

A
Mini-Project Report on

Admin Controlled Webstore Interface With Recommendation System

Submitted in partial fulfillment of the requirements
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IN
Computer Science & Engineering
Artificial Intelligence & Machine Learning

by

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CERTIFICATE

This is to certify that the project entitled “**Admin Controlled Webstore Interface With Recommendation System**” is a bonafide work of Kaiser Momin (21106009), Devesh Sali (21106016), Ratnakar Pisal (21106041), Yash Malvade (21106032) submitted to the University of Mumbai in partial fulfillment of the requirement for the award of **Bachelor of Engineering in Computer Science & Engineering (Artificial Intelligence & Machine Learning)**.

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Project Report Approval

This Mini project report entitled “**Admin Controlled Webstore Interface With Recommendation System**” by **Kaiser Momin, Devesh Sali, Ratnakar Pisal and Yash Malvade** is approved for the degree of *Bachelor of Engineering* in *Computer Science & Engineering, (AIML) 2022-23.*

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We declare that this written submission represents my ideas in my own words and where others' ideas or words have been included, I have adequately cited and referenced the original sources. I also declare that I have adhered to all principles of academic honesty and integrity and have not misrepresented or fabricated or falsified any idea/data/fact/source in my submission. I understand that any violation of the above will be cause for disciplinary action by the Institute and can also evoke penal action from the sources which have thus not been properly cited or from whom proper permission hasnot been taken when needed.

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ABSTRACT

The admin-controlled webstore interface with machine learning/deep learning integration is a project aimed at improving the shopping experience for customers and optimizing the operations of online stores. The project leverages machine learning and deep learning technologies to provide businesses with the tools to analyze customer data and offer personalized product recommendations based on their search history and preferences. This personalized approach increases customer engagement, loyalty, and revenue for businesses. Additionally, the webstore interface offers real-time analytics to track sales trends, monitor inventory, and manage online stores more efficiently, enabling businesses to make data-driven decisions. However, it is crucial to consider the potential ethical and privacy concerns associated with the use of machine learning and deep learning technologies. Therefore, appropriate measures should be taken to ensure that the technology is transparent, inclusive, and fair. Overall, the admin-controlled webstore interface with machine learning/deep learning integration is a promising solution for businesses to stay competitive and meet the evolving needs of customers in the e-commerce market.

Keywords: admin-controlled webstore, machine learning, deep learning, personalized product recommendations

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CHAPTER 1

INTRODUCTION

1. INTRODUCTION

An admin-controlled webstore interface with machine learning/deep learning integration is a platform that enables online businesses to provide personalized shopping experiences to their customers. Machine learning algorithms are used to analyze customer data and predict their preferences and interests based on their search history, browsing behavior, and purchasing patterns. This information is then used to suggest products that are more relevant to their interests, increasing the chances of making a sale.

The admin control allows the store owner to manage their inventory, set pricing, and customize the user interface. Additionally, the admin control also enables the store owner to access real-time analytics on the platform's performance and make data-driven decisions.

The machine learning/deep learning aspect of the webstore interface uses natural language processing (NLP) and image recognition technology to understand the customer's search queries and provide personalized product recommendations. This technology can also help categorize products, identify trends, and optimize the search and browsing experience.

Overall, an admin-controlled webstore interface with machine learning/deep learning integration provides businesses with a powerful tool to increase customer engagement, improve sales, and enhance the user experience.

CHAPTER2

LITERATURE SURVEY

2.1 A Brief History:

Machine learning (ML) is an important tool for the goal of leveraging technologies around artificial intelligence. Because of its learning and decision-making abilities, machine learning is often referred to as AI, though it is a subdivision of AI. Until the late 1970s, it was a part of AI's evolution. Then, it branched off to evolve on its own. Machine learning has become a very important response tool for cloud computing and eCommerce, and is being used in a variety of cutting-edge technologies.

