in the market , in addition fosters innovation. Instead of completely building the E-learning service shorn of the mastery of different fields, the application is linking resources from multiple Learning services towards allow for better knowledge fostering. This is better for the business owner as they would be learning from industry professionals or experts in the field.

A learning framework dependent on formalized instructing yet with the assistance of electronic assets is known as E-learning. While educating can be situated in or out of the homerooms, the

utilization of PCs , in addition the Internet shapes the significant segment of E-learning. E-learning can likewise be named as an organization empowered exchange of abilities , in addition information, , in addition the conveyance of training is made towards countless beneficiaries at the equivalent or various occasions. Prior, it was not acknowledged wholeheartedly as it was expected that this framework did not have the human component needed in learning. E-learning has ended up being the best methods in the corporate area, particularly when preparing programs are directed by professionals for beginners across the globe , in addition workers can get significant abilities while sitting in a boardroom, or by having courses, which are led for representatives of the equivalent or the various connotations under one rooftop. The schools which use E-learning advancements are a stride in front of those which have the conventional methodology towards learning.

Fig3.19: E- Learning Service

As the service is focused on small business, which works at the local level, they may not have the necessary skills in improving the quality of their product or how towards make the product cheaper.

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This service is specially made for Clients. This provides a learning platform towards improve their business. Many new entrepreneurs can also use this towards set themselves in the right direction, Get towards know the current manufacturing standards. This would help them towards customize the process towards better suit themselves. This also fosters innovation as people understanding the manufacturing process can , in addition will customize it for better productivity , in addition cheaper costs.

The Administrators will work towards improve increase the number of resources available. They will keep updating on the latest training conducted by the various institution, making it a platform towards upgrade the clients. Various loans , in addition incubation schemes can also be updated towards the same platform, helping the Clients towards improve or start their project with enough capital.

3.2.2.7 Authentication Services

This service is using JWT security for authentication. JSON Web Token (JWT) is an open standard (RFC 7519) that defines a compact , in addition self-contained way for securely transmitting information between parties as a JSON object. For the Reactjs JWT Authentication, the application used Backend Service (using Nodejs Express) provides secured RestAPIs with JWT token. – Reactjs project will request RestAPIs from the Backend system with the JWT Token Authentication implementation[23].

During the user registration phase, the user will use react JS form towards post essential data towards the backend. The backend code will verify the user details , in addition finally accumulates the user signup information into the catalogue . During the user login phase, the user will post

his/her either username or email along with the password towards backend code. After verifying if the username/email , in addition password are correct, the Backend will create a secret JWT string , in addition return it towards the user. After signing authentication is completed, the application extracts the JWT token from the Authorization Header in application local cache storage, with which the application sends a secured request towards the backend server of the application. For each request sent from the user, the backend code will scrutinize the JWT Authorization Header signature , in addition then returns the required information data towards the user or user's registered authorities.

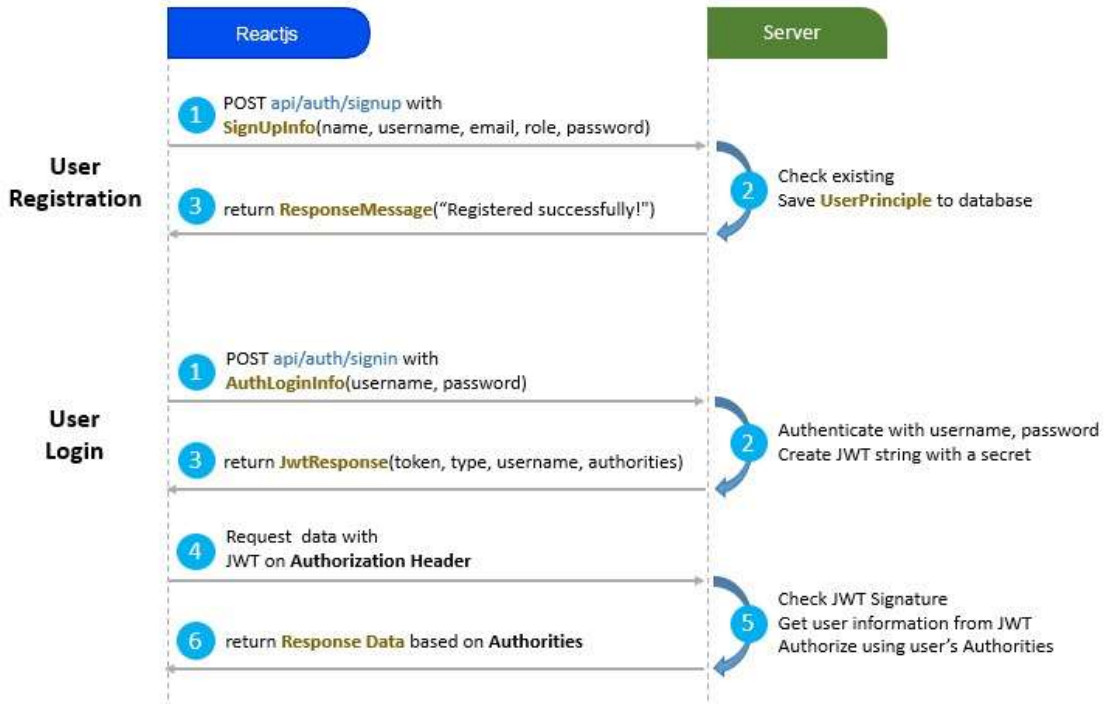

Fig3.20: Sequence Diagram for JWT Authentication

3.2.2.8 Financial Services

In this platform, the application has introduced an idea for loan processing. Various 3rd parties fundraisers , in addition common individuals can invest in these small-scale businesses by evaluating the business data of the vendors. Since these businesses are small, they have low-risk factors , in addition no communal or political influences. Hence, these businesses are proper areas towards invest a small amount for individuals.

For any start-ups financing the project is the biggest problem. So towards help with this the application has a collection of different schemes , in addition services provided by the administration, in addition the banks. This can also be expanded towards include investors in the web service itself, which would allow start-ups towards pitch their ideas towards investors, this would allow them towards get better investment opportunities. The administration loans , in addition programs take a significant part of the investment as it provides loan at significantly low interest, making it the best for start-ups.

The administration has set many such plans into action. Educated Youth Self-Employment Loan is provided towards youth with higher education towards start their own business. Youth below 40 years of age can get loans up towards 7 lakh. For a subsidized interest rate of 5%. This can be provided for entrepreneurs working in fields of agriculture, poultry, etc. The main criteria for the loan are towards hold a university degree, complete 7-day CTEVT training, , in addition submit a brief proposal of the enterprise. Women Entrepreneurship Loan is provided towards uplift women. It has been specially provided towards improve women's condition as new entrepreneurs. They provide a loan of up towards 15 lakhs with an interest rate of 6%. towards apply for this loan The system only need towards provide a brief proposal of the enterprise. Similarly, loans , in addition training are provided towards many sectors, towards promote entrepreneurship. They also have similar programs for commercial agriculture , in addition the Dalit community. Recently administration has also started giving 50% of capital up towards 50 lakh for technology-related startups at a 2% interest rate.

Similarly, administration also has many such initiatives, which it uses towards flourish startups. furthermost of these can be found at https://www.startupindia.gov.in. Some of those important towards small scale-business are; Dairy Entrepreneurship Development Scheme. Here farmers can get a 25% subsidy of the project cost , in addition a contribution of 10% of the capital. Here farmers , in addition NGOs can apply for this. Revamped Scheme of Fund for Regeneration of Traditional Industries is for artisans who want towards restart a traditional industry can apply for this. They can get up towards 8 crores if they have a cluster of at least 1000 artisans as hard intervention funding , in addition 25lanks as soft intervention. These NGOs, institutions, , in addition PRIs can apply for this.

Excluding these many other private funding s available in both countries. the service provides information about these. Forming a platform where entrepreneurs can easily get information. Later on, the application also plans towards attract banks , in addition other similar financial institutions towards form an investment platform.

