

INTEGRATION OF CHATBOT AND FRAUD DETECTION WITHIN THE E-COMMERCE PLATFORM

Submitted in partial fulfillment of the requirements for the award of
Bachelor of Engineering degree in Computer Science and Engineering

By

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**INSTITUTE OF SCIENCE AND TECHNOLOGY
(DEEMED TO BE UNIVERSITY)**

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BONAFIDE CERTIFICATE

This is to certify that this Project Report is the bonafide work of **Arul Murugan T** (40110116) and **Arun P** (40110117) who carried out the Project entitled "INTEGRATION OF CHATBOT AND FRAUD DETECTION WITHIN THE E-COMMERCE PLATFORM" under my supervision from November 2023 to April 2024.

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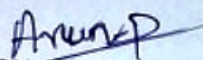
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DECLARATION

I, Arun P (Reg.No- 40110117) , hereby declare that the Project Report entitled "INTEGRATION OF CHATBOT AND FRAUD DETECTION WITHIN THE E-COMMERCE PLATFORM " done by me under the guidance of Dr. B. ANKAYARKANNI, M.E., Ph.D. is submitted in partial fulfillment of the requirements for the award of Bachelor of Engineering degree in **Computer Science and Engineering**.

DATE: 15/04/2024

PLACE: Chennai


SIGNATURE OF THE CANDIDATE

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ABSTRACT

Online shopping platforms are increasingly adopting chatbots to enhance customer interactions and simplify transactions. These automated assistants are capable of guiding customers through product selection, tracking orders, and addressing common inquiries, thereby elevating the overall shopping experience. Users have the option to engage in dialogue with the chatbot, posing routine questions to receive prompt responses. Chatbots are designed to generate meaningful conversations by leveraging dynamic data from user messages and suggesting relevant content, in addition to relying on pre-set responses. The objective of this initiative is to develop a holistic e-commerce solution that prioritizes user convenience, offers immediate support, and incorporates robust security features, aiming to provide an effective and secure online shopping environment. E-commerce fraud detection involves a set of practices and technologies aimed at identifying and preventing fraudulent activities within online transactions. Fraud in e-commerce can take many forms, including identity theft, credit card fraud, account takeover, chargeback fraud, and more. To effectively combat these threats, e-commerce businesses employ various strategies and tools. E-commerce fraud detection is a dynamic field that requires continuous monitoring, updating of security measures, and educating both employees and customers about potential risks and best practices for online safety. As fraud detection techniques become more sophisticated, so do concerns about privacy and data security. Future developments will need to balance effective fraud prevention with protecting users' personal information and complying with global data protection laws. By leveraging advanced technologies, fostering industry collaboration, and prioritizing customer experience and privacy, businesses can effectively combat fraud and build trust with their customers. Overall , this project aims to create a comprehensive e-commerce solution that combines user convenience, real-time assistance and enhanced security measures to deliver an efficient and trustworthy experience.

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CHAPTER 1

INTRODUCTION

In the rapidly evolving landscape of e-commerce, where online transactions have become an integral part of our daily lives, ensuring the security and reliability of these transactions is paramount. As e-commerce platforms continue to thrive, they also face an escalating threat in the form of fraudulent activities. Fraudsters constantly seek new ways to exploit vulnerabilities within these platforms, posing significant challenges to businesses and customers. To combat this growing menace, the integration of cutting-edge technology has become imperative. One such innovation is the fusion of chatbot technology with fraud detection systems within the e-commerce environment. This harmony can potentially revolutionize e-commerce platforms' operation by enhancing the customer experience and fortifying the security infrastructure. However websites with a large amount of content and poorly structured navigation can make it difficult for user to find the information easily and quickly. For instance if you consider an online shopping portal, it has a large catalogue of products. Browsing through the products can be challenging and time consuming given the variety of features a product can have.

In this scenario a chatbot to make it easier for the user to find information. The user has an option to chat with the bot and ask it normal questions to get responses. This integration aims to create a seamless and secure online shopping experience by utilizing chatbots to engage with customers in real-time while employing advanced fraud detection algorithms to identify and prevent fraudulent activities. By merging these two powerful tools, businesses can enhance customer engagement and support and bolster their defence against the ever-evolving tactics employed by fraudsters. We will explore the benefits, challenges, and best practices of this innovative approach. We will also examine the potential impact on customer satisfaction, transaction security, and the overall success of e-commerce businesses in an era where trust and convenience are the cornerstones of online commerce.

CHAPTER 2

LITERATURE SURVEY

2.1 INFERENCES FROM LITERATURE SURVEY

1. Kaur, G., Sinha, R., Tiwari, P. K., Yadav, S. K., Pandey, P., Raj, R., ... & Rakhra, M. (2022). Face mask recognition system using CNN model. *Neuroscience Informatics*, 2(3), 100035.

The article by Kaur, G., Sinha, R., Tiwari, P. K., Yadav, S. K., Pandey, P., Raj, R., ... & Rakhra, M. (2022) proposes a face mask recognition system using a convolutional neural network (CNN) model. This system aims to enhance the efficiency and accuracy of face mask detection in various e-commerce platforms. By leveraging advanced deep learning techniques, the CNN model is able to accurately identify whether an individual is wearing a face mask or not. In addition, the article suggests the integration of an openCV-based fraud image to sketch tool, which can help identify and prevent fraudulent activities by converting images to sketches for easy detection and analysis.

2. Villarroel Ordenes, F., & Zhang, S. (2019). From words to pixels: text and image mining methods for service research. *Journal of Service Management*, 30(5), 593-620.

In their article, Villarroel Ordenes and Zhang (2019) explore the integration of text and image mining methods for service research in the context of E-commerce. They investigate how these methods can be applied to improve service management in the digital realm. The authors discuss the potential of using image analysis techniques, specifically fraud image to sketch using openCV, to detect and prevent fraudulent activities in E-commerce platforms. Their research highlights the importance of leveraging both textual and visual information to enhance service processes and customer experiences in the digital marketplace.

3. Nipun, M. S., Sulaiman, R. B., & Kareem, A. (2022). Efficiency Comparison of AI classification algorithms for Image Detection and Recognition in Real-time. *arXiv preprint arXiv:2206.05842*.

The study conducted by Nipun, M. S., Sulaiman, R. B., and Kareem, A. (2022) revolves around the efficiency comparison of AI classification algorithms for image detection and recognition in real-time. Specifically focused on E-commerce applications, the research evaluates the performance of these algorithms when it comes to image detection and recognition tasks. The findings of the study provide valuable insights that can enhance the functionality of chat bots in E-commerce settings. Additionally, the research explores the utilization of the OpenCV library for converting fraud images into sketches, highlighting its potential application in fraud detection and prevention for E-commerce platforms.

4. Patil, S. V., & Kulkarni, D. B. (2019). Parallel computing approaches for dimensionality reduction in the high-dimensional data. In Third National Research Symposium on Computing (p. 25).

Patil, S. V., and Kulkarni, D. B. (2019) presented a research paper titled "Parallel computing approaches for dimensionality reduction in high-dimensional data" at the Third National Research Symposium on Computing, with page number 25. The paper discusses different approaches to parallel computing for dimensionality reduction in high-dimensional data. Additionally, it does not mention any specific applications related to e-commerce with chat bot or fraud image-to-sketch conversion techniques using OpenCV.

5. Singh, R. (2021). A Study of Artificial Intelligence and E-Commerce Ecosystem – A Customer's Perspective. International Journal of Research in Engineering, Science and Management. IJRESM.

The document titled "A Study of Artificial Intelligence and E-Commerce Ecosystem – A Customer's Perspective" by R. Singh, published in the International Journal of Research in Engineering, Science and Management (IJRESM), explores the impact of artificial intelligence (AI) on the e-commerce ecosystem from the perspective of customers[2]. The study delves into both the positive and negative implications of AI integration into e-commerce platforms, highlighting how AI technologies have transformed the online shopping experience for consumers.

- 6. A. Suresh and N. J. Rani, "Consumer perception towards artificial intelligence in E-commerce with reference to Chennai city, India," Journal of Information Technology and Economic Development, vol. 11, no. 1, pp. 1–14, 2020.**

In their article A. Suresh and N. J. Rani, titled "Consumer perception towards artificial intelligence in E-commerce with reference to Chennai city, India," published in the Journal of Information Technology and Economic Development, focuses on understanding how consumers in Chennai, India, perceive the integration of artificial intelligence (AI) in e-commerce. The study is significant as it provides insights into consumer attitudes in a specific geographical and cultural context, which can differ from global trends.

- 7. V. D. Tran, "The relationship among product risk, perceived satisfaction and purchase intentions for online shopping," the Journal of Asian Finance, Economics, and Business, vol. 7, no. 6, pp. 221–231, 2020.**

The article by V. D. Tran, titled "The relationship among product risk, perceived satisfaction and purchase intentions for online shopping," published in the Journal of Asian Finance, Economics, and Business, investigates the interplay between various types of risks associated with online shopping and how these risks influence customer satisfaction and their intentions to make a purchase.

- 8. Mohammad Monirujjaman Khan "Development of An e-commerce Sales Chatbot", Research gate, December 2020.**

The research paper titled "Development of An e-commerce Sales Chatbot," authored by Mohammad Monirujjaman Khan and Shahnoor Chowdhury Eshan from the Department of Electronics and Computer Engineering at North South University, Dhaka, Bangladesh, was presented in December 2020. This paper outlines the development process and the underlying technology of an e-commerce sales chatbot designed to enhance customer support and boost sales through the use of machine learning for natural language understanding (NLU). The chatbot is built on a modular framework, allowing for improved accuracy, easy addition of new features, and overall system flexibility.