Machine learning is a necessary aspect of modern business and research for many organizations today. It uses algorithms and neural network models to assist computer systems in progressively improving their performance. Machine learning algorithms automatically build a mathematical model using sample data – also known as “training data” – to make decisions without being specifically programmed to make those decisions.

Machine learning is, in part, based on a model of brain cell interaction. The model was created in 1949 by Donald Hebb in a book titled *The Organization of Behavior* (PDF). The book presents Hebb's theories on neuron excitement and communication between neurons.

Hebb wrote, “When one cell repeatedly assists in firing another, the axon of the first cell develops synaptic knobs (or enlarges them if they already exist) in contact with the soma of the second cell.” Translating Hebb's concepts to artificial neural networks and artificial neurons, his model can be described as a way of altering the relationships between artificial neurons (also referred to as nodes) and the changes to individual neurons. The relationship between two neurons/nodes strengthens if the two neurons/nodes are activated at the same time and weakens if they are activated separately. The word “weight” is used to describe these relationships, and nodes/neurons tending to be both positive or both negative are described as having strong positive weights. Those nodes tending to have opposite weights develop strong negative weights (e.g. $1 \times 1 = 1$, $-1 \times -1 = 1$, $-1 \times 1 = -1$).

2.1.1 Machine Learning the Game of Checkers

Arthur Samuel of IBM developed a computer program for playing checkers in the 1950s. Since the program had a very small amount of computer memory available, Samuel initiated what is called alpha-beta pruning. His design included a scoring function using the positions of the pieces on the board. The scoring function attempted to measure the chances of each side winning. The program chooses its next move using a minimax strategy, which eventually evolved into the minimax algorithm.

Samuel also designed a number of mechanisms allowing his program to become better. In what Samuel called rote learning, his program recorded/remembered all positions it had already seen and combined this with the values of the reward function. Arthur Samuel first came up with the phrase “machine learning” in 1952.

2.1.2 The Perceptron

In 1957, Frank Rosenblatt – at the Cornell Aeronautical Laboratory – combined Donald Hebb’s model of brain cell interaction with Arthur Samuel’s machine learning efforts and created the perceptron. The perceptron was initially planned as a machine, not a program. The software, originally designed for the IBM 704, was installed in a custom-built machine called the Mark 1 perceptron, which had been constructed for image recognition. This made the software and the algorithms transferable and available for other machines.

Described as the first successful neuro-computer, the Mark I perceptron developed some problems with broken expectations. Although the perceptron seemed promising, it could not recognize many kinds of visual patterns (such as faces), causing frustration and stalling neural network research. It would be several years before the frustrations of investors and funding agencies faded. Neural network/machine learning research struggled until a resurgence during the 1990s.

2.1.3 The Nearest Neighbor Algorithm

In 1967, the nearest neighbor algorithm was conceived, which was the beginning of basic pattern recognition. This algorithm was used for mapping routes and was one of the earliest algorithms used in finding a solution to the traveling salesperson’s problem of finding the most efficient route. Using it, a salesperson enters a selected city and repeatedly has the program visit the nearest cities until all have been visited. Marcello Pelillo has been given credit for inventing the “nearest neighbor rule.” He, in turn, credits the famous Cover and Hart paper of 1967 (PDF).

2.2 Speech and Facial Recognition:

2.2.1 Speech Recognition

Currently, much of speech recognition training is being done by a Deep Learning technique called long short-term memory (LSTM), a neural network model described by Jürgen Schmidhuber and Sepp Hochreiter in 1997. LSTM can learn tasks that require memory of events that took place thousands of discrete steps earlier, which is quite important for speech.

Around the year 2007, long short-term memory started outperforming more traditional speech recognition programs. In 2015, the Google speech recognition program reportedly had a significant performance jump of 49 percent using a CTC-trained LSTM.