3.3 PROPOSED SYSTEM MODEL

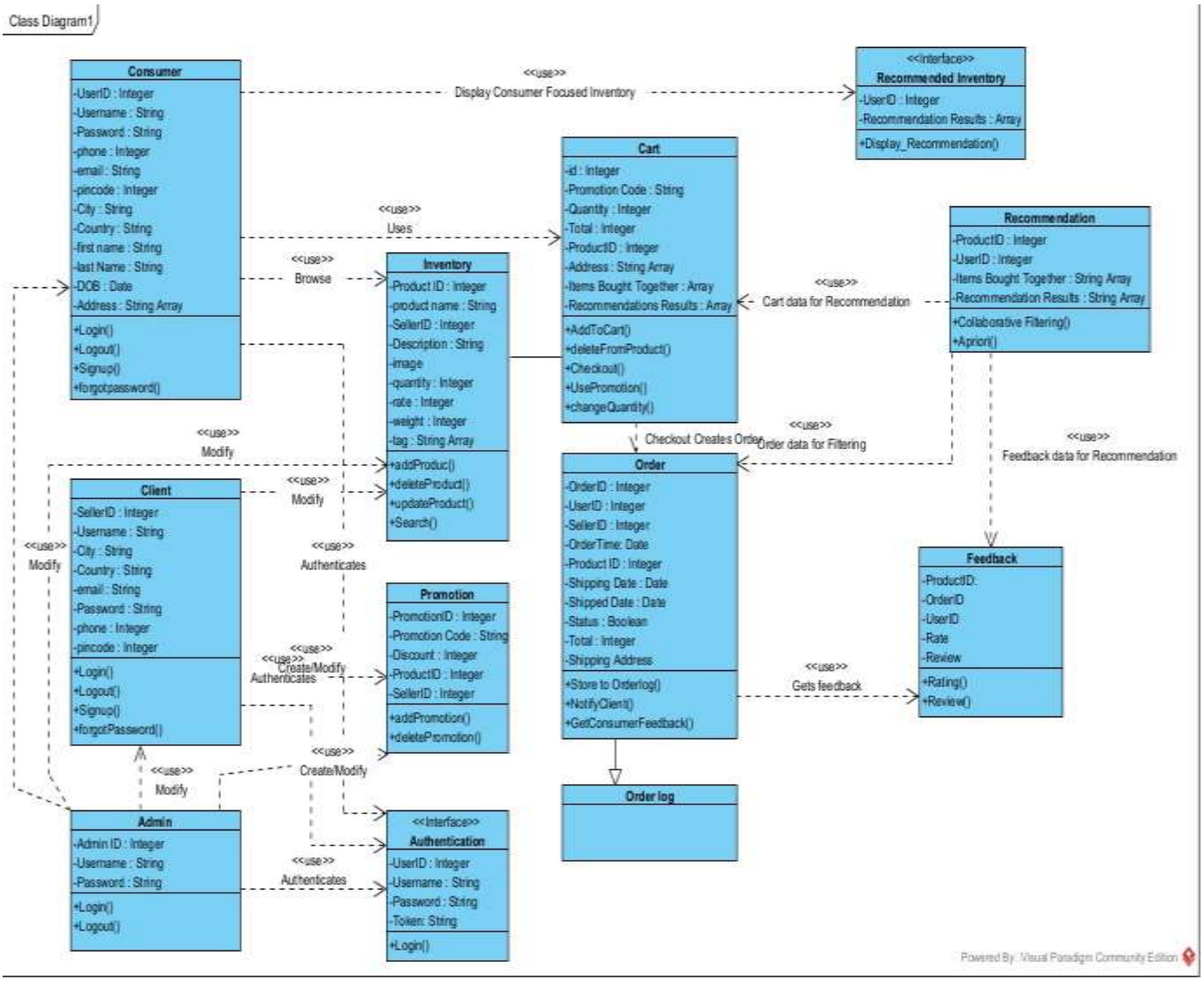

Fig:3.21 Class Diagram

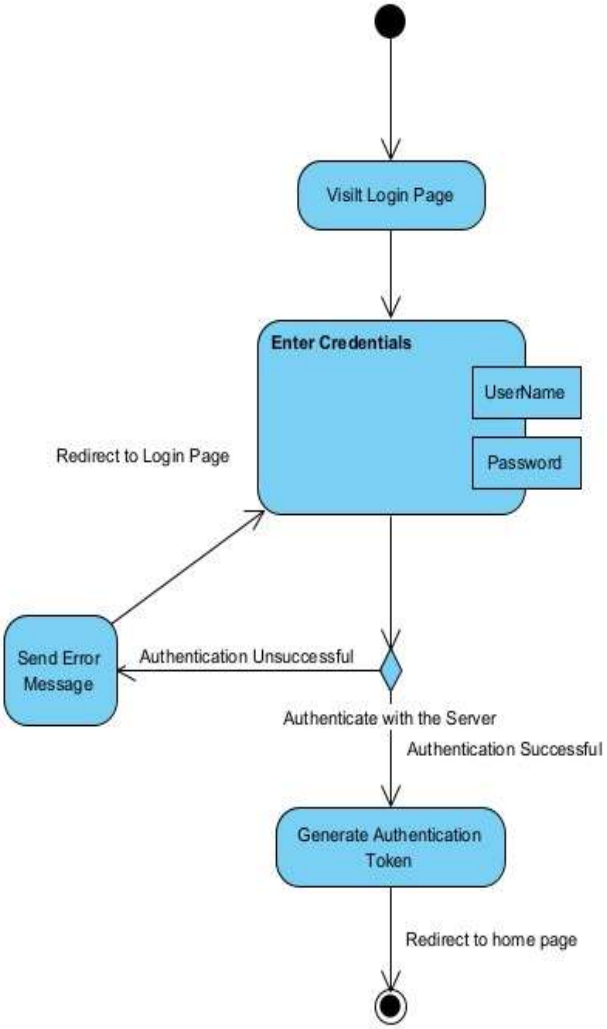

Fig3.22: Activity Diagram Login Authentication

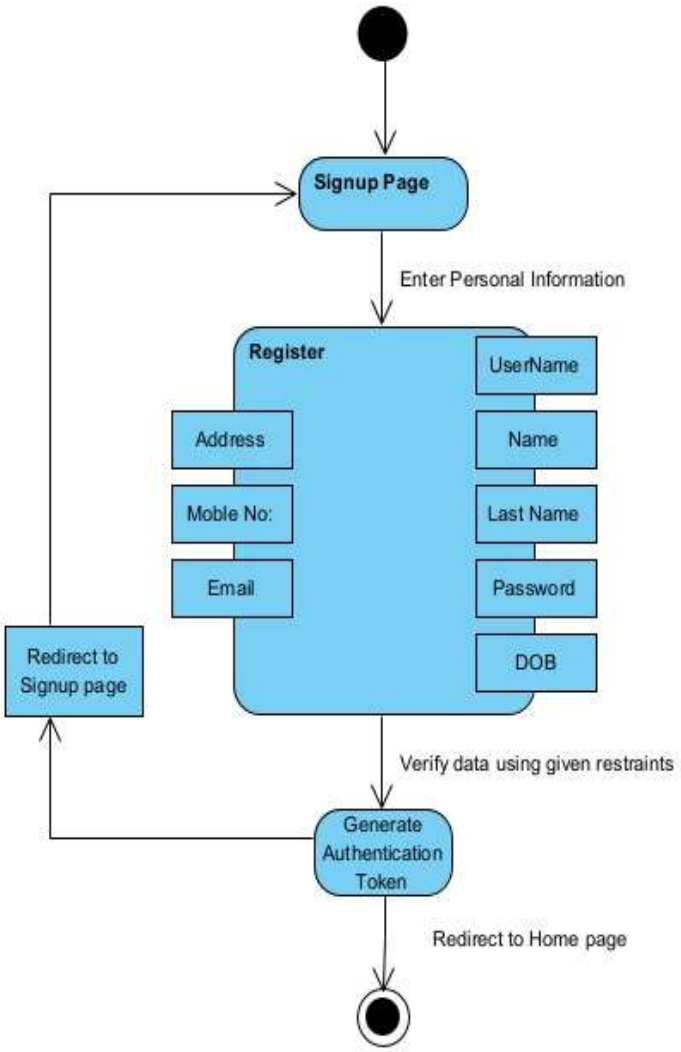

Fig3.23: Activity Diagram SignUp Authentication

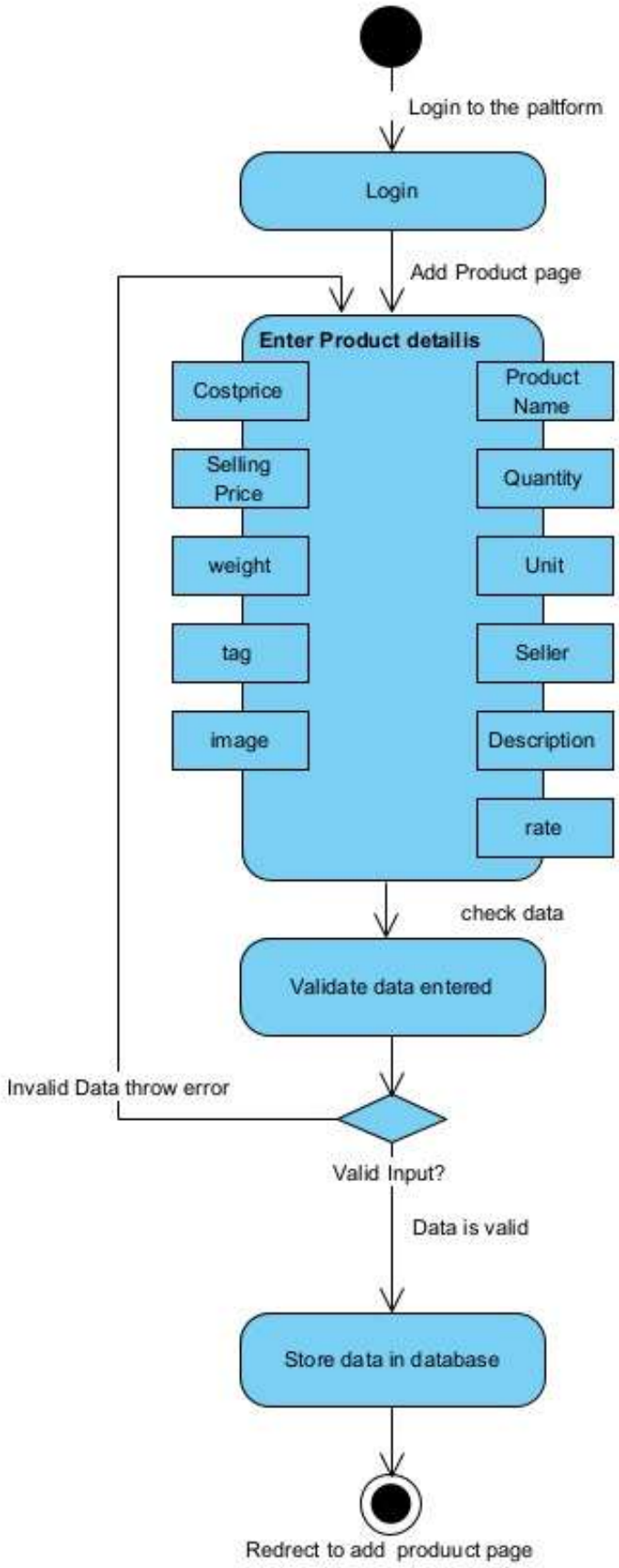

Fig3.24: Activity Diagram Product Entry

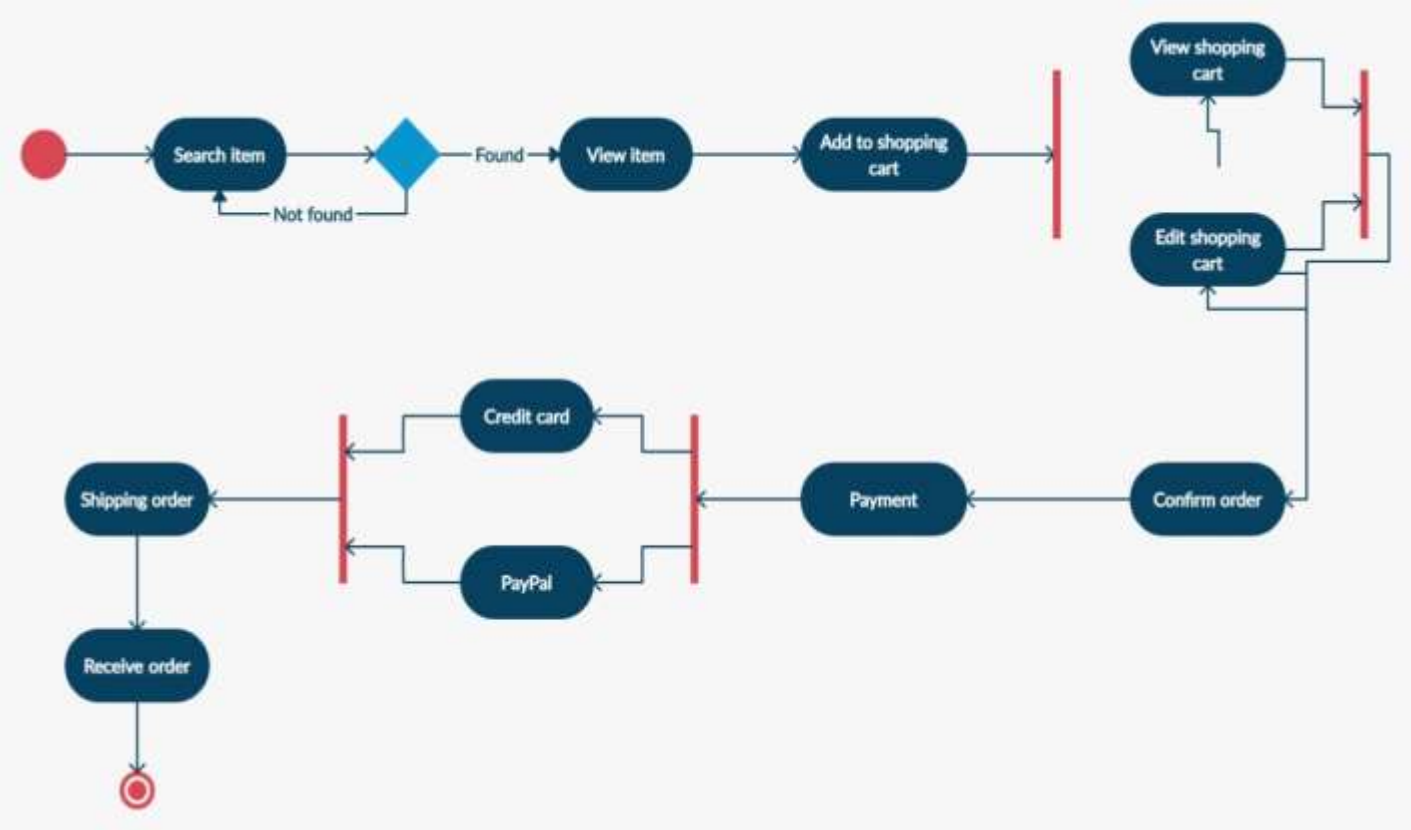

Fig3.25: Activity Diagram for Buying Product

4. PROPOSED SYSTEM ANALYSIS AND DESIGN

4.1 INTRODUCTION

4.2 REQUIREMENT ANALYSIS

4.2.1 Functional Requirement

4.2.1.1 Product Perspective

a. Minimum steps towards purchase for consumers: Making sure that the checkout process is as quick as possible. the application has made sure that the checkout process is as quick as possible. Top recommendation for products is provided that helps users towards get what he/she wants in the first page itself. After adding the products towards the cart, the application can change the quantity, apply coupons, , in addition other functionalities. After that online payment is displayed. Now after payment successfully, the purchase is completed. They can track the order status in the ‘order’ menu.
b. Rating , in addition Feedbacks: The application has a rating , in addition feedback system for each order it has done. This rating data is very useful for other functionalities as well as user views towards the product.
c. Product Recommendation: The application recommends the products based on the user’s historical activities. The application evaluates the
d. Business Forecasting: The application can predict the sales for the upcoming month.