9. Ghose, S., & Barua, J. J. (2013, May). Toward the implementation of a topic specific dialogue based natural language chatbot as an undergraduate advisor. In Informatics, Electronics & Vision (ICIEV), 2013 International Conference on (pp. 1-5). IEEE.

The research paper by Ghose, S., & Barua, J. J. titled "Toward the implementation of a topic specific dialogue based natural language chatbot as an undergraduate advisor," presented at the 2013 International Conference on Informatics, Electronics & Vision (ICIEV), explores the development and implementation of a chatbot designed to function as an undergraduate advisor. This study is significant as it delves into the use of natural language processing (NLP) and artificial intelligence (AI) to create a conversational agent capable of assisting undergraduate students with academic inquiries and guidance.

10. Siddharth Gupta, Deep Borkar, Chevelyn De Mello, and Saurabh Patil , (IJCSIT) International Journal of Computer Science and Information Technologies, Vol. 6 (2) , 2015, 1483-1485.

The document titled "An E-Commerce Website based Chatbot" by Siddharth Gupta, Deep Borkar, Chevelyn De Mello, and Saurabh Patil, published in the International Journal of Computer Science and Information Technologies, discusses the development and implementation of a chatbot designed to facilitate user interaction on e-commerce websites. This chatbot aims to simplify the process of navigating through the vast and complex databases of products available on e-commerce platforms, making it easier for users to find information and make purchasing decisions.

CHAPTER 3

REQUIREMENT ANALYSIS

3.1 RISK ANALYSIS OF THE PROJECT

3.1.1 FEASIBILITY STUDY

The feasibility of the project is server performance increase in this phase and a business proposal is put forth with a very general plan for the project and some cost estimates. During system analysis, the feasibility study of the proposed system is to be carried out. For feasibility analysis, some understanding of the major requirements for the system is essential.

Three key considerations involved in the feasibility analysis are

- Economical feasibility
- Technical feasibility
- Operational feasibility

3.1.2 ECONOMICAL FEASIBILITY

This study is carried out to check the economic impact that the system will have on the organization. The amount of funds that the company can pour into the research and development of the system is limited. The expenditures must be justified. Thus the developed system as well within the budget and this was achieved because most of the technologies used are freely available. Only the customized products had to be purchased.

3.1.3 TECHNICAL FEASIBILITY

This study is carried out to check the technical feasibility, that is, the technical requirements of the system. Any system developed must not have a high demand on the available technical resources. This will lead to high demands being placed

on the client. The developed system must have modest requirements, as only minimal or null changes are required for implementing this system.

3.1.4 OPERATIONAL FEASIBILITY

The aspect of the study is to check the level of acceptance of the system by the user. This includes the process of training the user to use the system efficiently. The user must not feel threatened by the system, instead must accept it as a necessity. The level of acceptance by the users solely depends on the methods that are employed to educate the user about the system and to make him familiar with it. His level of confidence must be raised so that he is also able to make some constructive criticism, which is welcomed, as he is the final user of the system.

3.2 REQUIREMENTS SPECIFICATION DOCUMENT

- **Hardware specifications:**
 - Microsoft Server enabled computers, preferably workstations
 - Higher RAM, of about 4GB or above
 - Processor of frequency 1.5GHz or above

- **Software specifications:**
 - Python 3.6 and higher
 - Anaconda software

CHAPTER 4

DESCRIPTION OF PROPOSED SYSTEM

The proposed system is an innovative solution for the e-commerce industry, integrating a chatbot and fraud detection system. We will create an e-commerce website with a browse-able product catalogue to illustrate the project's fundamental idea. The website is built with the chatbots easy integration in mind. The chatbot seamlessly engages with the user to gather supplementary information or swiftly enact requisite measures, effectively warding off or minimizing the risks associated with potential fraudulent activities. After receiving this input, the chatbots compare it to the pre-programmed responses. It then gives information in the form of links to the appropriate items and information in its responses. This system aims to enhance the shopping experience for customers while effectively combating and preventing fraud.

The system's chatbot component will provide customers with personalized and real-time assistance throughout their online shopping journey. It can answer standard product and order-related queries, provide recommendations, and assist with purchasing. This will improve customer satisfaction and reduce the need for manual customer support.

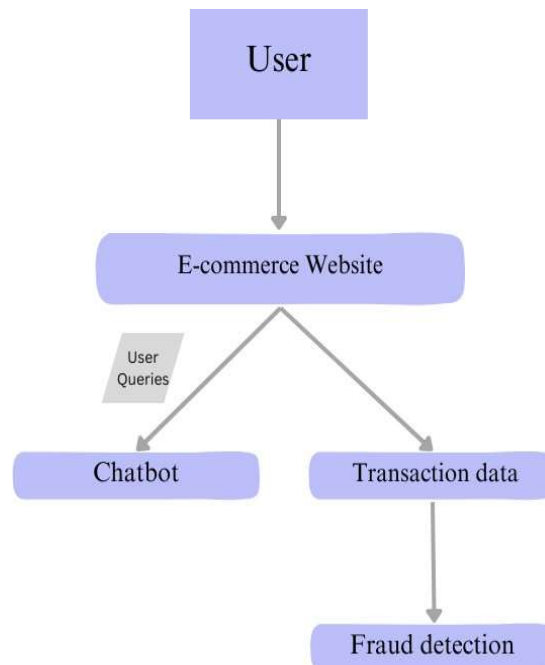


Fig 4.1: Flow Chart

4.1 SELECTED METHODOLOGY OR PROCESS MODEL

1. Data Cleaning: This subheading covers the various techniques and methods used to clean and prepare the data for analysis, such as removing missing values, handling duplicates, and standardizing formats.

One important aspect in E-commerce is data cleaning, which involves performing various techniques to ensure that the data is prepared for accurate analysis. This process involves removing missing values from the dataset, handling duplicates to avoid redundancy, and standardizing formats to ensure consistency. Additionally, E-commerce chat bots can be implemented to enhance customer experience by providing personalized assistance, answering queries, and suggesting products. By employing data cleaning methods, implementing chatbots businesses can enhance their E-commerce operations and offer safer and more efficient services to their customers.

2. Text Preprocessing: Focuses on cleaning and optimizing the textual data used in the chat bot, including activities like tokenization, stop word removal, stemming, and sentiment analysis.

Text preprocessing is an essential task in the development of an effective chat bot for E-commerce. This process involves cleaning and optimizing the textual data used in the chat bot to enhance its performance. One important step is tokenization, which involves breaking down sentences or paragraphs into smaller units known as tokens. This enables the chat bot to better understand the input text and generate more accurate responses. Another key task is stop word removal, which involves eliminating common words that do not carry much meaning, such as articles and prepositions. By removing these stop words, the chat bot can focus on the more significant words in the text. Stemming is another important technique used in text preprocessing. It involves reducing words to their root form, allowing the chat bot to treat different variations of the same word as one. Lastly, sentiment analysis can be employed to discern the sentiment or emotion conveyed in the text.

3. Feature Extraction: Covers the process of extracting relevant features and attributes from the processed data, both textual and visual, that can be used by the chatbot. Feature extraction is a crucial step in the development of an E-commerce system with a chatbot. This process involves extracting important features and attributes from the processed data, which can be both textual and visual. For the chat bot, relevant features such as customer preferences, purchase history, and browsing behavior can be extracted to personalize user experiences and provide tailored recommendations. Extracted features from the processed images can then be used to generate sketches that can help investigators identify or classify fraudulent images. Overall, feature extraction plays a fundamental role in enhancing the functionality and effectiveness of an E-commerce system with a chat bot and fraud image to sketch capability, enabling personalized experiences and efficient fraud detection.

4. Data Integration and Normalization: This subheading deals with merging different datasets, ensuring data consistency, and normalizing the data to a common format for seamless integration between the chat bot and the fraud image sketching component.

Data integration and normalization play a crucial role in the seamless integration between an e-commerce chat bot , These processes involve combining and merging different datasets to ensure data consistency and compatibility across platforms. By normalizing the data to a common format, it becomes easier to share and exchange information between the chat bot and the fraud image sketching component. Normalization also helps in standardizing the data, making it easier to compare and analyze. In the context of an e-commerce setting, data integration and normalization enable the chat bot to access relevant information about products, customers, and transactions, and provide accurate responses and recommendations. Additionally, by integrating the chat bot can flag suspicious activities and enhance the security of the e-commerce platform. Ultimately, the process of data integration and normalization ensures a smooth flow of information between the chat bot and the fraud image sketching component, enhancing user experience and improving fraud detection capabilities.

4.2 ARCHITECTURE / OVERALL DESIGN OF PROPOSED SYSTEM

In order to demonstrate the concept of the project we will design an E-Commerce Website that has a catalogue of products that can be browsed. The website itself is designed so it can be integrated seamlessly with the chatbot. The website has traditional navigation options for the user if he or she desires to browse the website, in a conventional manner. It will also feature conventional search/filter options. This website will have an unobtrusive chatbot that can be accessed from any page. The user can interact with the bot using Natural Language. The bot can make suggestions, give information or ask further questions to elicit further information depending on the user interaction.