2.2.2 Facial Recognition Becomes a Reality

In 2006, the *Face Recognition Grand Challenge* – a National Institute of Standards and Technology program – evaluated the popular face recognition algorithms of the time. 3D face scans, iris images, and high-resolution face images were tested. Their findings suggested the new algorithms were ten times more accurate than the facial recognition algorithms from 2002 and 100 times more accurate than those from 1995. Some of the algorithms were able to outperform human participants in recognizing faces and could uniquely identify identical twins.

In 2012, Google's X Lab developed an ML algorithm that can autonomously browse and find videos containing cats. In 2014, Facebook developed DeepFace, an algorithm capable of recognizing or verifying individuals in photographs with the same accuracy as humans.

CHAPTER 3

Problem Statement

2.Problem Statement

Despite the increasing popularity of e-commerce, businesses face challenges in providing a personalized shopping experience to their customers. Customers often struggle to find products that are relevant to their needs, resulting in low engagement, reduced customer loyalty, and lower revenue for businesses. Additionally, businesses struggle to manage their online store effectively, lacking the necessary tools to categorize products, identify trends, and optimize the search and browsing experience. Therefore, the need exists to develop an admin-controlled webstore interface with machine learning/deep learning integration that provides businesses with the tools to analyze customer data and provide personalized product suggestions. This technology would also allow businesses to manage their online store more efficiently, providing them with real-time analytics to optimize their operations and make data-driven decisions.

CHAPTER 4

Experimental Setup

2. Experimental Setup

4.1 Hardware Setup

Specifications of the Current machine:

CPU: Ryzen 5 5600H

GPU: Nvidia GTX 1650

RAM: 16GB

ROM: 512 GB M.2 SSD

Note: The above requirements are not necessary to run the entirety of the program. The program will run on any machine on which dependencies given in the software setup are installed.

4.2 Software Setup

Dependencies and Libraries:

1. Django:

Django is a free and open-source web framework written in Python. It follows the model-view-controller (MVC) architectural pattern and is designed to help developers build complex, database-driven web applications quickly and easily.

Django provides a lot of built-in tools and features for handling common web development tasks, such as URL routing, database schema migration, template rendering, authentication, and security. It also has a large and active community of developers who contribute to the framework and create reusable third-party packages that extend its functionality.

Some popular websites built using Django include Instagram, Mozilla, Pinterest, and Disqus.

2. NumPy:

NumPy is a **Python library used for working with arrays**. It also has functions for working in domain of linear algebra, Fourier transform, and matrices. NumPy was created in 2005 by Travis Oliphant. It is an open-source project and you can use it freely. NumPy stands for Numerical Python.

3. Pandas:

Pandas is an open source Python package that is most widely used for data science/data analysis and machine learning tasks. It is built on top of another package named Numpy, which provides support for multi-dimensional arrays.

4. SciPy:

SciPy is a scientific computation library that uses NumPy underneath. SciPy stands for

Scientific Python. It provides more utility functions for optimization, stats and signal processing. Like NumPy, SciPy is open source so we can use it freely.

5. django-bootstrap3:

Bootstrap is the most popular HTML, CSS, and JS framework for developing responsive, mobile first projects on the web.

6. certifi==2022.12.7:

Certifi provides Mozilla's carefully curated collection of Root Certificates for validating the trustworthiness of SSL certificates while verifying the identity of TLS hosts.

7. django-markdown:

This is a simple app, which supplies a single template tag for markdown markup.

8. Pillow==9.5.0

Pillows serve to keep the upper body in alignment during sleep, relieving pressure and counterbalancing the points in the body. The pillow should adjust to fit one's unique shape, curves, and sleeping position and alleviate any pressure points.

9. Matplotlib:

Matplotlib is a comprehensive library for creating static, animated, and interactive visualizations in Python. Matplotlib makes easy things easy and hard things possible. Create publication quality plots. Make interactive figures that can zoom, pan, update.

10. Pymysql:

The key reason for using PyMySQL is that it serves as a handy interface to interact directly with MySQL databases by incorporating SQL statements within the confines of Python scripts.