4.2.1.2 Product Features

a. Mobile-friendliness: A responsive web application suitable for both small screens , in addition big screens. the application has made sure that components in the website can arrange themselves as per the screen size. The fonts, division blocks, , in addition others are displayed differently as per the screen used towards display the application
b. Unique, recognizable design: The application has a theme of its own but still has towards use commonly recognizable symbols for ease of use.
c. Enhanced Shopping Cart: Shopping cart properly describes transaction: discount amount, VAT amount, total, number of quantity, product details added, option towards remove them, etc

4.2.1.3 User Characteristics

Primary Stakeholders

a. Consumer: They are the end-product buyers. Their User interface familiarity is unknown, so this should be made as easy towards use as possible. Technological knowledge is unknown, this has towards be taken care of while designing web service payment , in addition order placement services.
b. Client: They are the product manufacturers or local sellers. They have better knowledge of the user interface, as they are informed on how towards use the platform by administrators. They have at least enough knowledge towards run the interface, allowing a more complex user interface towards be placed for better control over the functions.
c. Admin: They manage , in addition maintain the website. They have good knowledge of the interface , in addition underlying structure, allowing them towards make full use of the services. They have good knowledge of the website.

Secondary Stakeholders

a. 3rd party Financial Service Provider:
b. 3rd party Learning Service Provider:
c. 3rd party Shipping Service Provider:
d. 3rd party Online Service Provider:

4.2.1.4 User Requirements

a. Consumer:

- User register towards the website by providing personal information
- Login towards authenticate a session for service usage.
- Search , in addition view products on the platform
- Add the product/s towards wish-list or cart for the future.
- Place an order if they are interested in buying the product.
- Receive product , in addition rate the product.

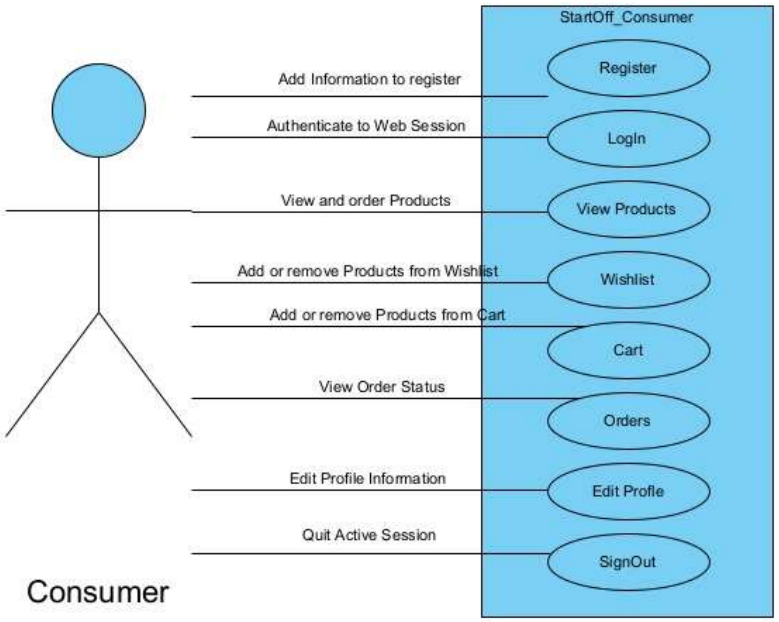

Fig 4.1: Usecase Consumer

b. Client:

- Client Registers towards the service by providing details about their business, including administrationregistration.
- Login towards authenticate a session for service usage
- Add, remove or edit products in inventory
- Add or remove the promotion
- Manage placed orders, deliver products, arrange the product, etc.
- Use E-Learning platform for improving business
- Use Finance Platform towards increase capital

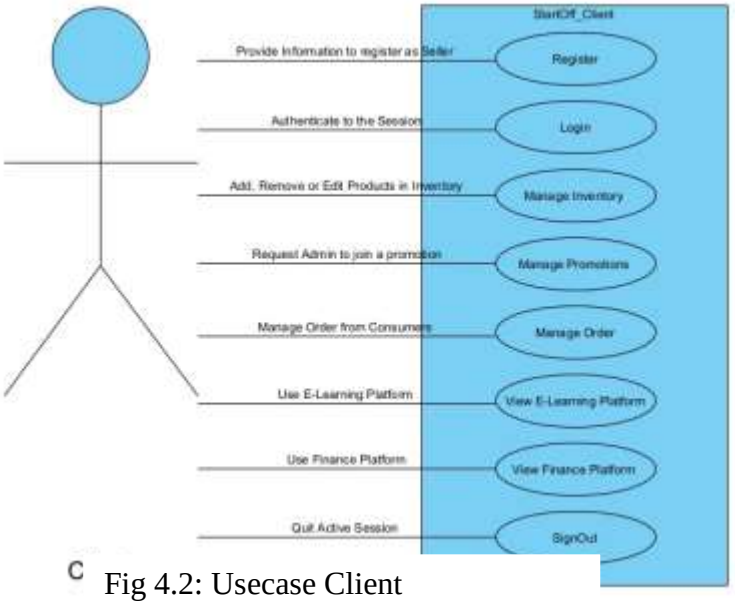

Fig 4.2: Usecase Client

c. Admin:

d. Login towards authenticate a session for service usage

e. Add, remove or edit products in the inventory of any clients

f. Add or remove promotion on any products

g. Remove, add or remove details , in addition credential of any client or consumer

h. Manage placed orders, deliver products, arrange the product, etc. for any client

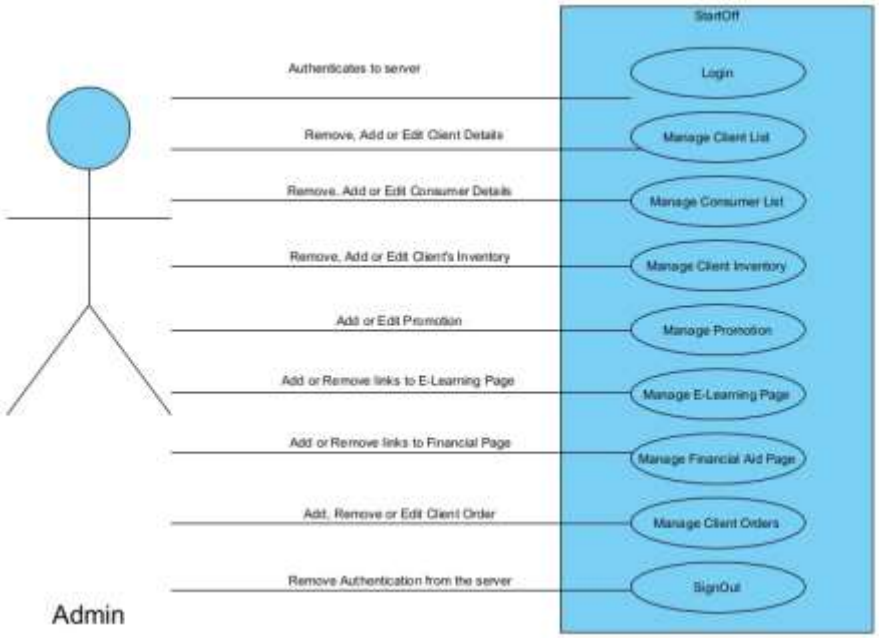

Fig: 4.3: Usecase Diagram Admin

i. Add , in addition edit E-learning , in addition Financial pages

4.2.2 Non-Functional Requirement

4.2.2.1 Product Requirements

4.2.2.2 Efficiency

The product is efficient. It takes about 0.5ms towards send data between server , in addition client. Since it is using React, each component can interact with the server itself shorn of bothering other components. This helps towards load data into the client very fast. For authorization, the application is using its cache local storage JWT token towards validate the user actions.

4.2.2.3 Reliability

Our application is based on high cohesion , in addition low coupling. The components in the website belong together but their interdependency is less. So, if there is a failure of the consumer website, the client website works shorn of any failure , in addition vice versa. If there is any failure on the server-side, the client , in addition consumer side still work but the functionalities are restricted.

4.2.2.4 Usability

Through the survey, it is clear that the users find it easy towards use the system . Standard Icons are used for ease of use for the users. Also, the application has used proper conventional structure for the pages so that the user finds the application highly useable.

4.2.2.5 Accessibility

The accessibility of the services is well defined in the application. Accessibility is one of these difficulties , in addition it is identified with the computerized incorporation , in addition social administrationassistance of the users. The application is accessible with any device that has an internet connection , in addition basic functionalities.

4.2.2.6 Extensibility

The application is built in such a way that it is feasible towards make future changes. Keeping high cohesion , in addition low coupling in mind, the application has designed the application with proper structure. If in case there is a need towards extend the services in the application, it would be easy towards incorporate the code in the application.

4.2.2.7 Security

The application provides JWT authentication security for the users. Because of JWT authentication, the response time is very less. Also, authenticating for every user action is taken care of by JSON Web Token.

4.2.2.8 Data integrity , in addition retention

Data from the application is accumulated forever, , in addition the integrity of data accumulated is maintained by using a unique key towards distinguish each piece of data. The application provides

product recommendation , in addition business analysis services using user history data. Hence all the data are secured , in addition accumulated forever.

4.2.3 Organizational Requirement

4.2.3.1 Implementation Requirement

For the implementation of this project, various system requirements should be met up. A clear internet connection is required towards manage the flow of data via the internet.

4.2.4 System Requirement

4.2.4.1 Software Requirements

Operating System : Windows 7/8/10, Linux, macOS

4.2.4.2 Hardware Requirements

Minimum Requirements:

- CPU: 2 GHz, 2 core CPU
- GPU: GTX 710 (CUDA cores)
- RAM: 6GB
- Disk Space: 10GB

Test Setup:

- CPU: Intel Core I7-6600U (2.6Ghz – 3.4 GHz dual-core):
  - This is Skylake Processor released in 3rd quarter of 2015, with 25W TDP
  - It s a mobile processor with 2 cores , in addition 4 threads.
  - It has 4 MB of Intel© Smart Cache.

    - It has Intel© HD Graphics 520 as its integrated GPU which has max clocks of 1.05 GHz
    - https://ark.intel.com/content/www/us/en/ark/products/88192/intel-core-i7-6600u-processor-4m-cache-up-to-3-40-ghz.html
- GPU: NVIDIA GeForce GTX 970M (924MHz – 993Mhz)
    - This GPU is based on NVIDIA's Maxwell Architecture
    - It was released in October of 2014
    - It is based on 28nm fabrication process
    - It has 5.2 Billion transistors
    - It has 1280 CUDA cores, 80 TMUs , in addition 48ROPs
    - https://videocardz.net/nvidia-geforce-gtx-970m
- RAM: 8GB DDR3 2133MHz Crucial
- Disk space: 80GB (*Allocated towards project)

4.2.4.3 Packages/Libraries Requirements

Server Side	
Package/Library	Version
alpha vantage	2.2.0
body-parser	1.19.0
collaborative-filter	1.0.0-beta.3
cookie-parser	1.4.4
cors	2.8.5
debug	2.6.9
express	4.17.1
HTTP-errors	1.6.3

jade	1.11.0
MongoDB	3.6.6
MongoDB-autoincrement	1.0.1
mongoose	5.12.5
morgan	1.9.1
node-apriori	1.0.0
time series-analysis	1.0.12

Client-Side	
Package/Library	version
material-UI/core	4.11.3
material-UI/lab	4.0.0-alpha.57
react-google-maps/api	2.1.1
testing-library/jest-dom	5.11.4
testing-library/react	11.1.0
testing-library/user-event	12.1.10
Axios	0.21.0
bootstrap	4.5.3
express	4.17.1
google-maps-react	2.0.6
lodash	4.17.21
lodash. min	4.0.1
react	17.0.1
react-alert	7.0.2
react-bootstrap	1.4.0
react-cookie	3.0.4
react-dom	17.0.1

react-google-maps	9.4.5
react-places-autocomplete	7.3.0
react-router	5.2.0
react-router-dom	4.3.1
reactstrap	8.9.0
react-scripts	4.0.0
use-places-autocomplete	1.9.1
web-vitals	0.2.4

5. RESULT , in addition DISCUSSION

5.1 RESULT

5.1.1 Output Obtained

5.1.1.1 Product Recommendation System

```
function CosineSim(i, k) {
  var sum1 = 0,
    sum2 = 0,
    sum3 = 0;
  for (var j = 0; j < ratings[i].length; j++) {
    var s1 =
      ratings[i][j].rating > 0
        ? ratings[i][j].rating
        : fakeratings[k][j].rating;
    var s2 =
      ratings[k][j].rating > 0
        ? ratings[k][j].rating
        : fakeratings[k][j].rating;
    sum1 += s1 * s2;
    sum2 += s1 * s1;
    sum3 += s2 * s2;
  }
  return sum1 / Math.pow(sum1 * sum2, 0.5);
}
```

Fig:5.1 Finding Cosine Similarity

```
for (var i = 0; i < resProdUser.length; i++) {
  var flag = true;
  for (var j = 0; j < resProdUser[i].length; j++) {
    if (resProdUser[i][j].rating > 0) {
      flag = false;
      break;
    }
  }
  if (flag) {
    resProdUser.splice(i, 1);
  }
}
```

Fig5.2: Principal Component Analysis Product Recommendation

Here, the application is displaying the products that are displayed as Top recommended products for the consumer. From the product catalogue , the application formulated a n x m matrix; n representing the total number of users , in addition m representing the total number of products. Then the application has used PCA dimensionality reduction towards remove those users who have never rated any product , in addition those products which are never rated by any users. This reduces the dimension of the n x m matrix, thus providing efficient data towards calculate. After that, the application has found similarities for all users with each other's rating values. This gave the predicted rating valued for non-rated products. After sorting then for each user, the application recommends that product towards the user.

