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## E-commerce Website With Sales Analysis And Price Optimization

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**Abstract:** Ecommerce is the buying and selling of goods and services over the Internet. It is conducted over computers, tablets, smartphones, and other smart devices. Almost anything can be purchased through ecommerce today. E-commerce puts new demands not only on support and delivery IT, but also on the way business processes have to be designed, deployed, and maintained. So our proposed idea is to develop a user friendly website for Ecommerce. To implement e-commerce, a virtual store on the Internet is needed which allows customers to seek for products and select them from a catalog. The customer needs to fill some fields to order a specific product. This research paper focuses on Sales Analysis and Product Price Optimization .

**Index Terms - Ecommerce, Sales analysis, Price optimization , Payment gateway**

### I. INTRODUCTION

Ecommerce is the new trend and is expected to drive the future. The customer needs to fill some fields to order a specific product. Broadly defined, electronic commerce encompasses all kinds of commercial transactions that are concluded over an electronic medium, mostly the Internet. E-commerce covers both business-to-consumer and business-to-business transactions, and is not limited to the purchase of a product. It includes all information or services that a company may offer to its customers over the Net, from pre-purchase information to after-sale service and support. E-commerce can have a very profound impact on corporate strategy because it changes the way a company interacts with its customers, but also its suppliers, partners, employees or investors. E-commerce actors, competition, rules and market-space, as well as evolution speed, are different from the traditional company operating environments. Firms need to adapt and integrate the Net into their business strategy.

The need of having analysis tools is occur because there is lot of competition in the market now -a days. The analysis tools helps the organization of e-commerce website whether they are providing desired services to customer or not .To get the feedback our project is having "Sales Analytics Dashboard" which will analyze the database transactions of e-commerce websites using various algorithms. Our proposed idea is to develop a system which takes input the database transactions of sold products, segments the data obtained, analyzes the graphs and extracts the market trends and product sales patterns. After this, the system optimizes this data on the basis of market requirements thereby improving sales and merchandise planning in a way that to increase the overall productivity and profits of the organization.

This E-commerce shopping website is proposed to be using many programming languages such as HTML, CSS, JAVASCRIPT and database such as MongoDB.

With the rapid growth in the fashion e-commerce industry, it is becoming extremely challenging for the E-tailers to set an optimal price point for all the products on the platform. By establishing an optimal price point, they can maximize overall revenue and profit for the platform. In this paper, we propose a novel machine learning and optimization technique to find the optimal price point at an individual product level. It comprises three major components. Firstly, we use a demand prediction model to predict the next day demand for each product at a certain discount percentage. Next step, we use the concept of price elasticity of demand to get the multiple demand values by varying the discount percentage. Thus we obtain multiple price demand pairs for each product and we have to choose one of them for the live platform. Typically fashion e-commerce has millions of products, so there can be many permutations.

## II. LITERATURE SURVEY

In this section , we have discussed working of E-commerce under different implementation models and the following is the related work in the domain of “E-commerce”.

**A. Dynamic Price Optimization for the Future of E-Commerce :** *Anusha.B , Sangeetha.H.S , Riyanka.R , Sushmitha.N , Chitra.R [1]* , This paper provide a brief introduction to the historical origins of quantitative research on pricing and demand estimation, point to different subfields in the area of dynamic pricing, and provide an in-depth overview of the available literature on dynamic pricing and learning.

**B. Price Optimization in Fashion E-commerce :** *Sajan Kedia , Samyak Jain , Abhishek Sharma [2]* , With the rapid growth in the fashion e-commerce industry, it is becoming extremely challenging for the E-tailers to set an optimal price point for all the products on the platform. By establishing an optimal price point, they can maximize the platform’s overall revenue and profit. This paper proposes a novel machine learning and optimization technique to find the optimal price point at an individual product level.

**C. Analysis and Optimization of Online Sales of Products:** *Anuja Marewar, Zainab Bhavnagarwala, Madhuri Kamble, Dr. Zainab Pirani [3]* , With the aim of developing a “Sales Analytics Tool” this paper describes the need of a system to analyze the database transactions of e-commerce websites using various data mining techniques and algorithms such as affinity analysis, logistic regression and linear regression.

**D. A sale-oriented product management method for e- commerce :** *Yoshitaka Sakurai, Takashi Kawabe, Takahiko Sakai, Kouhei Takada, Setsuo Tsuruta, Mizuno Yoshiyuki [4]* , In this paper, a robust substitution technique is used to implement proposed work of audio steganography. This technique resolves the various inherent issues ,after that it increases the data hiding capacity while being also achieve robustness from various intentional as well as unintentional hacking attacks. Like this it provides privacy to data.