11. Mysqlclient:

MySQL client is a common name for tools that are designed to connect to MySQL Server. Client programs are used to send commands or queries to the server and allow managing data in the databases stored on the server.

12. scikit_learn:

Scikit-learn (Sklearn) is the most useful and robust library for machine learning in Python. It provides a selection of efficient tools for machine learning and statistical modeling including classification, regression, clustering and dimensionality reduction via a consistence interface in Python.

HTML:

HTML (Hypertext Markup Language) is the standard markup language used for creating web pages and web applications. It is the primary building block for creating websites, and it is used to structure and format content for display on the internet.

HTML is a markup language, which means that it uses a series of tags to define the structure and content of a web page. These tags, such as `

`, `

`, ``, and ``, are enclosed in angle brackets and are used to define elements like paragraphs, headings, links, and images.

In addition to defining the content of a web page, HTML also allows web developers to add metadata, such as the title of the page, keywords, and descriptions, which can help with search engine optimization (SEO).

HTML works together with other web technologies like CSS (Cascading Style Sheets) and JavaScript to create interactive and visually appealing web pages and applications.

Python:

development, data analysis, artificial intelligence, scientific computing, and many other applications. It was first released in 1991 by Guido van Rossum and has since become one of the most popular programming languages in the world.

Python is known for its simplicity, readability, and ease of use. It uses an elegant syntax that emphasizes readability and reduces the cost of program maintenance. Python also has a large standard library that provides support for many common programming tasks, such as working with files, networking, and data manipulation.

Python is an interpreted language, which means that code can be executed directly without the need for a separate compilation step. This makes it easy to write and test code quickly, without the need for complex setup or compilation processes.

Python has a vast and active community of developers who contribute to the language and create libraries and frameworks that extend its functionality. Some popular libraries and frameworks for Python include NumPy, pandas, Django, Flask, and TensorFlow.

NodeJS:

Node.js is an open-source and cross-platform runtime environment for executing JavaScript code outside a browser. You need to remember that NodeJS is not a framework and it's not a programming language. Most people are confused and understand it's a framework or a programming language. We often use Node.js for building back-end services like APIs like Web App or Mobile App. It's used in production by large companies such as Paypal, Uber, Netflix, Walmart, and so on.