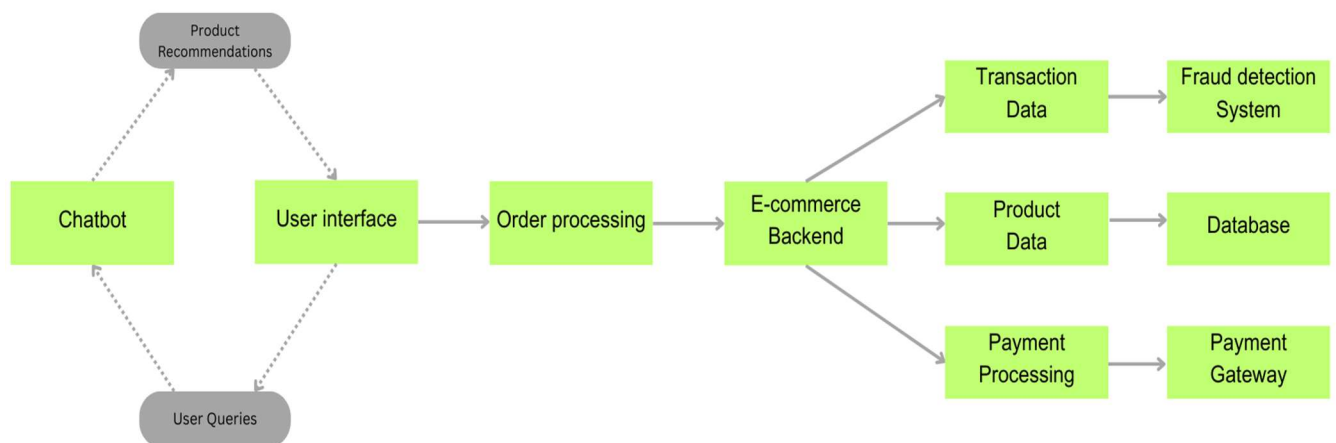


Fig 4.2: System Architecture

From the user's perspective, the website has a chat overlay using which the user can chat with the bot. Any information the chatbot requires, the user directly enters into the message window. The chatbots takes this input and matches it with the programmed responses. It then provides information in its responses and in the form of links to the suitable products.

4.3 DESCRIPTION OF SOFTWARE FOR IMPLEMENTATION AND TESTING PLAN OF PROPOSED MODEL/SYSTEM

To implement this model, execution of program is done through VScode ,Google colab. Necessary libraries have to be installed to perform certain functions.

PYTHON

Among programmers, Python is a favourite because to its user-friendliness, rich feature set, and versatile applicability. Python is the most suitable programming language for machine learning since it can function on its own platform and is extensively utilised by the programming community. Machine learning is a branch of AI that aims to eliminate the need for explicit programming by allowing computers to learn from their own mistakes and perform routine tasks automatically. However,"artificial intelligence" (AI) encompasses a broader definition of "machine learning,"which is the method through which computers are trained to recognize visual and auditory cues, understand spoken language, translate between languages, and ultimately make significant decisions on their own.

The desire for intelligent solutions to real-world problems has necessitated the need to develop AI further in order to automate tasks that are arduous to programme without Artificial intelligence.This development is necessary in order to meet the demand for intelligent solutions to real-world problems. Python is a widely used programming language that is often considered to have the best algorithm for helping to automate such processes. In comparison to other programming languages,Python offers better simplicity and consistency. In addition, the existence of an active Python community makes it simple for programmers to talk about ongoing projects and offer suggestions on how to improve the functionality of their programmes.

ANACONDA

Anaconda is an open-source package manager for Python and R. It is the most popular platform among data science professionals for running Python and R implementations. There are over 300 libraries in data science, so having a robust distribution system for them is a must for any professional in this field. Anaconda simplifies package deployment and management. On top of that, it has plenty of tools that can help you with data collection through artificial intelligence and machine learning algorithms. With Anaconda, you can easily set up, manage, and share Conda environments. Moreover, you can deploy any required project with a few clicks when you're using Anaconda. There are many advantages to using Anaconda and the following are the most prominent ones among them: Anaconda is free and open-source. This means you can use it without spending any money. In the data science sector, Anaconda is an industry staple. It is open-source too, which has made it widely popular. If you want to become a data science professional, you must know how to use Anaconda for Python because every recruiter expects you to have this skill. It is a must-have for data science.

It has more than 1500 Python and R data science packages, so you don't face any compatibility issues while collaborating with others. For example, suppose your colleague sends you a project which requires packages called A and B but you only have package A. Without having package B, you wouldn't be able to run the project. Anaconda mitigates the chances of such errors. You can easily collaborate on projects without worrying about any compatibility issues. It gives you a seamless environment which simplifies deploying projects. You can deploy any project with just a few clicks and commands while managing the rest. Anaconda has a thriving community of data scientists and machine learning professionals who use it regularly.

4.4 Modules

1. E-commerce Platform Integration: The first module of this project involves setting up an e-commerce platform, where users can browse products, add items to their cart, and proceed with the purchase. Additionally, a chatbot is integrated into the platform to

assist users with product recommendations, answering queries, and facilitating the shopping process. This module ensures a seamless and user-friendly online shopping experience.

2. Fraud Detection System : In the second module, Enterprises employ a variety of techniques for e-commerce fraud avoidance, identification, and reaction to safeguard themselves and their clientele from diverse risks. IP tracking and geolocation are methods that use a device's IP (Internet protocol) address to determine its geographic position when connected to the Internet.

These techniques are frequently used in the prevention and detection of e-commerce fraud because they assist companies in spotting odd or suspicious activity that could point to fraudulent transactions or unauthorized access. Suspicious behaviors, such as several transactions from various places in a brief period of time or login attempts from unknown locations, which may suggest fraud or account takeover attempts, can be discovered by tracking IP addresses and geolocation data. IP monitoring and geolocation combined with fraud prevention and detection techniques strengthens security protocols for online retailers, lowers the possibility of fraudulent activity, and boosts consumer satisfaction. This aids companies in adhering to regional laws and provide a better customized user experience according to the client's location.

3. Incorporation with chatbot: Chatbots can guide customers through the shopping process by offering personalized recommendations based on their browsing history, preferences, and past purchases. This module uses machine learning algorithms to analyze customer data and suggest products that they are likely to be interested in, thereby enhancing the shopping experience and potentially increasing sales.

A crucial module in e-commerce chatbots is cart management, which allows customers to add items to their cart, view cart contents, and remove items if needed. The checkout module facilitates the final purchase by guiding customers through payment options, applying discount codes, and confirming shipping details, all within the chat interface.

CHAPTER 5

RESULTS AND DISCUSSION

To enhance customer interactions on the e-commerce site, we developed a chatbot that is integrated with the site's framework. This chatbot is equipped with a predefined set of replies but also processes real-time user inputs to deliver relevant answers and suggestions for products. The addition or removal of new items within a category is streamlined, without the need to modify the pre-programmed chatbot responses, thanks to a distinct product database. Our system enhances security against e-commerce fraud by monitoring IP addresses, verifying shipping addresses, and analyzing transaction behaviors, ensuring a safe shopping environment for users. Figure (5.1–5.4) offers an overview of the complete chatbot integration method on an e-commerce platform, as elaborated in this comprehensive study.

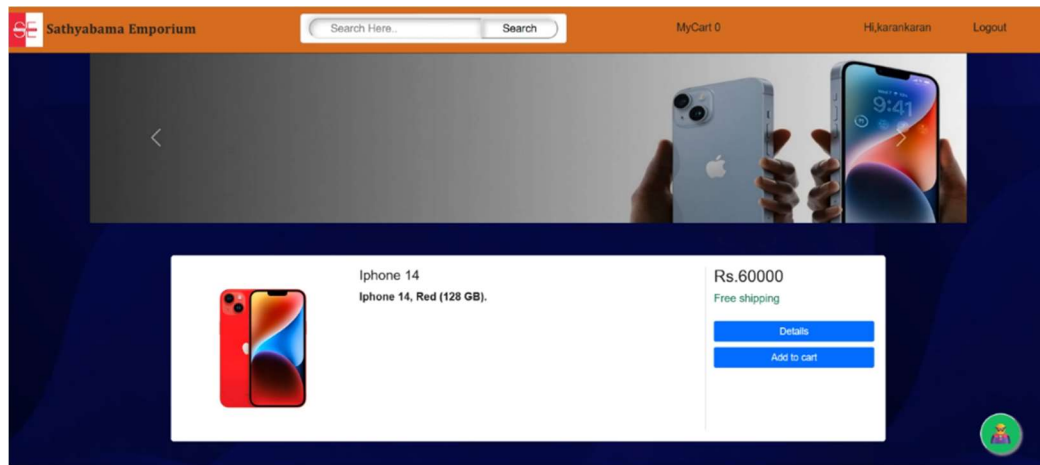


Fig 5.1: Online Storefront

The image represents "The E-commerce website" with the title "Online storefront" at the top. Below the title, there's a navigation bar with options like "Home," "Search Here...", and icons for user options like "MyCart " with a "Logout" option.

In the main section of the webpage, there's a product listing for an iPhone 14 in red color with 128GB storage. The listing includes an image of the phone along with the price, which is displayed as Rs. 60000 with a label for free shipping. Below the price, there are options to view details about the product or to add it to the cart.