**E. Developing an E-Commerce Website:** *Syed Emdad Ullah, Tania Alauddin and Hasan U. Zaman[5]* , This paper outlines different aspects of developing an e-commerce website and the optimum solution to the challenges involved in developing one. It consists of the planning process, which starts with determining the use case, domain modelling an Architectural pattern of the web application.

**F. Growth of E-commerce in India :** *Madhurima Khosla , Harish Kumar [6]* , The survival of the e-commerce firms in a highly dynamic environment becomes a challenging task when coupled with the cutthroat competition prevailing in the sector. The onus then lies on the firms to constantly adapt and innovate while providing an information rich and seamless experience to ensure customer loyalty. This paper study attempts to explore the evolution of e-commerce in India and identifies various challenges to as well the factors responsible for the future growth and development of e-commerce.

## III. EXISTING SYSTEM

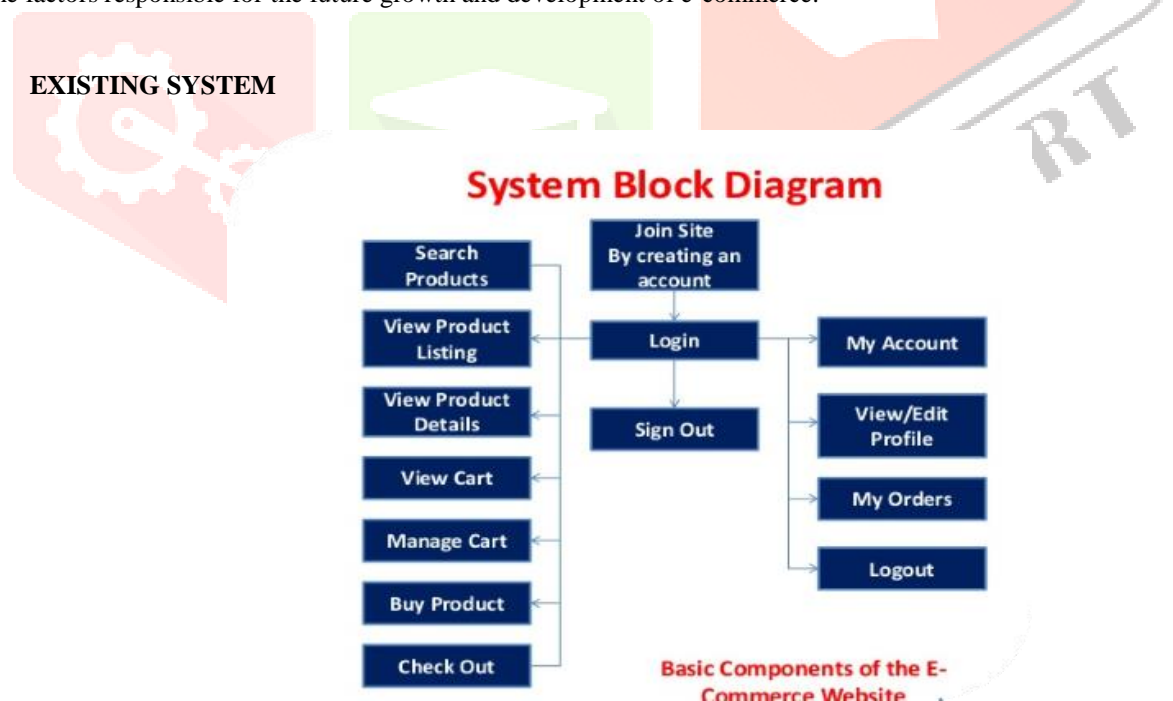


Fig 3.1 Existing system block diagram [10]

Existing System Block Diagram consists of Search Products ,View Product Listing ,View Product Details ,View Cart ,Manage Cart ,Buy Product ,Check Out ,Join Site By creating an account ,Login ,Sign Out ,My Account ,View/Edit Profile ,My Orders ,Logout ,Basic Components of the E-Commerce Website. In this website, a user can surf through website and find products of their choice. User can become member of the website to gain some other discount benefits.

#### IV. PROPOSED SYSTEM

E-commerce is based on the client-server architecture. A client can be an application, which uses a Graphical User Interface (GUI) that sends request to a server for certain services. The server is the provider of the services requested by the client. In E-commerce, a client refers to a customer who requests for certain services and the server refers to the business application through which the services are provided. The business application that provides services is deployed on a Web' server. In client-server architecture, a machine can be both a client as well as a server.

In this project , we have demonstrated a user friendly website as well as dedicated application for Ecommerce. The application helps the customer for online shopping in best way possible as well as the price Optimizer helps as a proper price decider.