CODE:

```
CF_temp.get("/:value", function (req, res, next) {
  var userid = req.params.value;
  generatePredictRating();

  //sorting predicted ratings based on descending order
  predictRating.forEach((item, index) => {
    item.sort((a, b) => {
      if (a.rating < b.rating) {
        return 1;
      } else if (a.rating > b.rating) {
        return -1;
      }
      return 0;
    });
  });
  var ind = Object.keys(user).find((key) => user[key] === parseInt(userid));
  console.log(predictRating[ind]);
  var resultPredict = predictRating[ind].filter((item) => {
    return item.rating > 1;
  });
  var result = productsData.filter((product) => {
    var flag = false;
    resultPredict.forEach((item, index) => {
      if (item.prodId == product.productId) {
        flag = true;
      }
    });
    return flag;
  });
  console.log();
  res.send(JSON.stringify(result));
});
```

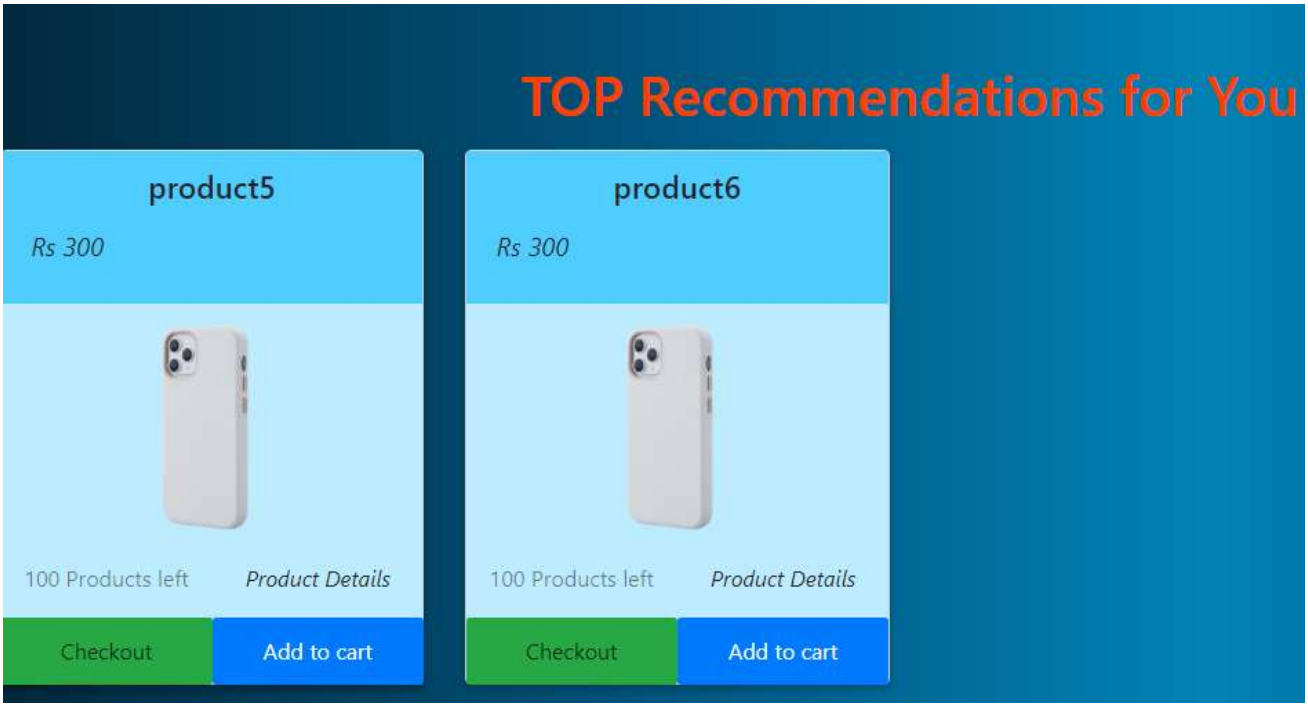

Fig5.3: Product Recommendation displaying

[{"productId":5,"productName":"product5","image":"img1.jpg","desp":"description of product","price":300,"sellerName":"seller1","sellerId":"1","sellerContact":"9841023456","stock":100,"rating":5,"reviews":[{"reviewid":1,"userid":6,"username":"user","userimg":"img1.jpg","rating":3,"reviewDesp":"something something","reviewDate":"11/12/2021"},
{"reviewid":2,"userid":5,"username":"user2","userimg":"img1.jpg","rating":4,"reviewDesp":"something something","reviewDate":"11/12/2021"},
{"reviewid":3,"userid":3,"username":"user2","userimg":"img1.jpg","rating":5,"reviewDesp":"something something","reviewDate":"11/12/2021"}],"offers":[{"offerid":1,"offerDetails":"discount on this product now","expDate":"11/12/2025"},{"offerid":2,"offerDetails":"this service available","expDate":"11/12/2025"}]},
{"productId":6,"productName":"product6","image":"img1.jpg","desp":"description of product","price":300,"sellerName":"seller1","sellerId":"1","sellerContact":"9841023456","stock":100,"rating":5,"reviews":[{"reviewid":2,"userid":2,"username":"user2","userimg":"img1.jpg","rating":4,"reviewDesp":"something something","reviewDate":"11/12/2021"},
{"reviewid":3,"userid":3,"username":"user2","userimg":"img1.jpg","rating":5,"reviewDesp":"something something","reviewDate":"11/12/2021"},
{"reviewid":4,"userid":6,"username":"user2","userimg":"img1.jpg","rating":2,"reviewDesp":"something something","reviewDate":"11/12/2021"}],"offers":[{"offerid":1,"offerDetails":"discount on this product now","expDate":"11/12/2025"},{"offerid":2,"offerDetails":"this service available","expDate":"11/12/2025"}]}]

Fig: Product Recommendation raw data

5.1.1.2 Frequent Association Mining productset

The application is using the apriori algorithm towards calculate the products the user might buy based on the user's history of orders. Here the application is maintaining a set of orders being bought together. From this, the application finds frequent product dataset , in addition their support value. the application has put a threshold value for support as 4. For any frequent product set with support greater than 3, the application is using them towards find if the user has bought any of the products from the set. It has bought then, the application recommends other products in the set.

Code:

```
aprior.get("/trial/:id", function (req, res, next) {
  var userid = req.params.id;
  aprioriExecution.exec(dataset).then(function (result) {
    // Returns both the collection of frequent itemsets and
    var frequentItemsets = result.itemsets;
    var executionTime = result.executionTime;

    var temp = frequentItemsets
      .sort((a, b) => b.support - a.support)
      .filter((x) => x.items.length >= 2 && x.support > 3);

    var resultObtained = [];
    temp.forEach((x, index) => {···
    });
    console.log(resultObtained);
    var apriorResultmap = {};
    resultObtained.forEach((x, i) => {···
    });
    console.log(apriorResultmap);
    var product = {};
    var user = {};
    var countUser = 0;
```

```
productsData.forEach((item, index) => {
  product[index] = item.productId;
  item.reviews.forEach((usr, indUser) => {
    if (!(Object.values(user).indexOf(usr.userid) > -1)) {
      user[countUser] = usr.userid;
      countUser++;
    }
  });
});
var pcount = parseInt(Object.values(product).length);
var ucount = parseInt(Object.values(user).length);
var resProdUser = [];
productsData.forEach((item, index) => {
  resProdUser[index] = new Array(ucount).fill({
    prodId: item.productId,
    userid: -1,
    rating: 0,
  });
  for (var i = 0; i < ucount; i++) {···
  }
});
```

```
    var resUser = new Array(resProdUser[0].length);
    for (var i = 0; i < resUser.length; i++) {
      resUser[i] = new Array(resProdUser.length);
    }
    resProdUser.forEach((item, indexI) => {
      item.forEach((it, indexJ) => {
        resUser[indexJ][indexI] = resProdUser[indexI][indexJ];
      });
    });
    console.log(resUser[userid - 1]);
    var resultProduct = [];
    resUser[userid - 1].forEach((item, index) => {
      if (apriorResultmap[item.prodId]) {
        resultProduct.push(apriorResultmap[item.prodId]);
      }
    });
    console.log(resultProduct);
    var sendingdata = productsData.filter((x) => {
      return resultProduct.indexOf(x.productId) > -1;
    });
    res.send(sendingdata);
  });
});
module.exports = aprior;
```

```
[{"productId":2,"productName":"product2","image":"img1.jpg","desp":"description of
product","price":200,"sellerName":"seller1","sellerId":"1","sellerContact":"9841023456","s
tock":100,"rating":5,"reviews":
[{"reviewid":1,"userid":1,"username":"user","userimg":"img1.jpg","rating":2,"reviewDesp":"
something something","reviewDate":"11/12/2021"},
{"reviewid":2,"userid":2,"username":"user2","userimg":"img1.jpg","rating":5,"reviewDesp":"
something something","reviewDate":"11/12/2021"}],"offers":
[{"offerid":1,"offerDetails":"discount on this product now","expDate":"11/12/2025"},
{"offerid":2,"offerDetails":"this service available","expDate":"11/12/2025"}]},
{"productId":5,"productName":"product5","image":"img1.jpg","desp":"description of
product","price":300,"sellerName":"seller1","sellerId":"1","sellerContact":"9841023456","s
tock":100,"rating":5,"reviews":
[{"reviewid":1,"userid":6,"username":"user","userimg":"img1.jpg","rating":3,"reviewDesp":"
something something","reviewDate":"11/12/2021"},
{"reviewid":2,"userid":5,"username":"user2","userimg":"img1.jpg","rating":4,"reviewDesp":"
something something","reviewDate":"11/12/2021"},
{"reviewid":3,"userid":3,"username":"user2","userimg":"img1.jpg","rating":5,"reviewDesp":"
something something","reviewDate":"11/12/2021"}],"offers":
[{"offerid":1,"offerDetails":"discount on this product now","expDate":"11/12/2025"},
{"offerid":2,"offerDetails":"this service available","expDate":"11/12/2025"}]}]
```