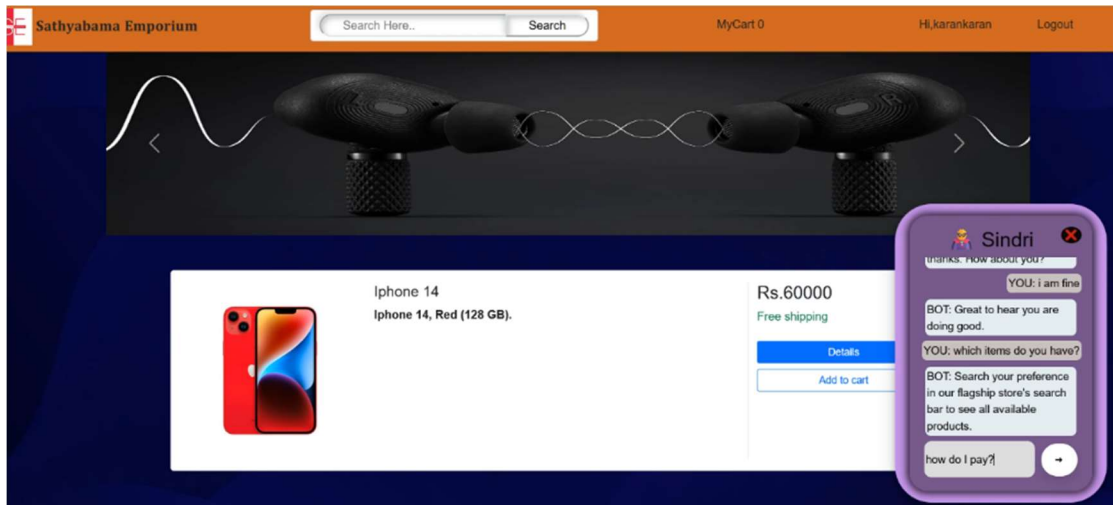


Fig 5.2: Customer interaction with chatbot

The image depicts a customer interaction with a chatbot named "Sindri" overlaid on a webpage. The chatbot appears as a purple window with a cartoon avatar. It clearly shows the chatbot understood the user's question and responded with information on payment methods.

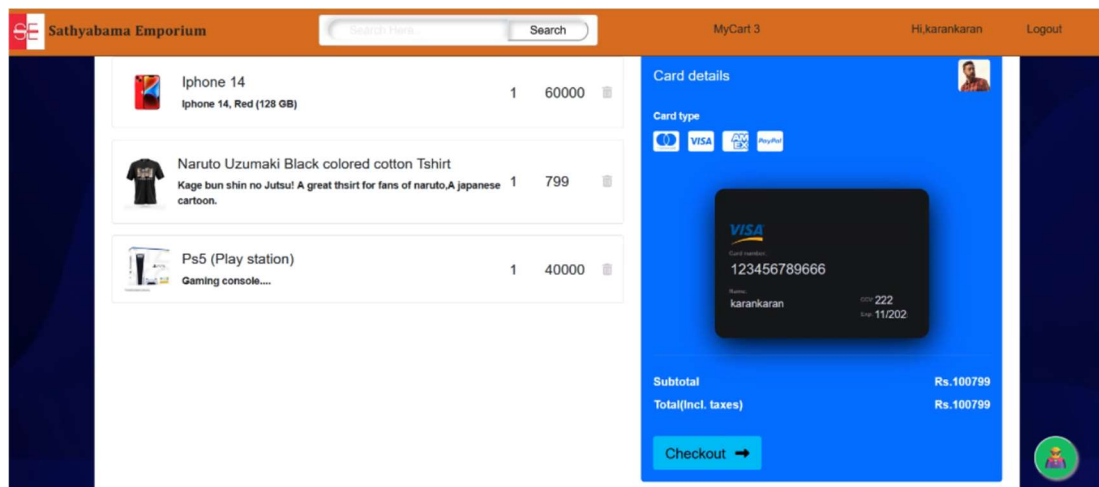


Fig 5.3: Order and Checkout

The image shows a webpage titled "Order and Checkout" on an online storefront. The page displays a list of items the user has added to their cart for purchase:

1. iPhone 14: Red color with 128GB storage, priced at Rs. 60,000.

2. Naruto Uzumaki Black colored T-shirt: Described as "Kage bun shin no Jutsu! A great shirt for fans of Naruto, a Japanese cartoon," priced at Rs. 799.

3. PS5 (PlayStation): A gaming console, priced at Rs. 40,000.

On the right side of the page, there's a summary of the order including the subtotal, total including taxes, and a "Checkout" button. It appears the user is about to proceed with the checkout process to purchase the selected items using the provided card details.

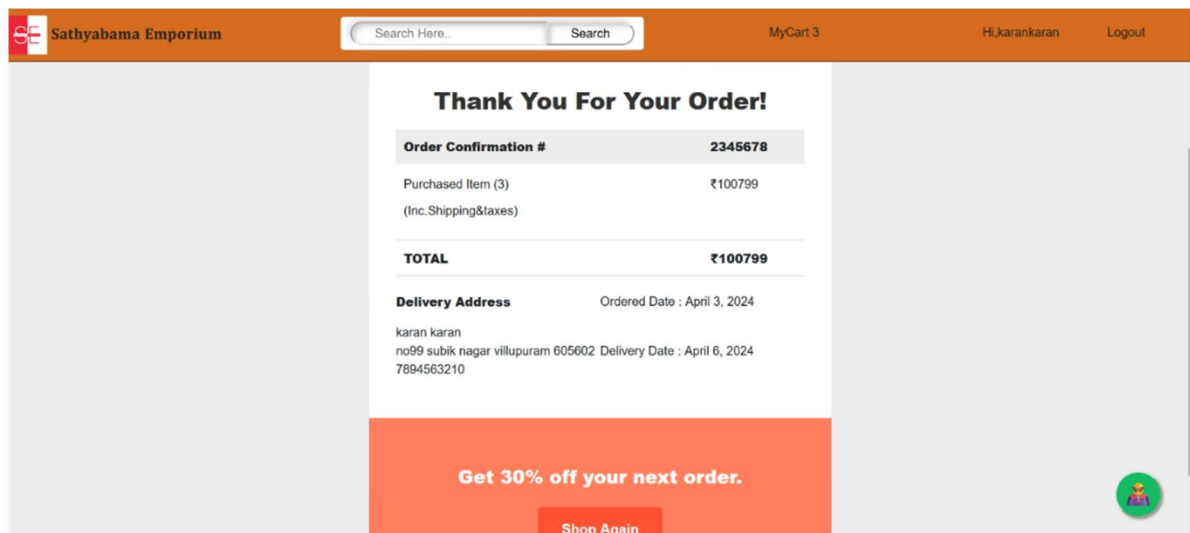


Fig 5.4: Order confirmation

The webpage titled "Order confirmation" on an online store is depicted in the image, offering confirmation details for a recent user order. Additionally, there's a promotional offer displayed at the bottom, offering the user a 30% discount on their next order. Overall, the page serves to confirm the details of the user's order and provides essential information such as order number, total amount, delivery address, and delivery date..

CHAPTER 6

SUMMARY AND CONCLUSION

The integration of chatbots and fraud detection systems within e-commerce platforms is a significant development in the digital marketplace, leveraging artificial intelligence (AI) and machine learning (ML) to enhance customer experiences and secure online transactions. Chatbots are AI-powered virtual assistants that provide real-time customer service without the need for human intervention. They are capable of handling a wide range of customer inquiries, from providing product information and order status updates to facilitating transactions and returns. Fraud detection systems in e-commerce utilize complex algorithms to scrutinize transaction data meticulously, identifying patterns and anomalies that may indicate fraudulent activities. These systems analyze variables such as transaction size, frequency, timing, and geolocation in real-time to flag suspicious transactions for further investigation. The integration of chatbots and fraud detection systems within e-commerce platforms represents a comprehensive approach to improving the online shopping experience and securing transactions. Chatbots enhance customer service by providing immediate, personalized support, while fraud detection systems safeguard the integrity of online marketplaces by preemptively identifying and mitigating potential threats. In conclusion, the integration of chatbots and fraud detection systems is a testament to the transformative power of AI and ML in e-commerce, providing businesses with the tools to offer superior customer service and robust security measures against fraud.