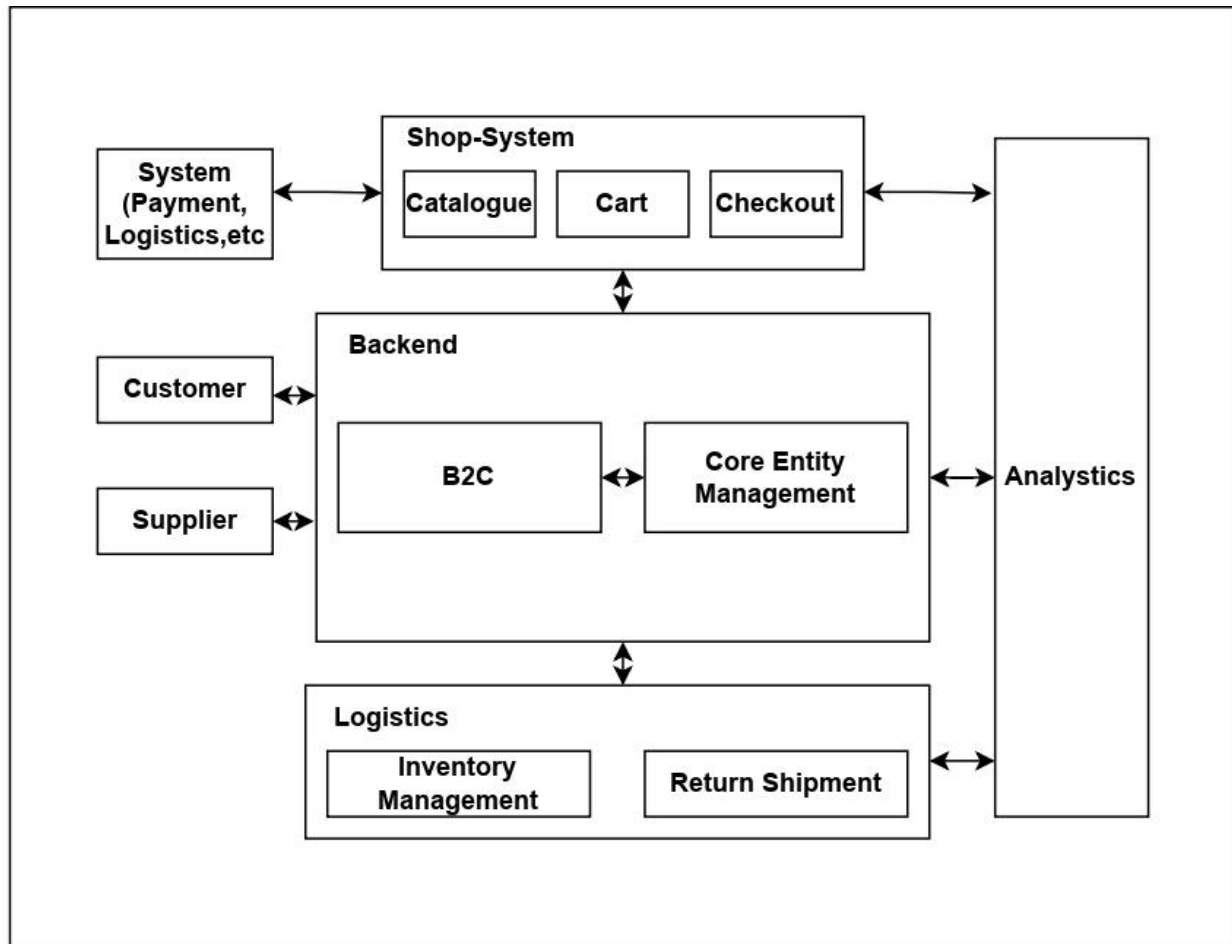


Fig 4.1 Proposed system block diagram

Our E-commerce website consists :

- **Sales analysis :**

A sales dashboard is a visual representation of your sales data. It provides an ocular overview of your KPIs so that your team can get an at-a-glance understanding and make data-driven decisions based on these visual insights. Presenting analytical findings in this way is achieved through business intelligence. It is done for better understanding of the Store Insights. This includes a graphical representation of various things such as Inventory stock management, Active Users as well as total revenue collected by sales.

- **Price optimization :**

Price optimization [7] is the use of mathematical analysis by a company to determine how customers will respond to different prices for its products and services through different channels. It is also used to determine the prices that the company determines will best meet its objectives such as maximizing operating profit. Price optimization helps businesses strike the right balance of efficient pricing, achieving profit objectives, and also serve their customers. Firstly, we use a demand prediction model to predict the next day demand for each product at a certain discount percentage. Next step, we use the concept of price elasticity of demand to get the multiple demand values by varying the discount percentage. Thus we obtain multiple price demand pairs for each product and we have to choose one of them for the live platform. Typically fashion e-commerce has millions of products, so there can be many permutations.