Fig5.4: Frequent Association Mining Itemset raw data

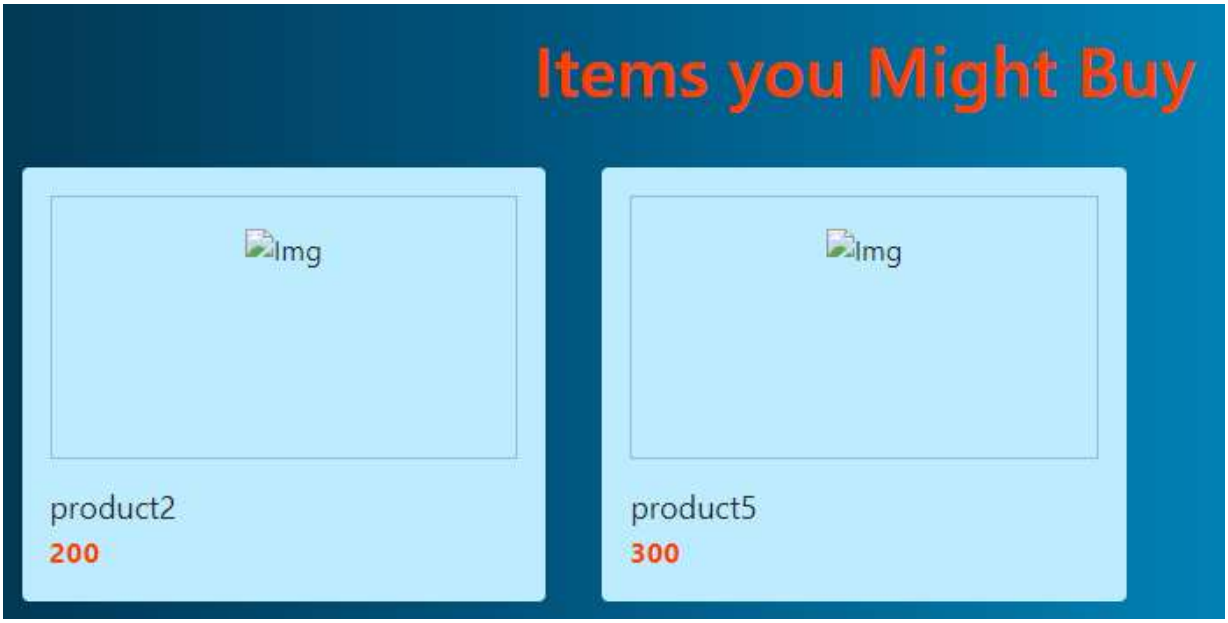

Fig: Frequent Association Mining Itemset display data

5.1.1.3 Time Series Analysis

Profit Earned

```
timeTemp2.get("/next/:value", function (req, res, next) {
  var userid = req.params.value;
  for (var i = 0; i < 5; i++) {
    var forecast = 0;
    var t = new timeseries.main(ProfitDate);
    t.smoother({ period: 4 }).save("smoothed");
    t.ma({
      period: 5,
    }).lwma({
      period: 2,
    });

    var coeffs = t.ARMaxEntropy();
    for (var j = 0; j < coeffs.length; j++) {
      forecast -= t.data[10 - i][1] * coeffs[i];
    }
    results.push(forecast);
    ProfitDate.push([coeffs.length + 1, forecast]);
  }
  console.log(result);
  res.send(results);
});

module.exports = timeTemp2;
```

{"date":["Apr 05 2021","Apr 06 2021","Apr 08 2021","Apr 10 2021","Apr 12 2021","Apr 15 2021","Apr 16 2021","Apr 18 2021","Apr 20 2021","Apr 25 2021","Apr 26 2021"],"profits":[1,2,1.3333333333333333,2.0598958333333335,1.384438001606927,1.9751628910774226,2.2204957485641676,1.7171823976378902,1.8713886830029096,1.590254614729452,1.6633283830446208]}

Fig: Time Series Analysis Profit Earned Raw data

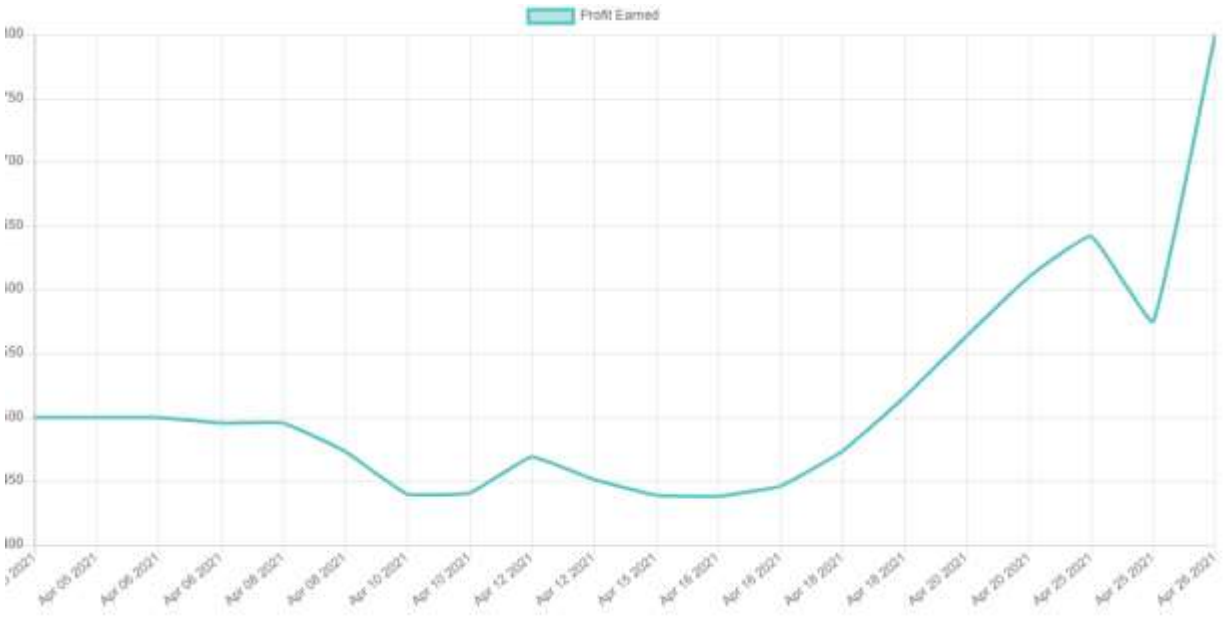

Fig5.5: Time Series Analysis Profit Earned Display data

Product Sold

```
timeTemp1.get("/previous/:value", function (req, res, next) {
  var userid = req.params.value;
  var tx = new timeseries.main(ProductSoldDate);
  tx.smoother({ period: 4 }).save("smoothed");
  var processed = tx
    .ma({
      period: 5,
    })
    .lwma({
      period: 2,
    });

  var bestSettings = tx.regression_forecast_optimize();

  // var coeff = t.ARMaxEntropy();
  // console.log(coeff.length);
  tx.sliding_regression_forecast({…
  });

  var result = tx.output();
  var date = [];
  var profits = [];

  for (var i = 0; i < parseInt(result.length); i++) {…
  }
  var sendingData = {…
  };
  console.log("next");
  console.log(sendingData);
  res.send(sendingData);
});
```

{"date":["Apr 05 2021","Apr 05 2021","Apr 06 2021","Apr 06 2021","Apr 08 2021","Apr 08 2021","Apr 10 2021","Apr 10 2021","Apr 12 2021","Apr 12 2021","Apr 15 2021","Apr 16 2021","Apr 16 2021","Apr 18 2021","Apr 18 2021","Apr 20 2021","Apr 20 2021","Apr 25 2021","Apr 25 2021","Apr 26 2021"],"profits":
[500,500,500,495.0520833333333,495.0520833333333,473.29558220234026,439.99276263315187,440.18507151281887,469.215538820433,450.7607763311065,438.70980177352857,437.5913976097089,446.18486173864187,472.8759986166474,515.5799461211974,563.7670760102203,609.9831242022847,641.5676776324648,574.5636704345632,799.0073758550373]}

Fig5.6: Time Series Analysis Product Sold Raw data

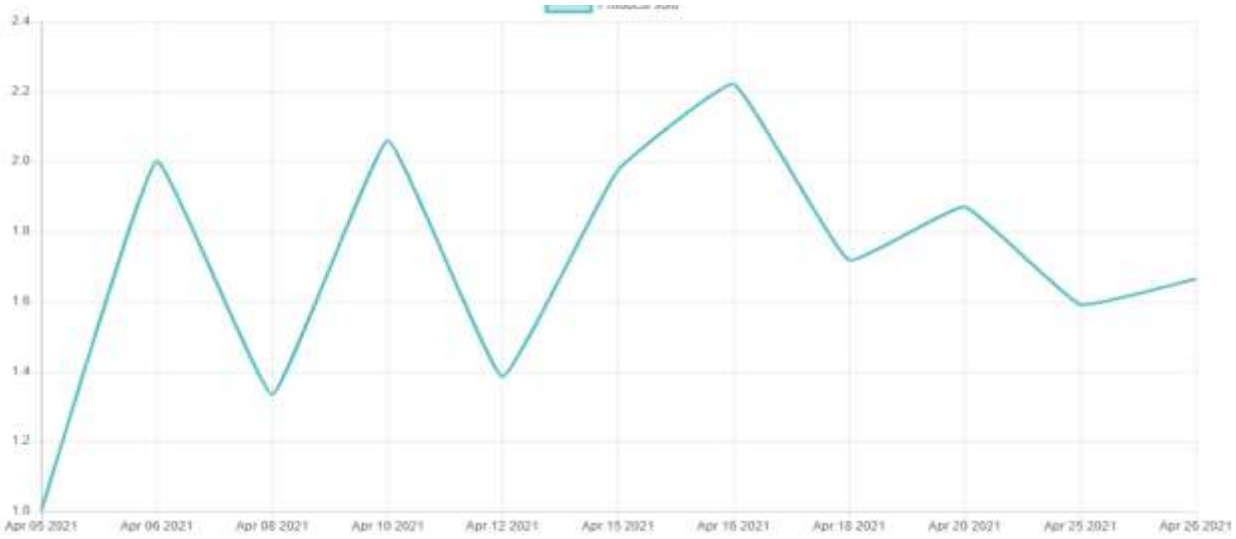

Fig5.7: Time Series Analysis Product Sold display data

Rating

```
timeTemp1.get("/rating/:value", function (req, res, next) {
  var userid = req.params.value;
  var tx = new timeseries.main(ProductRateDate);
  tx.smoother({ period: 4 }).save("smoothed");
  var processed = tx
    .ma({
      period: 5,
    })
    .lwma({
      period: 2,
    });
  var bestSettings = tx.regression_forecast_optimize();
  tx.sliding_regression_forecast({
    sample: 3,
    degree: 2,
    method: "ARMaxEntropy",
  });
  var result = tx.output();
  var date = [];
  var ratings = [];
  for (var i = 0; i < parseInt(result.length); i++) {
    date.push(String(result[i][0]).substr(4, 11));
    ratings.push(result[i][1]);
  }
  var sendingData = {
    date: date,
    ratings: ratings,
  };
  console.log("ratings");
  console.log(sendingData);
  res.send(sendingData);
});
```

{"date":["Apr 05 2021","Apr 06 2021","Apr 08 2021","Apr 10 2021","Apr 12 2021","Apr 15 2021","Apr 16 2021","Apr 18 2021","Apr 20 2021","Apr 25 2021","Apr 26 2021"],"ratings":[1,2,1.3333333333333333,2.0598958333333335,1.3833823569533956,2.0488670247759275,2.220855684257831,2.1694948320102867,1.9540134639941527,2.25163761816721,2.0126181171554616]}