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APPENDIX

A.SOURCE CODE

```
from django.shortcuts import render, redirect

from django.http import HttpResponse, JsonResponse

from django.contrib.auth.models import User

from .models import Account, Product, Cart, Category, Carddetail, Product_banners

from django.contrib.auth.forms import UserCreationForm

from django.contrib.auth import authenticate, login, logout

from django.db.models import Q

from django.shortcuts import HttpResponseRedirect

from datetime import date, datetime, timedelta

import joblib

import os

import subprocess

from .chat import get_response

# Create your views here.


def home(request):

    return redirect('marketplace')


def userRegister(request):

    context = {}

    if request.method == 'POST':
```

```

username = request.POST['username']

firstname = request.POST['fname']

lastname = request.POST['lname']

phnnum = request.POST['phnnum']

password = request.POST['pwd']

email = request.POST['email']

address= request.POST['address']

cardholdername = request.POST['holdername']

cardno = request.POST['cardno']

cvv = request.POST['cvcpwd']

expmnth = request.POST['expmonth']

expyear = request.POST['expyear']


expdate = date(int(expyear), int(expmnth), 1)

user = User.objects.create_user(username=username,

                                email=email,

                                password=password)

account = Account(user=user, address=address,

                  number_order=0, firstname=firstname,

                  lastname=lastname, phonenum = phnnum)

account.save()

carddets = Carddetail(user = user, holdername=cardholdername,

                      cardno=cardno,exp_date=expdate, cvv=cvv)

```

```
carddets.save()

login(request, user)

return redirect('home')

return render(request, 'userregistration.html', context)
```

```
def userLogin(request):

    if request.method == 'POST':

        username = request.POST['username']

        password = request.POST['password']

        user = authenticate(request, username=username,

                             password=password)

        if user is not None:

            login(request, user)

            account = Account.objects.get(user = user)

            return redirect('home')

        else:

            return HttpResponseRedirect(

                "<h3 style='color : red'>User Not Found</h3>"

            )

    return render(request, 'userlogin.html')
```

```

def marketplace(request):

    context = {}

    m_total_count = 0

    all_prooducts = Product.objects.all()

    carousel_products = Product_banners.objects.all()[:5]


    if request.method == 'POST':

        q = request.POST['q']

        try:

            all_prooducts = Product.objects.filter(

                Q(name__icontains = q))

        except:

            category = Category.objects.filter(

                Q(name__icontains = q))

            all_prooducts = Product.objects.filter(

                category = category)


    context['products'] = all_prooducts

    context['carousel'] = carousel_products

    context['m_total_count'] = m_total_count

    context['username'] = request.user


    return render(request, 'marketplace.html', context=context)

```

```
def product_page(request, id):  
    context = {}  
    product = Product.objects.get(id=id)  
    context['product'] = product  
    prev_url = request.META.get('HTTP_REFERER')  
    context['prev_url'] = prev_url  
    return render(request, 'product.html', context)
```

```
def viewCart(request):  
    curr_user = request.user  
    cart = Cart.objects.get(user = curr_user)  
    username = curr_user.username  
    products = cart.products.all()  
    context = {}  
    context['username'] = username  
    context['products'] = products  
    context['user'] = request.user  
    return render(request, 'cart.html', context=context)
```

```
def user_logout(request):
```

```
logout(request)

return redirect('/')
```

```
def checkout(request):
```

```
def convert_ipaddress(x : str) -> int:
```

```
    res = "
```

```
    for i in x:
```

```
        if i.isdigit():
```

```
            res += i
```

```
    return int(i)
```

```
def convert_number(x : str) -> int:
```

```
    res = "
```

```
    for i in x:
```

```
        if i.isdigit():
```

```
            res += i
```

```
    return int(i)
```

```
context = {}
```

```
user = request.user
```

```
account = Account.objects.get(user=user)
```

```
fname = account.firstname
```

```

lname = account.lastname

full_name = fname + ' ' + lname

addr=account.address

cur_date = date.today()

ship_date = cur_date + timedelta(days=3)

phonenumber = account.phonenum

order_number = account.number_order

carddets = Carddetail.objects.get(user=user)

holdername = carddets.holdername

cardno = carddets.cardno

expdate = str(carddets.exp_date)

date_obj = datetime.strptime(expdate,
                               "%Y-%m-%d")

month = date_obj.strftime("%m")

year = date_obj.strftime("%Y")

expdate = f"{month}/{year}"

cvv = carddets.cvv

cart = Cart.objects.get(user=user)

products = cart.products.all()

total_count = len(products)

total_price = sum(product.price for
                   product in products)

context['products'] = products

```

```

context['total_price'] = total_price

context['m_total_count'] = total_count

context['holdername'] = holdername

context['cardno'] = cardno

context['expdate'] = expdate

context['cvv'] = cvv

context['username'] = request.user

if request.method == 'POST':

    holdername = request.POST['cardholdername']

    cardno = request.POST['cardno']

    expdate = request.POST['expdate']

    cvv = request.POST['cvv']

    x_forwarded_for_value = request.META.get('HTTP_X_FORWARDED_FOR')

    if x_forwarded_for_value:

        user_ip_address = x_forwarded_for_value.split(',')[0].strip()

    else:

        user_ip_address = request.META.get('REMOTE_ADDR')

    ip_addr = convert_ipaddress(user_ip_address)

    phonenumb = convert_number(str(phonenum))

    model = joblib.load('media/model/model.joblib')

    predict = model.predict([[ip_addr, phonenumb, order_number]])

    print(type(predict[0]))

    print(predict[0])

```

```

if predict[0] == False:

    context['fullname'] = full_name

    context['addr'] = addr

    context['phone'] = phonenumber

    context['success'] = 'Order Placed'

    context['Date'] = cur_date

    context['SDate'] = ship_date

    return render(request, 'order_status.html',

                  context)

else:

    context['failure']='Order Can\'t be placed'

    return render(request, 'order_status.html',

                  context)

return render(request, 'checkout.html', context=context)

```

#Adding to Cart and Removing from cart

```

def removefromcart(request, id):

    curr_user=request.user

    cart = Cart.objects.get(user=curr_user)

    product = cart.products.get(id=id)

    cart.products.remove(product)

    prev_url = request.META.get('HTTP_REFERER')

```

```
return HttpResponseRedirect(prev_url)
```

```
def addtocart(request, id):
```

```
    product = Product.objects.get(id=id)
```

```
    curr_user = request.user
```

```
    cart, created = Cart.objects.get_or_create(
```

```
        user=curr_user)
```

```
    cart.products.add(product)
```

```
    prev_url = request.META.get('HTTP_REFERER')
```

```
    if prev_url:
```

```
        return HttpResponseRedirect(prev_url)
```

```
    else:
```

```
        return HttpResponseRedirect('/')
```

```
def buynow(request, id):
```

```
    product = Product.objects.get(id=id)
```

```
    curr_user = request.user
```

```
    cart, created = Cart.objects.get_or_create(
```

```
        user=curr_user)
```

```
    cart.products.add(product)
```

```
    return redirect('checkout')
```

```
def chatbot_access(request):
```

```

    path = r"cd
C:\Users\sachi\OneDrive\Desktop\EcommerceML_new_chat_ui\EcommerceML_new
_chat_ui\ecommerce chatbot & python -m streamlit run webapp.py"

    os.system(path)

    return redirect('https://localhost:8001')

def chatbot_view(request):

    if request.method == 'GET':

        message = str(request.GET['message'])

        reply = get_response(message)

        return JsonResponse({"data":reply,"message":message})

from django.db import models

from django.contrib.auth.models import User

from django.conf import settings

# Create your models here.

class Category(models.Model):

    name = models.CharField(max_length=255)

    def __str__(self):

        return self.name

```

```

class Product(models.Model):

    name = models.CharField(max_length=100)

    price = models.PositiveIntegerField()

    description = models.TextField()

    image = models.ImageField(upload_to='products_pic', blank=True)

    category = models.ForeignKey(Category, on_delete=models.CASCADE)


    def __str__(self):

        return self.name


class Account(models.Model):

    user = models.OneToOneField(User, on_delete=models.CASCADE)

    firstname = models.CharField(max_length=255, default='na')

    lastname = models.CharField(max_length=255, default='na')

    address = models.TextField()

    phonenum = models.IntegerField(default=0)

    number_order = models.PositiveIntegerField(default=0)

    # profilePic = models.ImageField(upload_to='profile_pic', blank=True)


    def __str__(self):

        return self.user

```

```

class Cart(models.Model):

    user = models.OneToOneField(User, on_delete = models.CASCADE)

    products = models.ManyToManyField(Product)


    def __str__(self):

        return f'Cart_{self.user}'


class CartItem(models.Model):

    cart = models.ForeignKey(Cart, on_delete=models.CASCADE)

    product = models.ForeignKey(Product, on_delete=models.CASCADE)

    quantity = models.PositiveIntegerField(default=1)


class Carddetail(models.Model):

    user = models.OneToOneField(User, on_delete = models.CASCADE)

    holdername = models.CharField(max_length=255, default = "Not available")

    cardno = models.IntegerField()

    exp_date = models.DateField()

    cvv = models.IntegerField()

import numpy as np

import random

import json

```

```

from tqdm import tqdm

import torch

import torch.nn as nn

from torch.utils.data import Dataset, DataLoader


from base.nltk_utils import bag_of_words, tokenize, stem

from base.model import NeuralNet


with open('intents.json', 'r') as f:

    intents = json.load(f)


all_words = []

tags = []

xy = []

# loop through each sentence in our intents patterns
for intent in intents['intents']:

    tag = intent['tag']

    # add to tag list

    tags.append(tag)

    for pattern in intent['patterns']:

        # tokenize each word in the sentence

        w = tokenize(pattern)

        # add to our words list

```

```

    all_words.extend(w)

    # add to xy pair
    xy.append((w, tag))

# stem and lower each word

ignore_words = ['?', '!', '!']

all_words = [stem(w) for w in all_words if w not in ignore_words]

# remove duplicates and sort

all_words = sorted(set(all_words))

tags = sorted(set(tags))

print(len(xy), "patterns")

print(len(tags), "tags:", tags)

print(len(all_words), "unique stemmed words:", all_words)

# create training data

X_train = []

y_train = []

for (pattern_sentence, tag) in xy:

    # X: bag of words for each pattern_sentence

    bag = bag_of_words(pattern_sentence, all_words)

    X_train.append(bag)

    # y: PyTorch CrossEntropyLoss needs only class labels, not one-hot

```

```

    label = tags.index(tag)
    y_train.append(label)

X_train = np.array(X_train)
y_train = np.array(y_train)

# Hyper-parameters
num_epochs = 2000
batch_size = 8
learning_rate = 0.001
input_size = len(X_train[0])
hidden_size = 8
output_size = len(tags)
print(input_size, output_size)

class ChatDataset(Dataset):

    def __init__(self):
        self.n_samples = len(X_train)
        self.x_data = X_train
        self.y_data = y_train

# support indexing such that dataset[i] can be used to get i-th sample