- **Payment gateway :**

Use to accept payment via debit card and credit card from the customers . We are using the payment gateway of PayPal .

## V. REQUIREMENT ANALYSIS

### 1. Software requirements :

For our development VS Code was used which is a code editor redefined and optimized for building and debugging modern web and cloud applications. It is most commonly used in computer programming, specifically for the Python and JavaScript language. MongoDB an NoSQL Database was used for efficient management of data on webapp. Web-browser like Chrome/Mozilla Firefox and an Android Device with Android version greater than 6.0 is required.

### 2. Hardware requirements :

A computer or laptop / android device is needed. No strict specification about the hard disk.

## VI. MATHEMATICAL MODELS AND TECHNIQUES

### • OLS (Ordinary Least Square) model :

Our website uses a very basic OLS (Ordinary Least Square) [8] model for sales analysis. In statistics, ordinary least squares (OLS) is a type of linear least squares method for estimating the unknown parameters in a linear regression model. OLS chooses the parameters of a linear function of a set of explanatory variables by the principle of least squares: minimizing the sum of the squares of the differences between the observed dependent variable (values of the variable being observed) in the given dataset and those predicted by the linear function of the independent variable. Ordinary Least-Squares (OLS) estimates of the relationship between internet sales and SALES-direct and mediating effect.

### • Plotty Dash :

Plotty Dash, is used for creating interactive application .Dash is a python framework created by plotly for creating interactive web applications. Dash is written on the top of Flask, Plotly.js and React.js. With Dash, you don't have to learn HTML, CSS and Javascript in order to create interactive dashboards, you only need python. Dash is open source and the application build using this framework are viewed on the web browser.

### • Graphical Charts :

Our website represents the analysed data in graphical presentation also . A chart [9] is a graphical representation for data visualization, in which "the data is represented by symbols, such as bars in a bar chart, lines in a line chart, or slices in a pie chart". A chart can represent tabular numeric data, functions or some kinds of quality structure and provides different info. A chart can take a large variety of forms. However, there are common features that provide the chart with its ability to extract meaning from data.

## VII. EVALUATION PARAMETERS

We divide the layout into 4 sections one beside the other :

1. The controls/fields namely slider for selecting maximum and minimum, radio button to select Price or Quantity to optimize, text input to set fixed cost
2. A chart to visualize the relation between Price Vs Quantity
3. A chart to visualize the optimum revenue
4. A table that has simulated data

Also , an important parameter is ,

**Average profit margin :** This is what you earn from each product after deducting what you paid for supplying it. It's calculated as a percentage of the retail price and shows what portion of it your profit is ,

$$\text{Profit margin} = [(\text{Selling price} - \text{Cost of goods}) / \text{Selling price}] * 100$$

You may be selling tons, but are you making any profit? Try to keep it higher than the average acquisition cost if you want to have a sustainable online business.

### VIII. RESULTS AND CONCLUSION

After the development of website we got the several results which are as follows :