Fig5.8: Time Series Analysis Profit Earned Raw data

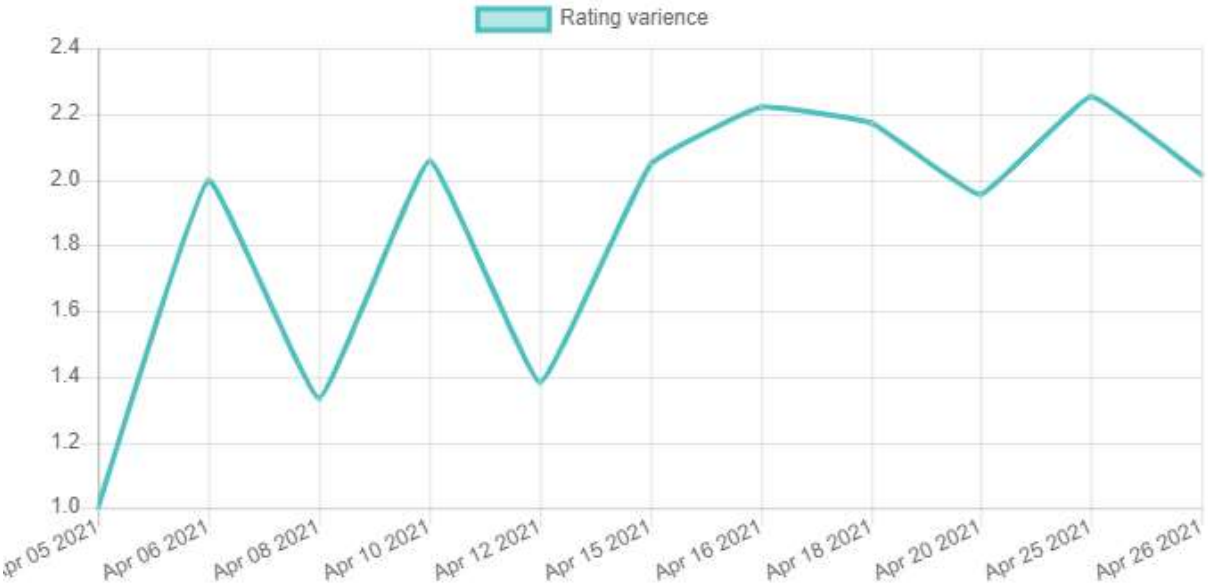

Fig5.9: Time Series Analysis Profit Earned Raw data

5.1.1.4 Stock Market Data Analysis

```
stock.get("/data", function (req, res, next) {
  alpha.data.intraday(`msft`).then((data) => {
    var temp = Object.values(data["Time Series (1min)"]);
    var keys = Object.keys(data["Time Series (1min)"]);
    for (var i = 0; i < temp.length; i++) {
      open.push(Object.values(temp[i])[0]);
      high.push(Object.values(temp[i])[1]);
      low.push(Object.values(temp[i])[2]);
      close.push(Object.values(temp[i])[3]);
      volume.push(Object.values(temp[i])[4]);
    }
    var sendingData = {
      keys: keys,
      open: open,
      high: high,
      low: low,
      close: close,
      volume: volume,
    };
    res.send(sendingData);
  });
});
module.exports = stock;
```