```

```

def __getitem__(self, index):

    return self.x_data[index], self.y_data[index]

# we can call len(dataset) to return the size

def __len__(self):

    return self.n_samples

dataset = ChatDataset()

train_loader = DataLoader(dataset=dataset,

                           batch_size=batch_size,

                           shuffle=True,

                           num_workers=0)

device = torch.device('cuda' if torch.cuda.is_available() else 'cpu')

model = NeuralNet(input_size, hidden_size, output_size).to(device)

# Loss and optimizer

criterion = nn.CrossEntropyLoss()

optimizer = torch.optim.Adam(model.parameters(), lr=learning_rate)

# Train the model

loss_record = []

```

```

for epoch in range(num_epochs):

    for (words, labels) in train_loader:

        words = words.to(device)

        labels = labels.to(dtype=torch.long).to(device)


        # Forward pass

        outputs = model(words)

        # if y would be one-hot, we must apply

        # labels = torch.max(labels, 1)[1]

        loss = criterion(outputs, labels)


        # Backward and optimize

        optimizer.zero_grad()

        loss.backward()

        optimizer.step()


    if (epoch+1) % 100 == 0:

        print (f'Epoch [{epoch+1}/{num_epochs}], Loss: {loss.item():.7f}',end="\r")

        loss_record.append(f'Epoch [{epoch+1}/{num_epochs}], Loss: {loss.item():.7f}')


with open("loss.log", 'w') as f:

    for item in loss_record:

        f.write(item+"\n")

```

```
print(f'final loss: {loss.item():.7f}')

data = {
    "model_state": model.state_dict(),
    "input_size": input_size,
    "hidden_size": hidden_size,
    "output_size": output_size,
    "all_words": all_words,
    "tags": tags
}

FILE = "data.pth"

torch.save(data, FILE)

print(f'training complete. file saved to {FILE}')
```