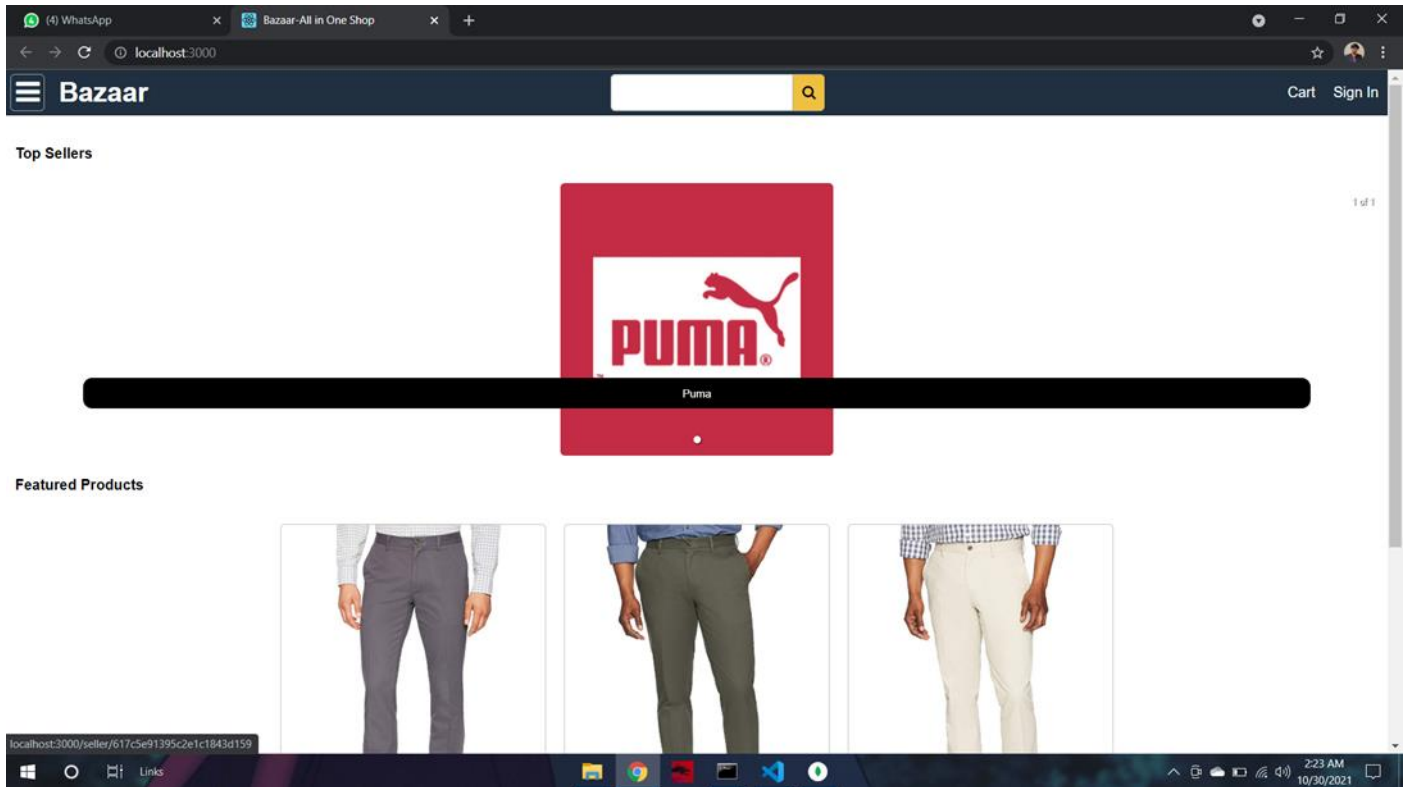


Fig 8.1 Home page after page

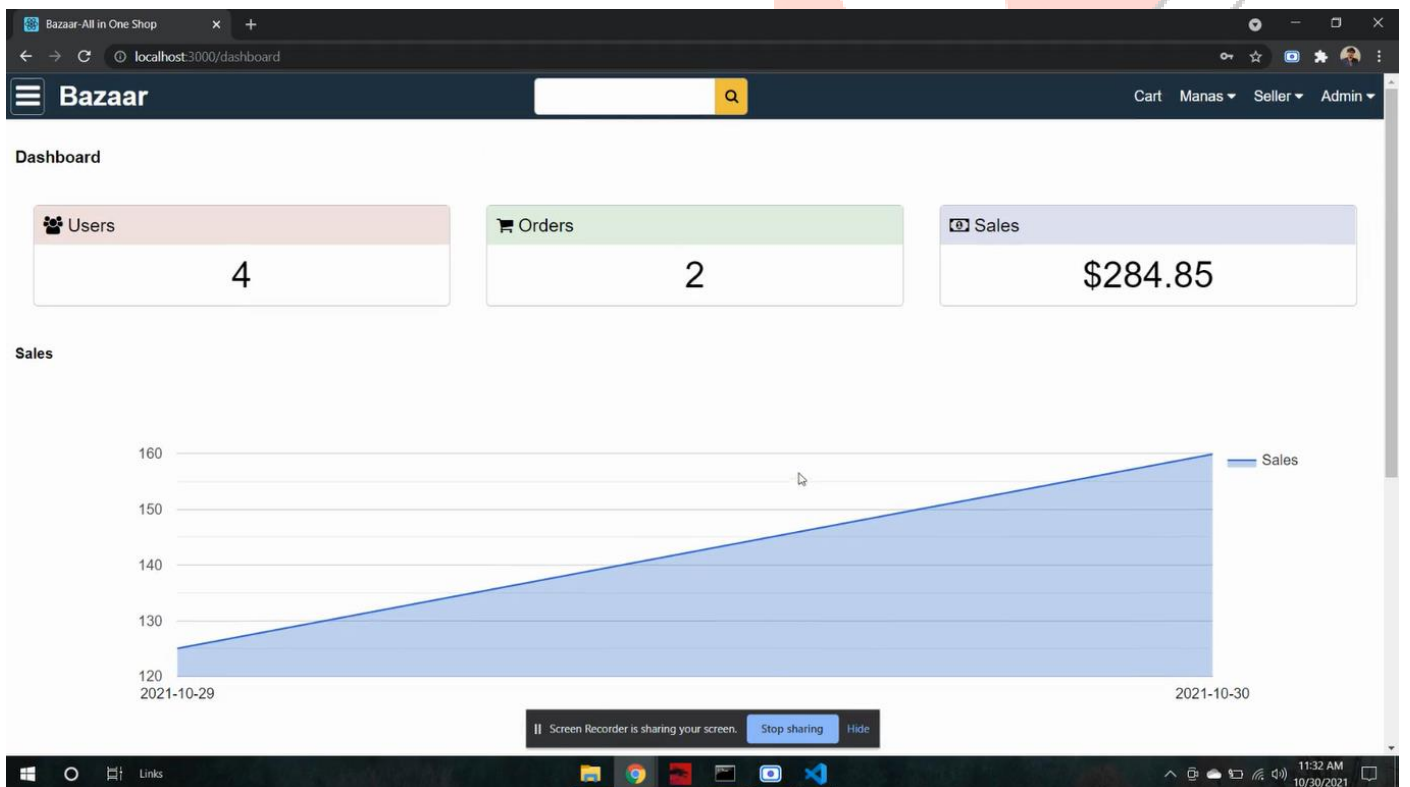


Fig 8.2 Sales analysis dashboard

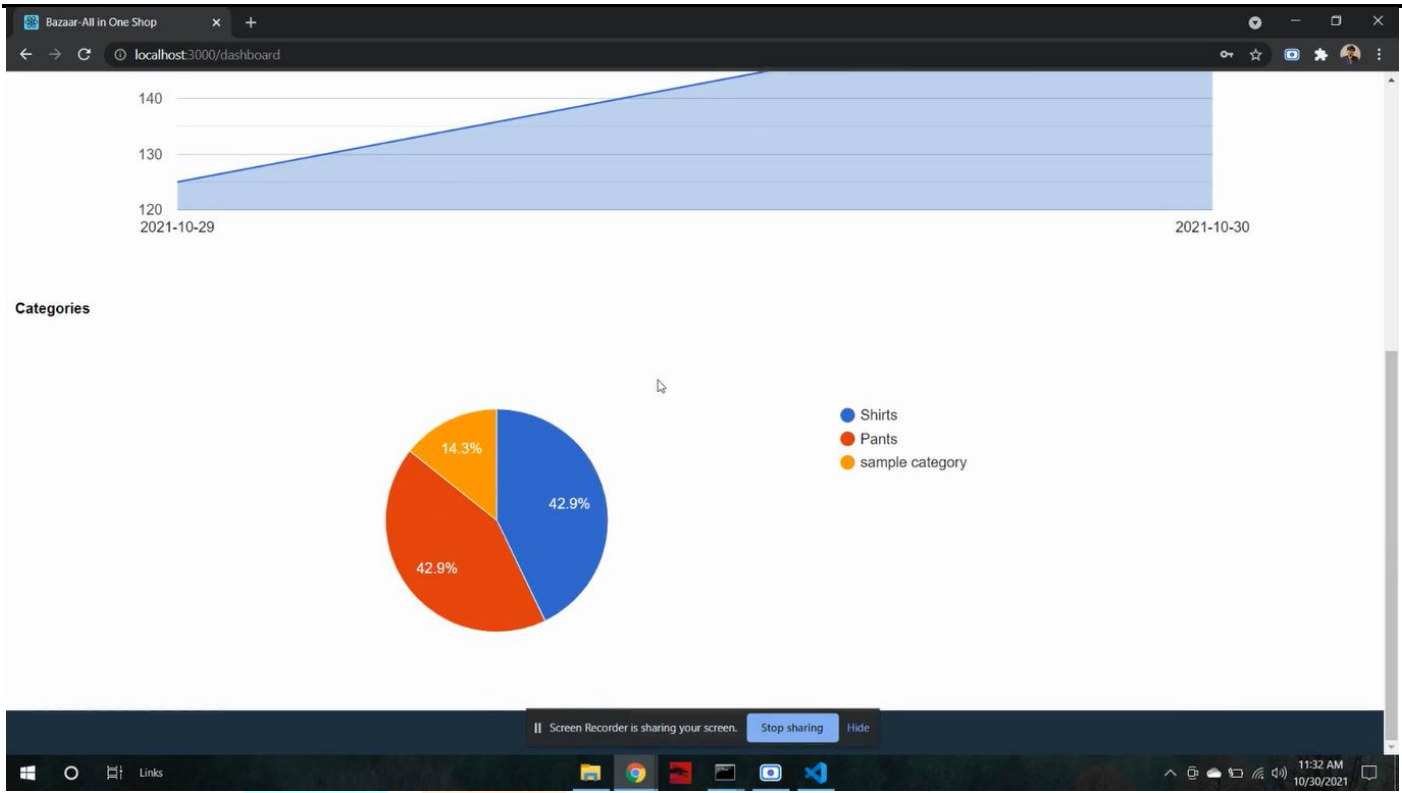


Fig 8.3 Sales analysis dashboard

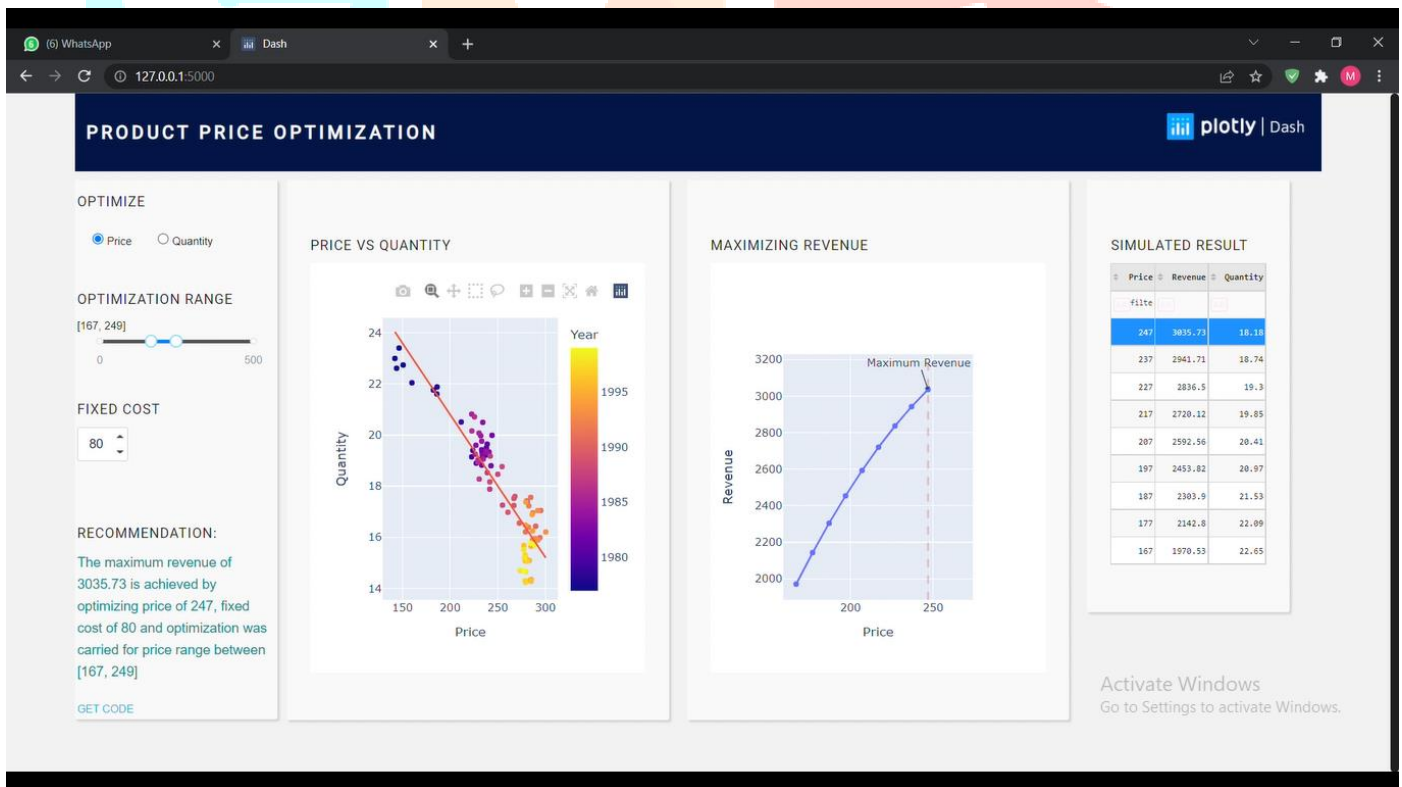


Fig 8.4 Price optimization

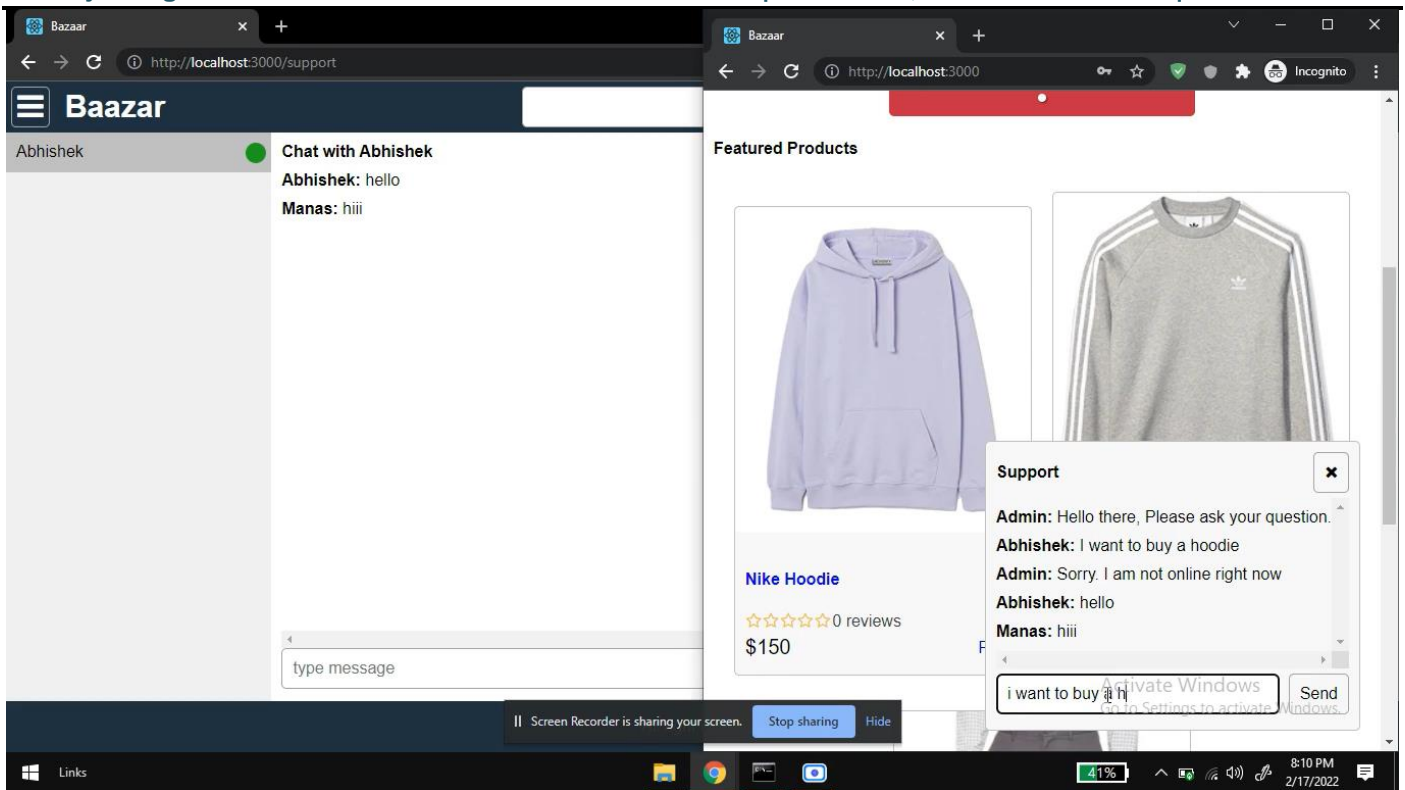


Fig 8.5 Chat feature

E-Commerce has changed our life styles entirely because we do not have to spend time and money travelling to the market. One can pick up the pace of his online business with the help of e-commerce application development and web development solutions. It is one of the cheapest