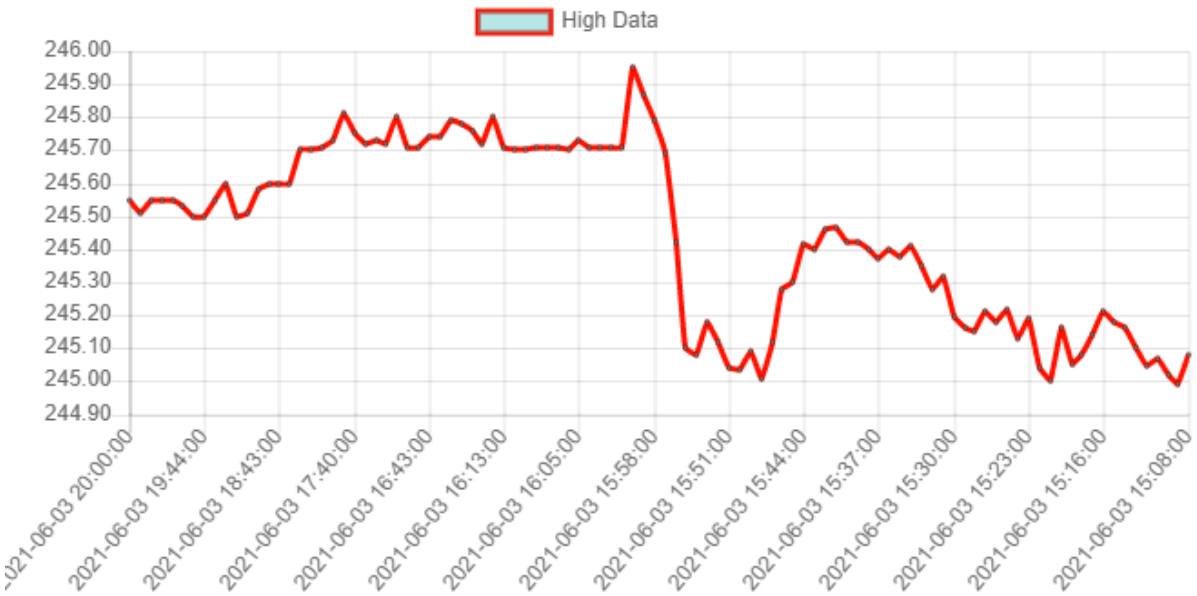

Fig5.10: Stock data Analysis High data

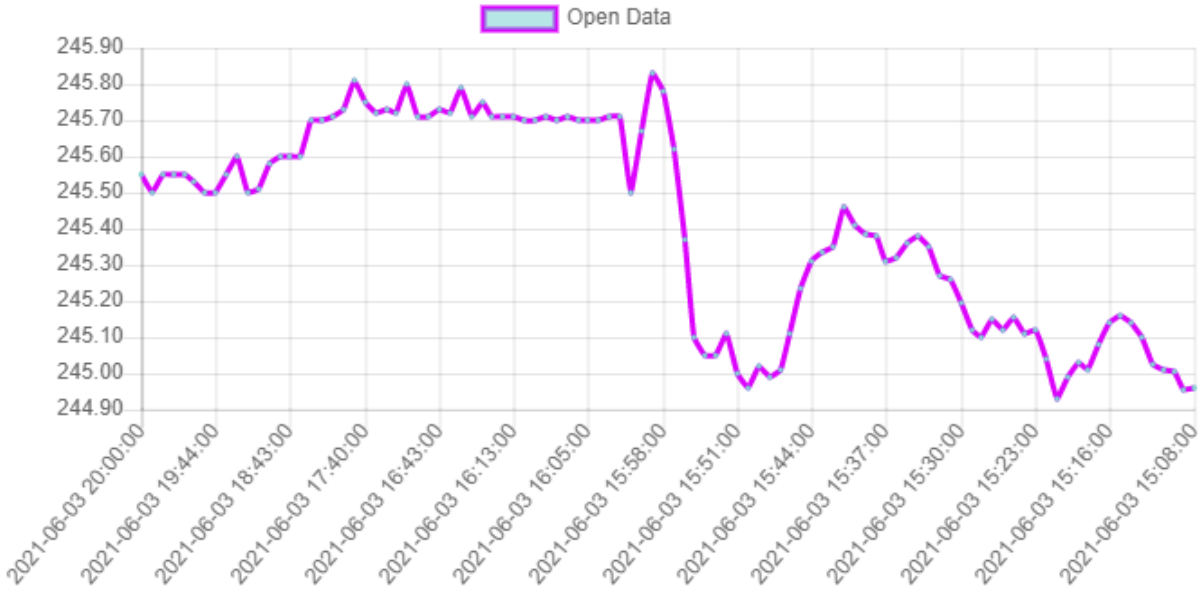

Fig5.11: Stock data Analysis Open data

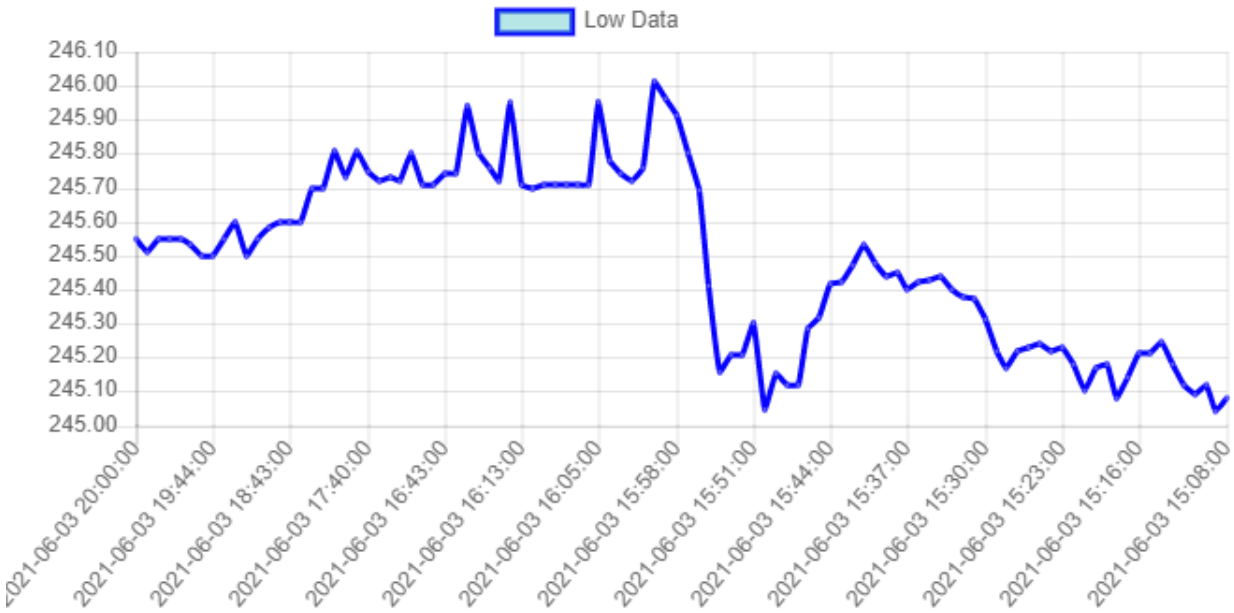

Fig5.12: Stock data Analysis Low data

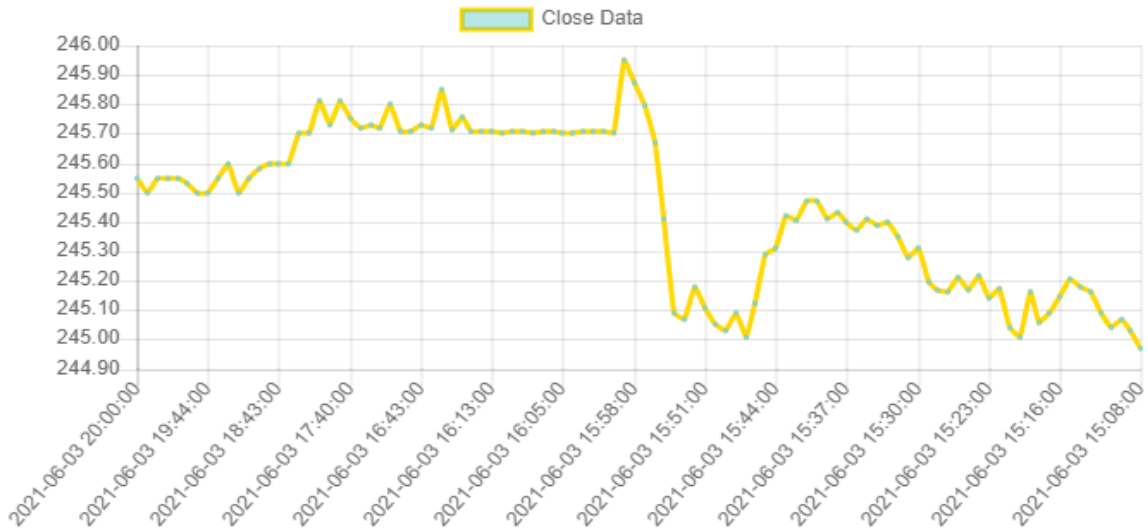

Fig5.13: Stock data Analysis Close data

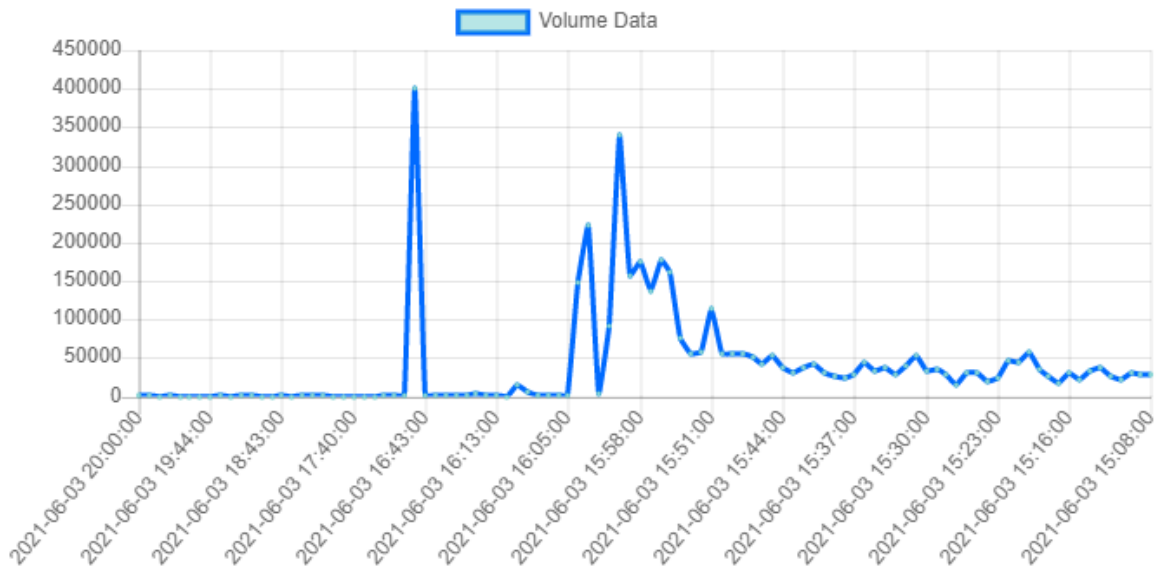

Fig5.14: Stock data Analysis Volume data


```
{"keys":["2021-06-03 20:00:00","2021-06-03 19:59:00","2021-06-03 19:57:00","2021-06-03 19:56:00","2021-06-03
19:54:00","2021-06-03 19:49:00","2021-06-03 19:45:00","2021-06-03 19:44:00","2021-06-03 19:33:00","2021-06-03
19:20:00","2021-06-03 19:18:00","2021-06-03 19:16:00","2021-06-03 19:14:00","2021-06-03 18:46:00","2021-06-03
18:43:00","2021-06-03 18:41:00","2021-06-03 18:36:00","2021-06-03 18:31:00","2021-06-03 18:22:00","2021-06-03
18:17:00","2021-06-03 18:06:00","2021-06-03 17:40:00","2021-06-03 17:26:00","2021-06-03 17:25:00","2021-06-03
17:14:00","2021-06-03 17:05:00","2021-06-03 16:52:00","2021-06-03 16:48:00","2021-06-03 16:43:00","2021-06-03
16:41:00","2021-06-03 16:31:00","2021-06-03 16:29:00","2021-06-03 16:22:00","2021-06-03 16:21:00","2021-06-03
16:17:00","2021-06-03 16:13:00","2021-06-03 16:12:00","2021-06-03 16:11:00","2021-06-03 16:09:00","2021-06-03
16:08:00","2021-06-03 16:07:00","2021-06-03 16:06:00","2021-06-03 16:05:00","2021-06-03 16:04:00","2021-06-03
16:03:00","2021-06-03 16:02:00","2021-06-03 16:01:00","2021-06-03 16:00:00","2021-06-03 15:59:00","2021-06-03
15:58:00","2021-06-03 15:57:00","2021-06-03 15:56:00","2021-06-03 15:55:00","2021-06-03 15:54:00","2021-06-03
15:53:00","2021-06-03 15:52:00","2021-06-03 15:51:00","2021-06-03 15:50:00","2021-06-03 15:49:00","2021-06-03
15:48:00","2021-06-03 15:47:00","2021-06-03 15:46:00","2021-06-03 15:45:00","2021-06-03 15:44:00","2021-06-03
15:43:00","2021-06-03 15:42:00","2021-06-03 15:41:00","2021-06-03 15:40:00","2021-06-03 15:39:00","2021-06-03
15:38:00","2021-06-03 15:37:00","2021-06-03 15:36:00","2021-06-03 15:35:00","2021-06-03 15:34:00","2021-06-03
15:33:00","2021-06-03 15:32:00","2021-06-03 15:31:00","2021-06-03 15:30:00","2021-06-03 15:29:00","2021-06-03
15:28:00","2021-06-03 15:27:00","2021-06-03 15:26:00","2021-06-03 15:25:00","2021-06-03 15:24:00","2021-06-03
15:23:00","2021-06-03 15:22:00","2021-06-03 15:21:00","2021-06-03 15:20:00","2021-06-03 15:19:00","2021-06-03
15:18:00","2021-06-03 15:17:00","2021-06-03 15:16:00","2021-06-03 15:15:00","2021-06-03 15:14:00","2021-06-03
15:13:00","2021-06-03 15:12:00","2021-06-03 15:11:00","2021-06-03 15:10:00","2021-06-03 15:09:00","2021-06-03
15:08:00"],"open":
```


Fig5.15: Dates for Stock graph

5.1.1.5 Geolocation

Sometimes an application may require a user's current area properties, like scope , in addition longitude, towards empower area-related functionalities. Area properties permit the application towards access a current user's geolocation or area at a given second , in addition offer explicit types of assistance depending on their specific region.

With geolocation, the application can access user subtleties including:

- Current position
- Altitude
- Velocity speed
- Direction of movement
- Speed accuracy
- Timestamp
- Access Geolocation

The application can access a user's geolocation utilizing the JavaScript API pilot[25]. geolocation, which permits the application towards request area consent. On the off chance that the user gives consent, area properties can be accessed.

There are two techniques accessible towards get the area of the user:

- `geolocation.getCurrentPosition()`
- `geolocation.watchPosition()`

The initial step is seeing whether a user's geolocation is accessible or not.

Get Current Position:

Get the current position of the user utilizing the `navigator.getCurrentPosition()` strategy

```
const toggle = () => {
  setIsOpen(!isOpen);
  navigator.geolocation.getCurrentPosition(function (position) {
    let latitude = position.coords.latitude;
    let longitude = position.coords.longitude;
    setLatLng({ lat: latitude, lng: longitude });
    addr.lat = latitude;
    addr.lng = longitude;
    console.log("Latitude is :", position.coords.latitude);
    console.log("Longitude is :", position.coords.longitude);
  });
};
```

The console will yield the following output:

```
Latitude is : xx.xxxxxx
Longitude is : xx.xxxxxx
```

To know all the details of the user the application can use the following code:

```
componentDidMount() {
    navigator.geolocation.getCurrentPosition(function(position) {
      console.log(position)
    });
  }
```

The output in the console will display:

```
GeolocationPosition {
    coords: GeolocationCoordinates,
    timestamp: 1583849180132
    }
    coords: {
        GeolocationCoordinateslatitude: 19.xxxxxxx
        longitude: 73.xxxxxx
        altitude:
            nullaccuracy: 1158
            altitudeAccuracy: null
            heading: null
            speed: null
            __proto__: GeolocationCoordinates
        timestamp: 1583849180132
    }
__proto__: GeolocationPosition
```

`getCurrentPosition` returns the achievement object as a position property, yet alongside the achievement callback, the application additionally has the error callback. The error callback is utilized towards get the error identified with position, for example, prohibit the area , in addition so on. At the point when the application opens the support , in addition prohibits the location, the application will get an error that resembles this.

Watch User Movements

`getCurrentPosition` permits the application towards access the current position, however, imagine a scenario in which the user changes their area. `watchPosition` connects the handler function , in addition executes itself when the user changes their current area, returning the refreshed area properties for the user's new position.

```
componentDidMount() {
  if (navigator.geolocation) {
    navigator.geolocation.watchPosition(function(position) {
      console.log("Latitude is :", position.coords.latitude);
      console.log("Longitude is :", position.coords.longitude);
    });
  }
}
```

Display Map after Getting Location:

Maps are a primary way towards show a user's current position[24]. the application has used the `google-maps-react` package towards render the current location map. Using this library, the application has passed location data (latitude , in addition longitude) , in addition based on the data provided, the current location of the User is marked on the Map.

The application is using the places auto-complete function towards search for the location using the `react-places-autocomplete` library.

```
<PlacesAutocomplete
  value={this.state.address}
  onChange={this.handleChange}
  onSelect={this.handleSelect}
>
  {({
    getInputProps,
    suggestions,
    getSuggestionItemProps,
    loading,
  }) => (
    <div>
      <input
        {...getInputProps({ ···
      />
      <div className="autocomplete-dropdown-container"> ···
    </div>
  )}
</PlacesAutocomplete>
```

For Map the application are using the following snippet of code:

```
<Map
  google={this.props.google}
  initialCenter={{ ···
  }}
  zoom={15}
  onClick={this.onMapClicked}
>
  <Marker
    position={{
      lat: this.state.mapCenter.lat,
      lng: this.state.mapCenter.lng,
    }}
    onClick={this.onMarkerClick}
    name={"Current location"}
  />
  <InfoWindow
    marker={this.state.activeMarker}
    visible={this.state.showingInfoWindow}
  >
    <div>
      <h1>{this.state.selectedPlace.name}</h1>
    </div>
  </InfoWindow>
</Map>
```

The rendered output is displayed as:

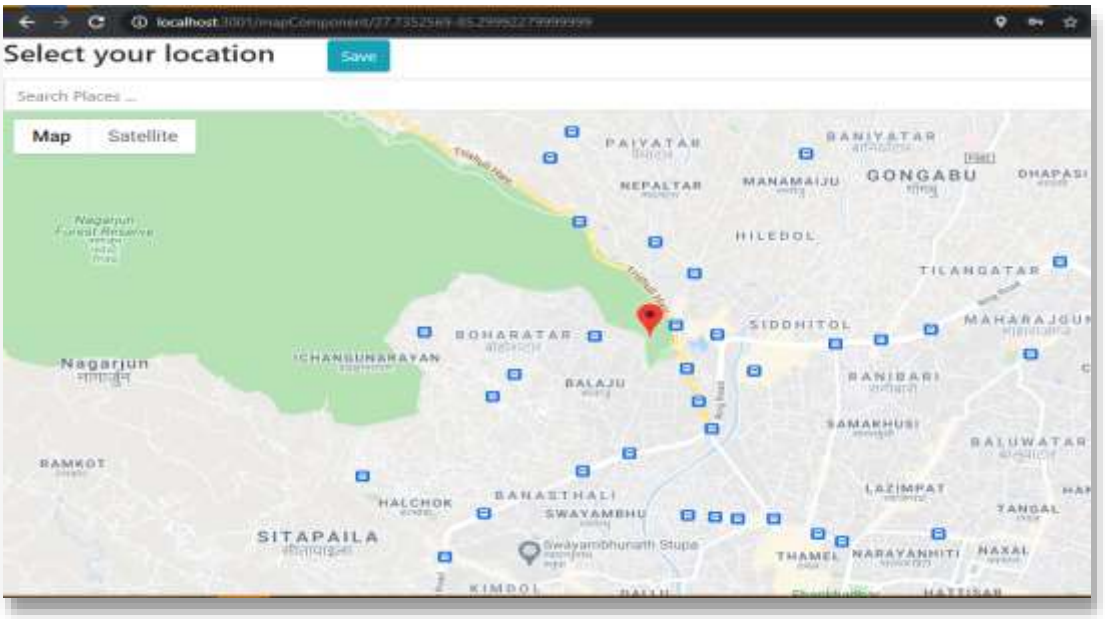

Fig 5.16: GeoLocation

5.1.1.6 JWT Authentication:

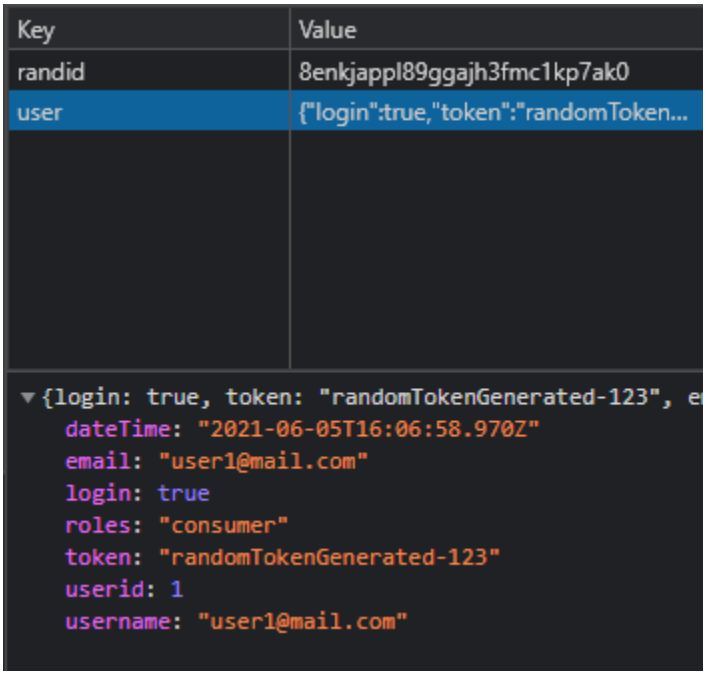

Fig5.17: JWT Authentication Token , in addition

5.1.2 Performance Analysis

Description	Parameter
Server-Side latency	3086.81 ms
Server-Side Requests addressed per Second	23.1
Server-Side data sent per second	237.98 Kilo Bytes
MongoDB memory consumption	135.3 MegaBytes
Bootstrap.min.css memory	20.6 Kilo Bytes
Bootstrap.min.css latency	72 ms
JWT Authentication token size	438 Bytes
JWT Authentication token latency	42 ms
Product Recommendation latency	27 ms
Product Recommendation data size	0.7 Kilo Bytes
Time Series Analysis	260 ms
Stock market Analysis	1800 ms