B.SCREENSHOTS

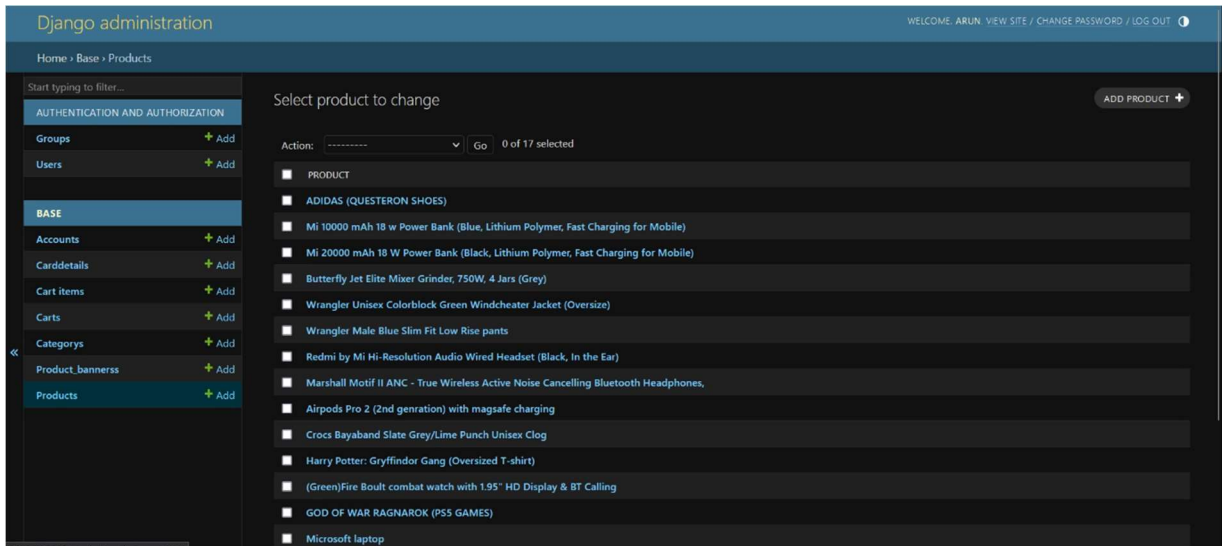


Fig B.1: Marketspace

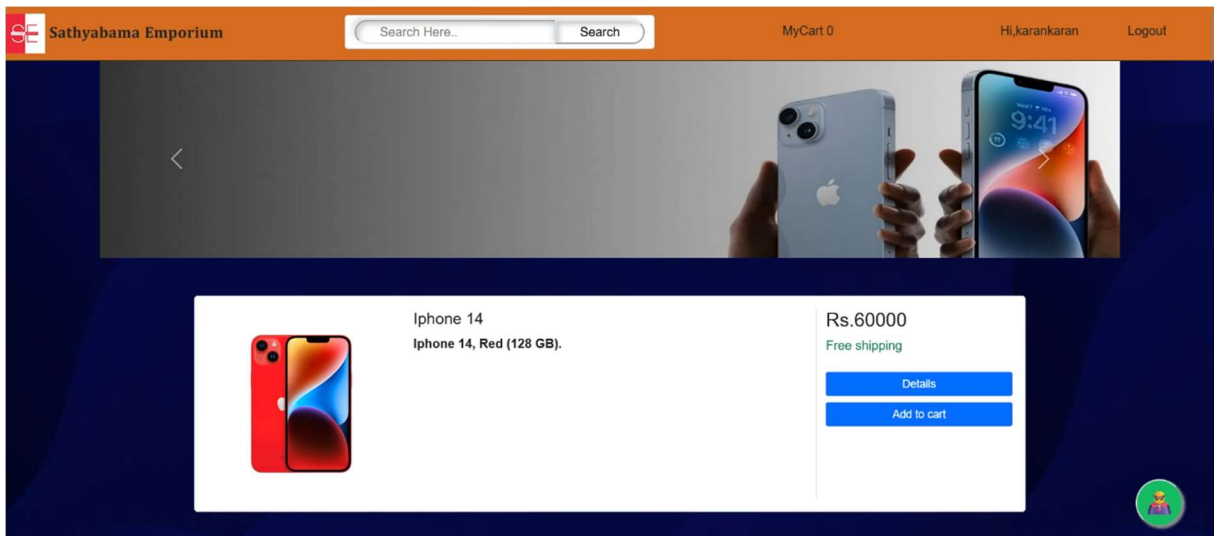


Fig B.2: Online Storefront

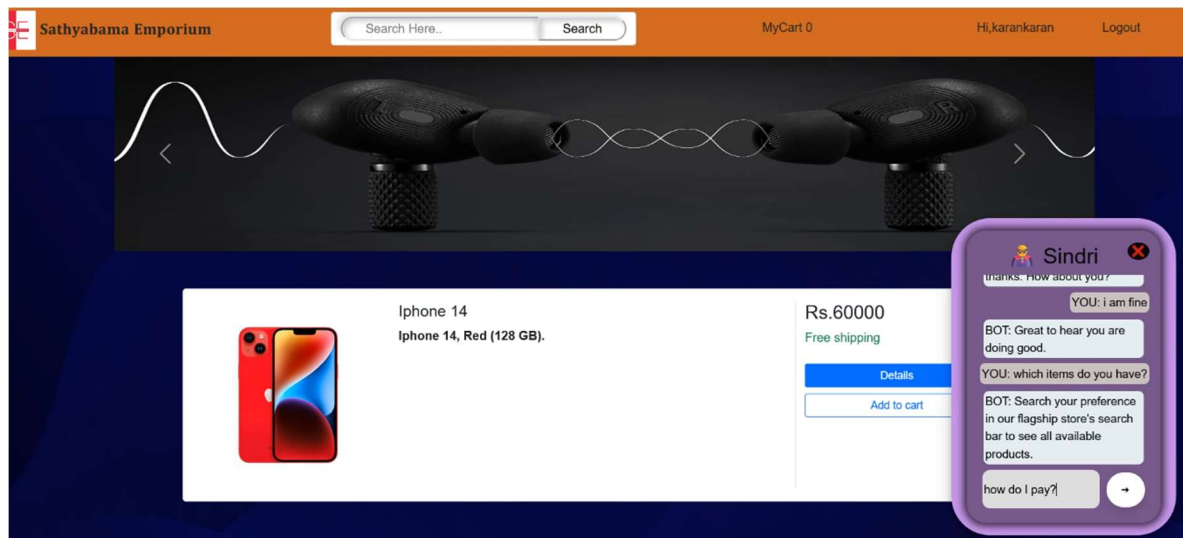


Fig B.3: Customer interaction with Chatbot

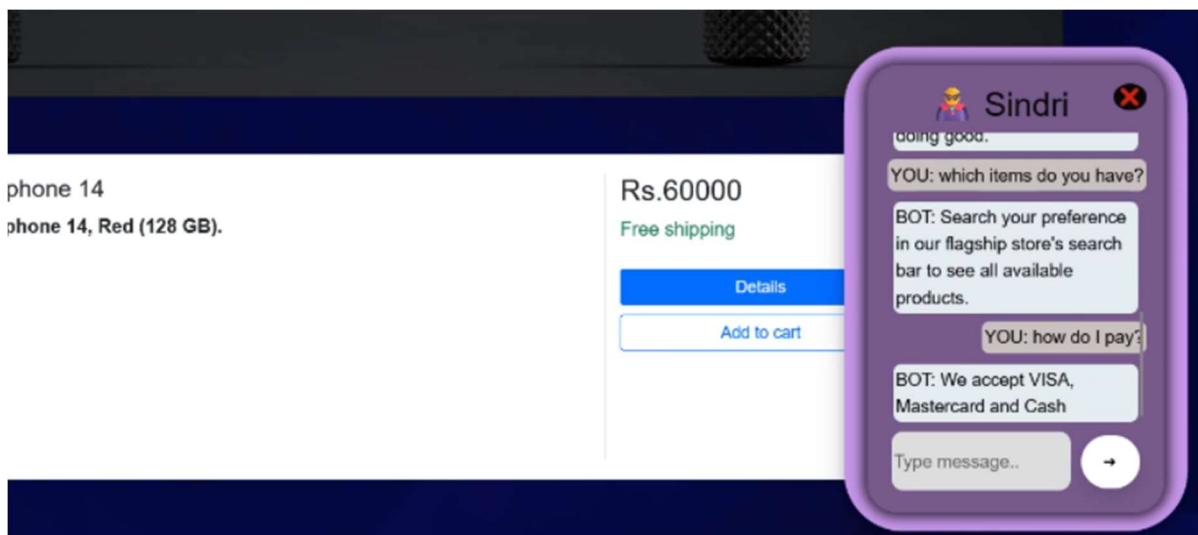


Fig B.4: Chatbot's Response

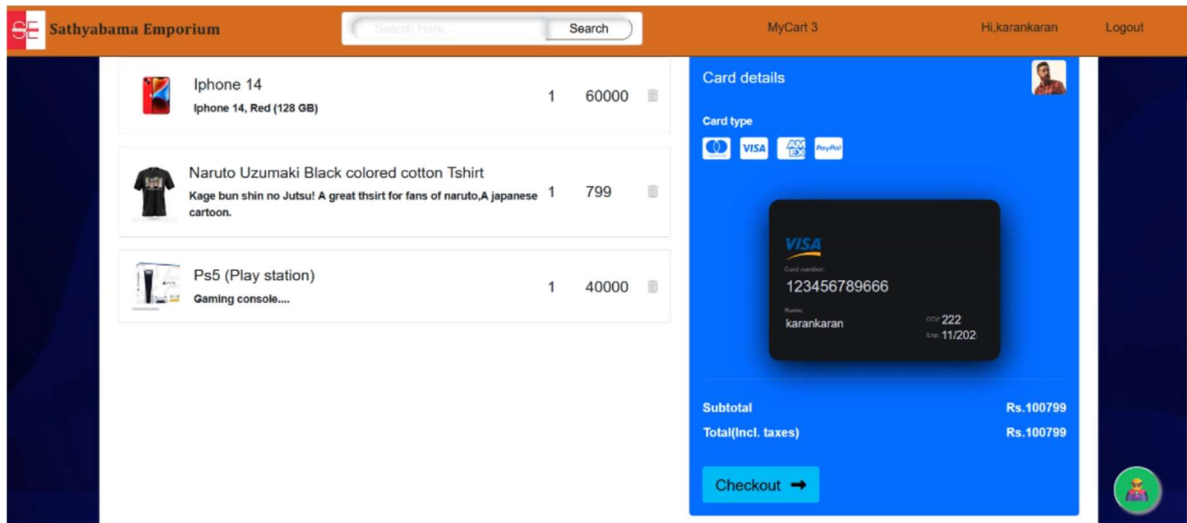


Fig B.5: Order and Checkout

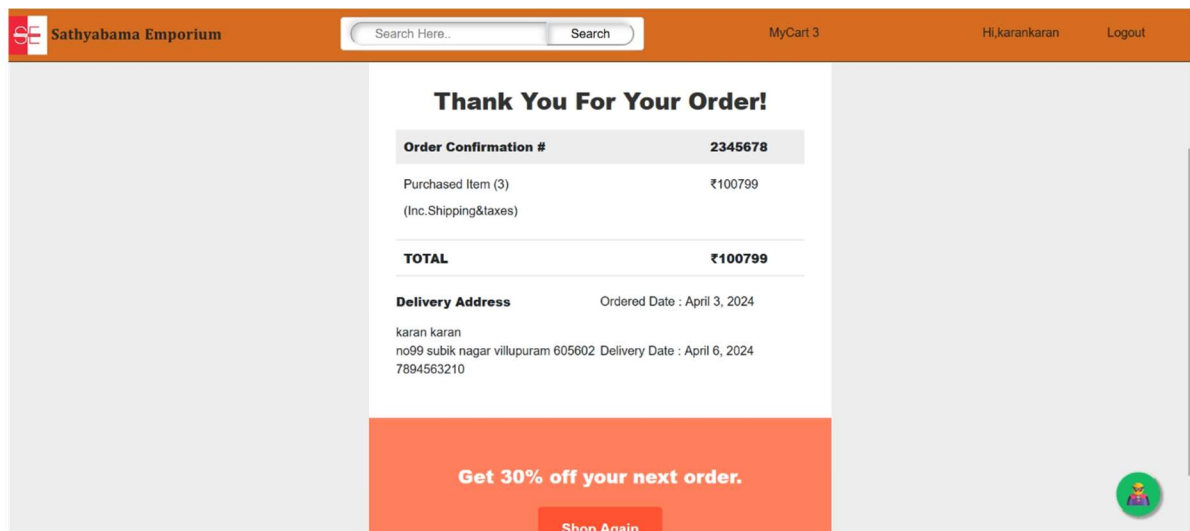


Fig B.6: Order confirmation

Integration Of Chatbot And Fraud Detection Within The E-commerce Platform

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Abstract: E-commerce platforms increasingly use chatbots to enhance customer service and streamline transactions. Chatbots can assist customers with product recommendations, order tracking, and frequently asked questions, improving the shopping experience. The user can choose to converse with the chatbot and ask standard queries to receive answers. The chatbot can utilize dynamic information from a user message to create meaningful conversations and recommend related content, but it also has preprogrammed responses. This project aims to create a comprehensive e-commerce solution that combines user convenience, real-time assistance, and enhanced security measures to deliver an efficient and trustworthy online shopping experience.

Keywords: *E-commerce platforms, preprogrammed responses, Real-time Assistance*

To combat this growing menace, the integration of cutting-edge technology has become imperative. One such innovation is the fusion of chatbot technology with fraud detection systems within the e-commerce environment. This harmony can potentially revolutionize e-commerce platforms' operation by enhancing the customer experience and fortifying the security infrastructure. This integration aims to create a seamless and secure online shopping experience by utilizing chatbots to engage with customers in real-time while employing advanced fraud detection algorithms to identify and prevent fraudulent activities. By merging these two powerful tools, businesses can enhance customer engagement and support and bolster their defence against the ever-evolving tactics employed by fraudsters. We will explore the benefits, challenges, and best practices of this innovative approach. We will also examine the potential impact on customer satisfaction, transaction security, and the overall success of e-commerce businesses in an era where trust and convenience are the cornerstones of online commerce.

I. INTRODUCTION

In the rapidly evolving landscape of e-commerce, where online transactions have become an integral part of our daily lives, ensuring the security and reliability of these transactions is paramount. As e-commerce platforms continue to thrive, they also face an escalating threat in the form of fraudulent activities. Fraudsters constantly seek new ways to exploit vulnerabilities within these platforms, posing significant challenges to businesses and customers.

II. LITERATURE SURVEY

[1] The article by Kaur, G., Sinha, R., Tiwari, P. K., Yadav, S. K., Pandey, P., Raj, R., ... & Rakhra, M. (2022) proposes a face mask recognition system using a convolutional neural network (CNN) model. This system aims to enhance the efficiency and accuracy of face mask detection in various e-commerce platforms. By

leveraging advanced deep learning techniques, the CNN model can accurately identify whether an individual is wearing a face mask. In addition, the article suggests integrating an openCV-based fraud image into a sketch tool, which can help identify and prevent fraudulent activities by converting images to sketches for easy detection and analysis.

[2] Villarroel Ordenes and Zhang (2019) In their article , they explored the integration of text and image mining methods for service research in E-commerce. They investigate how these methods can be applied to improve service management in the digital realm. The authors discuss the potential of using image analysis techniques, precisely fraud image to sketch using openCV, to detect and prevent fraudulent activities in E-commerce platforms. Their research highlights the importance of leveraging textual and visual information to enhance service processes and customer experiences in the digital marketplace.

[3] The study conducted by Nipun, M. S., Sulaiman, R. B., and Kareem, A. (2022) revolves around the efficiency comparison of AI classification algorithms for real-time image detection and recognition. Specifically focused on E-commerce applications, the research evaluates the performance of these algorithms when it comes to image detection and recognition tasks. The study's findings provide valuable insights that can enhance the functionality of chatbots in E-commerce settings. Additionally, the research explores the utilization of the OpenCV library for converting fraud images into sketches, highlighting its potential application in fraud detection and prevention for E-commerce platforms.

III. EXISTING SYSTEM

The current system for managing the health of cyber-physical systems (CPS) in e-commerce needs to be improved. CPS refers to interconnected systems of physical entities and computational devices, such as online platforms, payment gateways, and customer databases. The existing system often relies on manual intervention and traditional data analysis techniques, which results in inefficiencies and inaccuracies.