means of doing business as it is e-commerce development that has made it possible to reduce cost of promotion of products and services. There is no time barriers in selling the products. One can log on the internet even at midnight and can sell products at a single click of mouse. An interactive user friendly and focused website in the form of online shop can generate good business. The chat feature in the website help the customer to seek help from the seller directly . Live chat gives customers an opportunity to get answers right away so they can keep shopping confidently. The sales analysis gives us the better idea about product demands and product selling . Price optimization results in businesses strike the right balance of efficient pricing, achieving profit objectives, and also serve their customers in better way . So we are of the opinion that big companies should invest more on research and development for e-commerce with sales analysis and price optimization .

## IX. FUTURE SCOPE

The project can be further extend with the following features:

- **Bilateral negotiations in an e-commerce environment involve two parties:** a buyer and a seller. The negotiation begins when either the buyer/seller makes a proposal for the product to buy/sell. The given proposal will be evaluated by the opponent and it will be either accepted or the opponent will generate a counter proposal. This process will continue until both the parties reach consensus or the time elapses.
- **E-commerce in cooperate with AR(Augmented reality) for better and 3D representation of products :** AR allows ecommerce customers to preview products or experience services in their own environment and on their own time, before electing to make a purchase. Using AR, your customers can preview products and be more likely to pick the right product the first time.

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