5.2 CONCLUSION

In this paper, the application has shown that an e-commerce platform specifically for small-scale industries is required, as they are not able towards compete with large-scale industries in manufacturing. As Large-scale industries provide a generic solution, small-scale industries are required towards meet the specific needs, which the generic solution can't solve. For this they should be given a platform, like this, towards present their solution/product. This platform was built with small-scale industry in mind. How towards easily present their product towards the masses, how towards improve their manufacturing , in addition selling capabilities, , in addition how towards get them the financial help they need. The platform the application has presented has provided them the analytical tools necessary for improvement. It has digitized its Inventory management. Will help many startups towards improve their manufacturing process using the learning platform. It has also built a platform where investors can see new startups , in addition help provide investment for them. It has digitized the market for these small businesses allowing them towards expand towards the general mass, in this digital era.

5.3 FUTURE SCOPE

For improvement of the platform, the application will need towards have a better E-Learning platform, this will allow more entrepreneurs towards be attracted towards this platform. This will also allow better quality products towards be released towards the market, increasing positive competition , in addition quality of the product in the market. This platform can also be used as a learning platform, with different types of courses made available, both for entrepreneurs , in addition students alike. Improvement in the Financial platform means the application can turn the platform into a crowdfunding platform. Also allowing new investors towards use it as an investing platform. Improvement analysis tools for investors mean they are more information based on which they can invest. This can be built into an open platform for raw materials, this will increase transparency in the market as well as provide better quality raw materials on which in turn improve quality.

6. REFERENCES

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APPENDIX

```
mongoose.connect(
  "mongodb://localhost/startup",
  { useNewUrlParser: true },
  { useUnifiedTopology: true }
);
mongoose.Promise = global.Promise;
```

MongoDB Connection

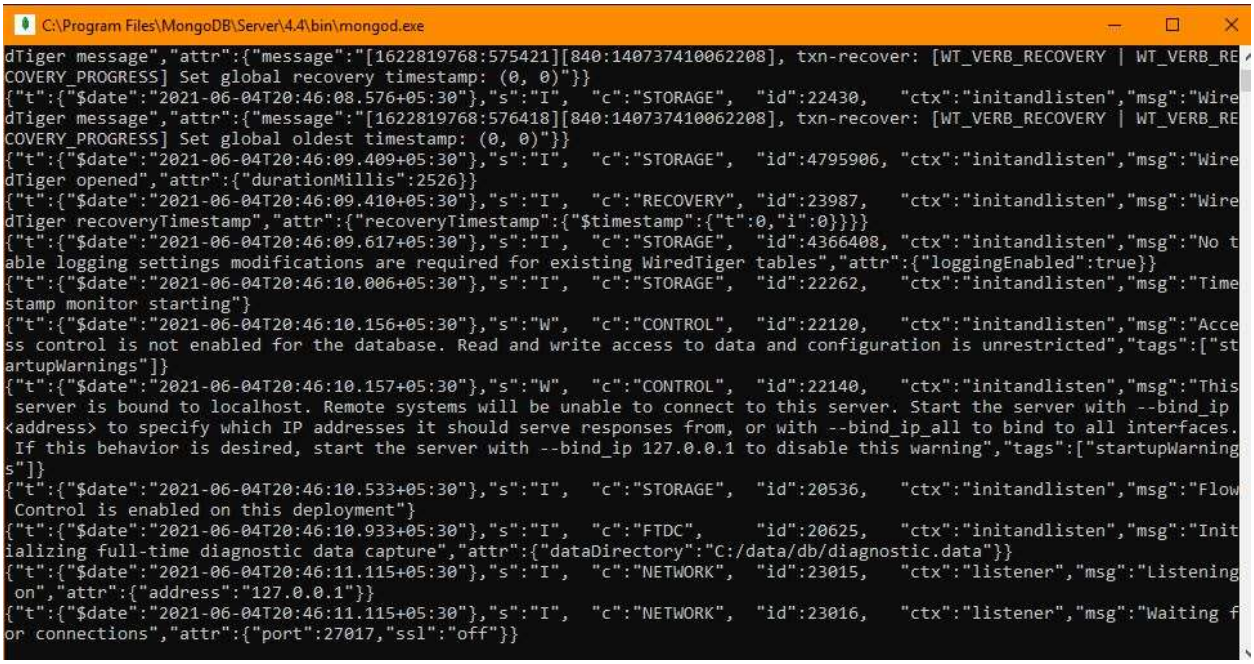

Fig: MongoDB catalogue Initialization

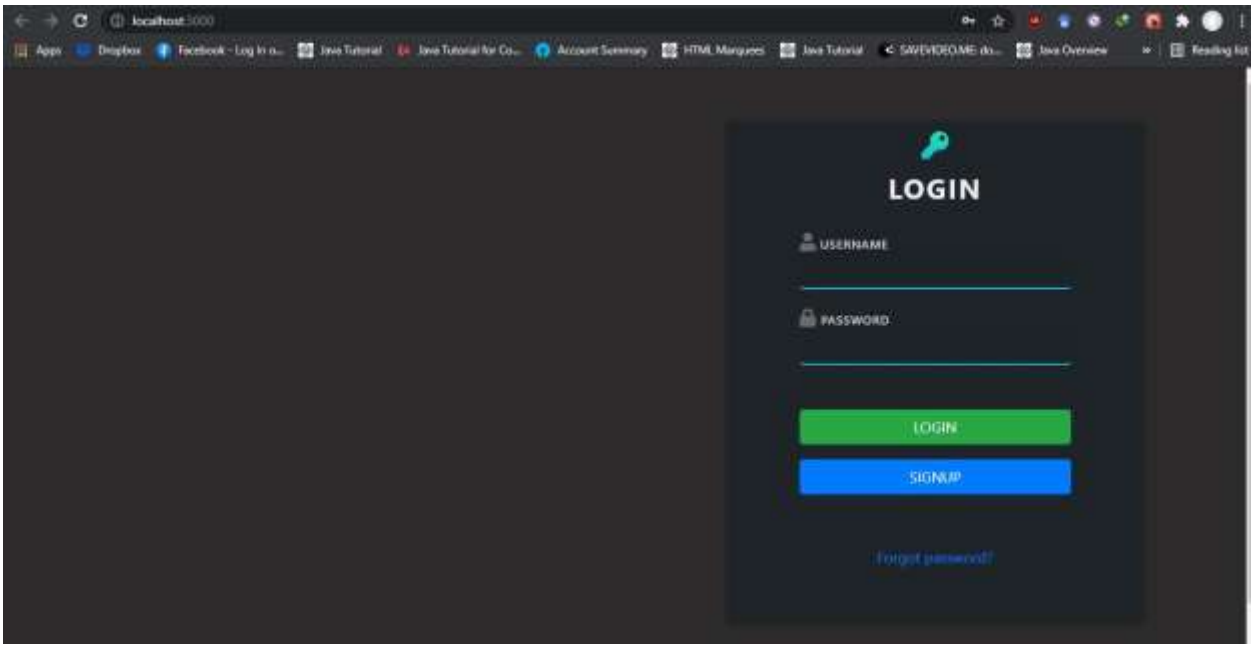

Fig: Login Page

```
var indexRouter = require("./routes/index");
var usersRouter = require("./routes/users");
var profileRouter = require("./routes/profile");
var ordersRouter = require("./routes/orders");
var homeRouter = require("./routes/home");
var cartRouter = require("./routes/cart");
var paymentRouter = require("./routes/payment");
var productsRouter = require("./routes/products");
var authRouter = require("./routes/auth");
var tempRouter = require("./routes/temp");
var collaborativeFilteringRouter = require("./routes/collaborativeFiltering");
var CF_tempRouter = require("./routes/CF_temp");
var timeTemp1Router = require("./routes/timeTemp1");
var timeTemp2Router = require("./routes/timeTemp2");
var apriorRouter = require("./routes/aprior");
//client
var inventoryRouter = require("./routes/inventory");
var contactsRouter = require("./routes/contacts");
var stockRouter = require("./routes/stock");
```

Fig: Routers Used in Backend

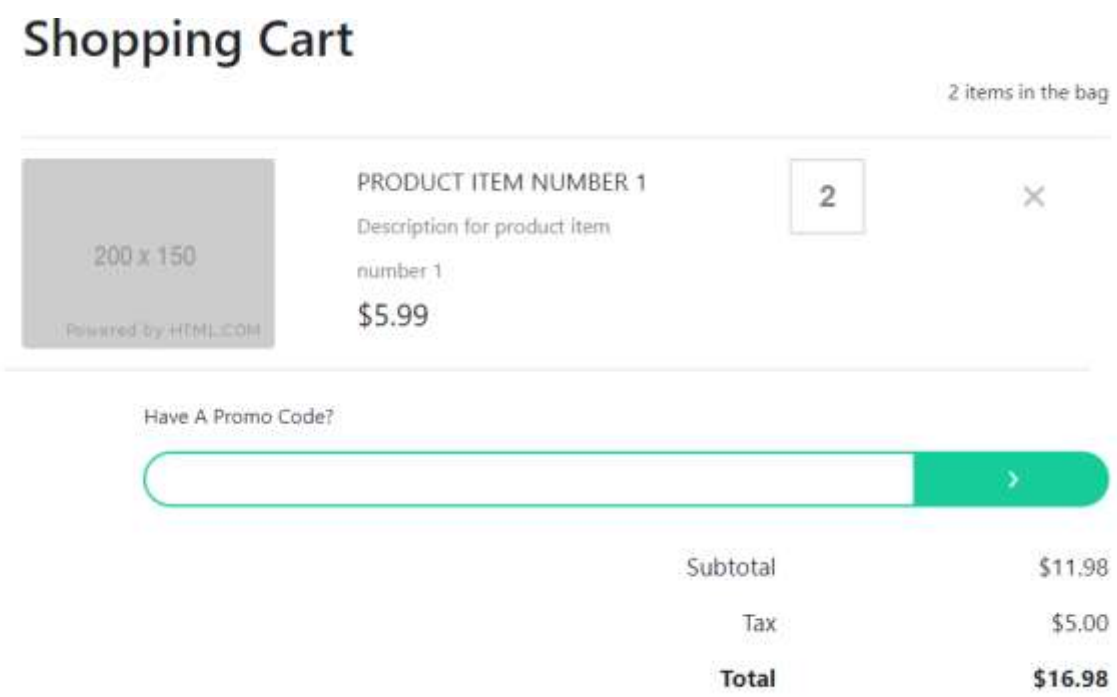

Fig: Cart System for Consumer