One major issue with the current system is its heavy reliance on manual intervention. Experts must manually collect data from various sources, such as transaction logs and user behavior patterns, and analyze it to identify potential fraudulent activities and security vulnerabilities in CPS. This process is time-consuming and prone to errors, as it heavily depends on human expertise and subjectivity.

IV. SELECTED METHODOLOGY

[1].Data Cleaning: This subheading covers the various techniques and methods used to clean and prepare the data for analysis, such as removing missing values, handling duplicates, and standardizing formats.

[2].Text Preprocessing: Focuses on cleaning and optimizing the textual data used in the chatbots , including activities like tokenization, stop word removal, stemming, and sentiment analysis.

[3].Feature Extraction: Covers the process of extracting relevant features and attributes from the processed data, both textual and visual.

[4].Data Integration and Normalization: This subheading deals with merging different datasets, ensuring data consistency, and normalizing the data to a standard format for seamless integration between the chatbots and the fraud detection component.

V. PROPOSED SYSTEM

The proposed system is an innovative solution for the e-commerce industry, integrating a chatbot and fraud detection system. We will create an e-commerce website with a browse-able product catalogue to illustrate the project's fundamental idea. The website is built with the chatbot's easy integration in mind. The chatbot seamlessly engages with the user to gather supplementary information or swiftly enact requisite measures, effectively warding off or minimizing the risks associated with potential fraudulent activities. After receiving this input, the chatbots compare it to the pre-programmed responses. It then gives information in the form of links to the appropriate items and information in its responses. This system aims to enhance the shopping experience for customers while effectively combating and preventing fraud.

The system's chatbot component will provide customers with personalized and real-time assistance throughout their online shopping journey. It can answer standard product and order-related queries, provide recommendations, and assist with purchasing. This will improve customer satisfaction and reduce the need for manual customer support.

The proposed Architecture is shown in figure 1.

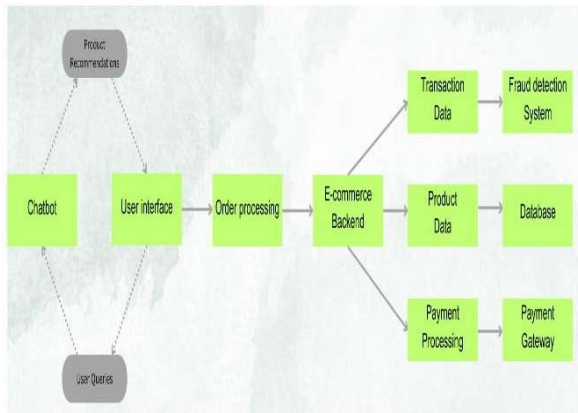


Figure 1

Modules

Module 1: E-commerce Platform Integration

The first module of this project involves setting up an e-commerce platform, where users can browse products, add items to their cart, and proceed with the purchase. Additionally, a chatbot is integrated into the platform to assist users with product recommendations, answering queries, and facilitating the shopping process. This module ensures a seamless and user-friendly online shopping experience.

Module 2: Fraud Detection System

In the second module, Enterprises employ a variety of techniques for e-commerce fraud avoidance, identification, and reaction to safeguard themselves and their clientele from diverse risks. IP tracking and geolocation are methods that use a device's IP (Internet protocol) address to determine its geographic position when connected to the Internet. These techniques are frequently used in the prevention and detection of e-commerce fraud because they assist companies in spotting odd or suspicious activity that could point to fraudulent transactions or unauthorized access.

Suspicious behaviors, such as several transactions from various places in a brief period of time or login attempts from unknown locations, which may suggest fraud or account takeover attempts, can be discovered by tracking IP addresses and geolocation data. IP monitoring and geolocation combined with fraud prevention and detection techniques strengthens security protocols for online retailers, lowers the possibility of fraudulent activity, and boosts consumer satisfaction. This aids companies in adhering to regional laws and provide a better customized user experience according to the client's location.

Flowchart

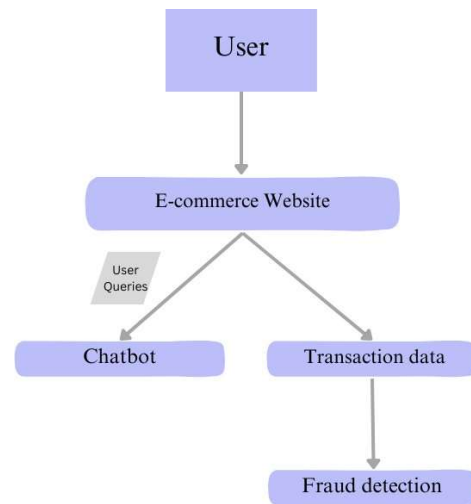


Figure 2

VI. DESCRIPTION OF SYSTEM FOR IMPLEMENTATION

Hardware specifications:

- [1] Microsoft Server enabled computers, preferably workstations
- [2] Higher RAM, of about 4GB or above
- [3] Processor of frequency 1.5GHz or above

Software specifications:

- [1] Python 3.6 and higher: Python is a widely used programming language that is often considered to have the best algorithm for helping to automate such processes. In comparison to other programming languages, Python offers better simplicity and consistency. In addition, the existence of an active Python community makes it simple for programmers to talk about ongoing projects and offer suggestions on improving their programs' functionality.

- [2] Anaconda software: Anaconda is an open-source package manager for Python and R. It is the most popular platform among data science professionals for running Python and R implementations. There are over 300 libraries in data science, so having a robust distribution system for them is a must for any professional in this field. Anaconda simplifies package deployment and management. On top of that, it has plenty of tools that can help you with data collection through artificial

intelligence and machine learning algorithms. You can easily set up, manage, and share Conda documents with Anaconda. Moreover, you can deploy any required project with a few clicks when using Anaconda.

VII. RESULTS AND DISCUSSION

In an attempt to improve customer interaction with the e-commerce website, we have built a chatbot based on the website. In addition to having a set of responses saved, the chatbot considers dynamic user input and as a result, often offers pertinent answers and product recommendations. Newer products under a certain category can be added or withdrawn with ease and don't require changing the stored chatbot responses because the product database is separate from the responses that have been stored. Our system can prevent e-commerce fraud by tracking IP addresses, confirming shipment addresses, and examining transaction patterns. This prevents harmful attacks and guarantees a secure experience for all users. Figure 3(a-d) provides a glimpse of the entire chatbot integration process in an e-commerce platform, as detailed in this study based on in-depth research.

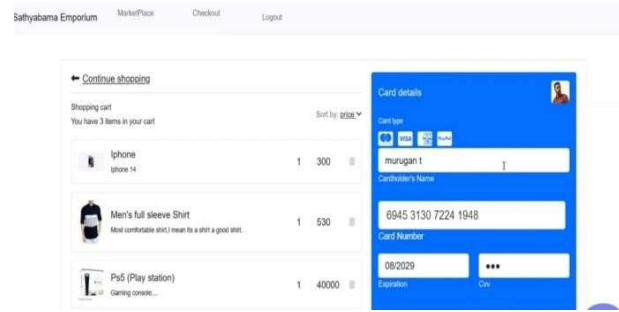


Figure 3(c)

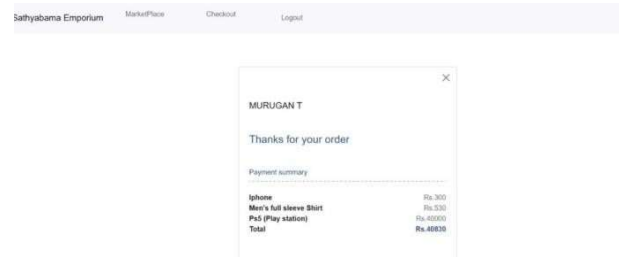


Figure 3(d)

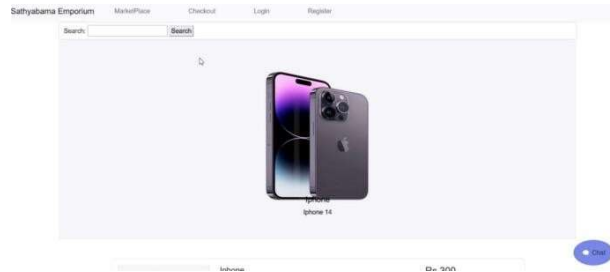


Figure 3(a)

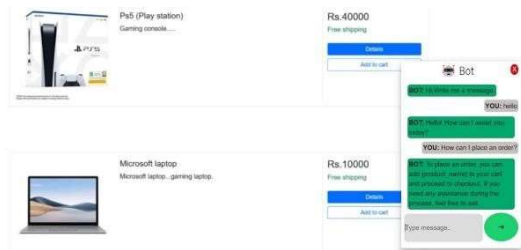


Figure 3(b)

VIII. CONCLUSION

In conclusion, integrating a chatbot and fraud detection system into the e-commerce industry holds great potential to improve customer satisfaction and prevent fraudulent activities. The chatbot, powered by natural language processing and machine learning algorithms, can provide instant customer support, answer their queries, assist in product selection, and facilitate transactions. It saves time and resources for both customers and businesses and enhances the overall user experience. Additionally, the chatbot can be programmed to detect and prevent potential fraud attempts, such as suspicious transactions or identity theft, by analyzing user behavior. This proactive approach can help mitigate financial losses and protect customers' sensitive information. Businesses must make investments in strong security measures, fraud detection software, and personnel training to counter these fraudulent activities, reduce the possibility of fraud, and safeguard both their clients and themselves. This can significantly reduce the risk of fraudulent transactions and enhance the credibility of e-commerce platforms.

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