CHAPTER 5

Proposed System & Implementation

5.1 Block diagram of proposed system:

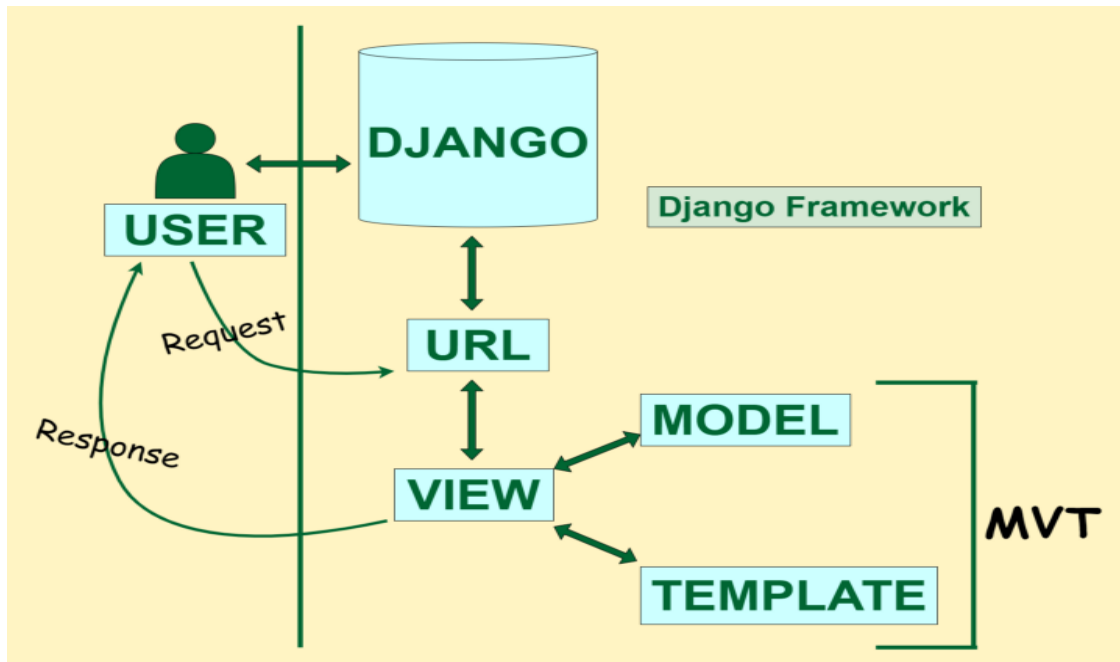
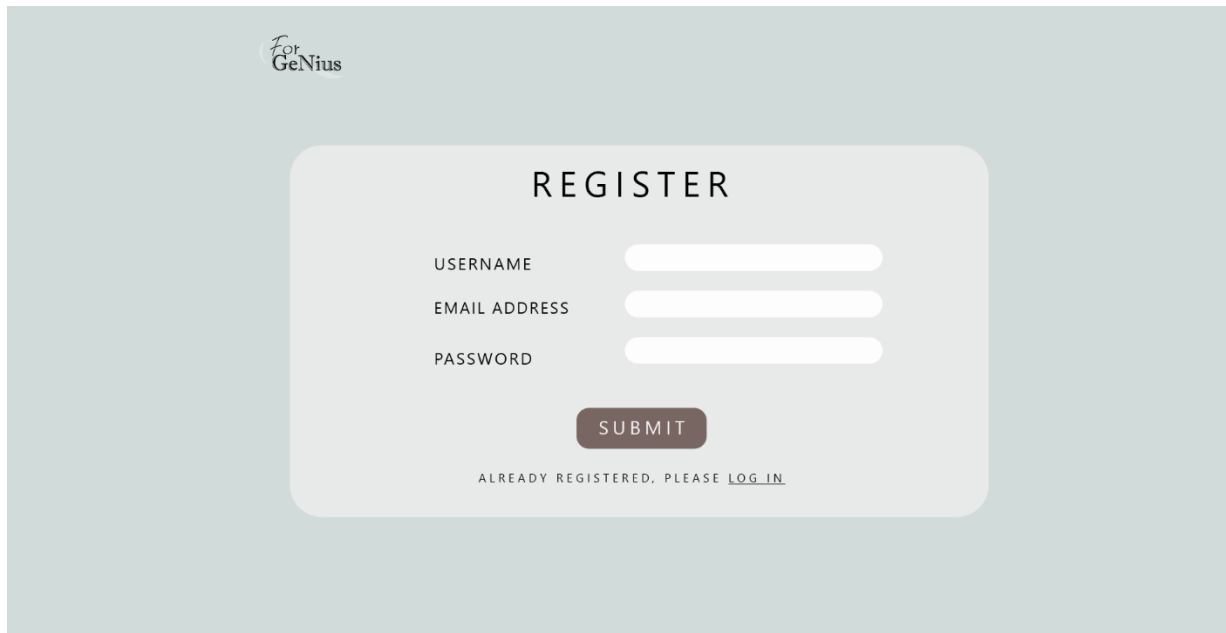


Figure : 5.1.1 Architecture



Figure : 5.1.2 Tech Stack

5.2 Implementation



The screenshot shows the 'ForGeNius' logo in the top left corner. The main heading is 'REGISTER' in a large, bold, sans-serif font. Below the heading are three input fields labeled 'USERNAME', 'EMAIL ADDRESS', and 'PASSWORD'. Each field is a simple white rectangle with a light gray border. Below the input fields is a dark gray 'SUBMIT' button. At the bottom of the form, there is a link that says 'ALREADY REGISTERED, PLEASE [LOG IN](#)'.

Figure : 5.2.1 Register Page

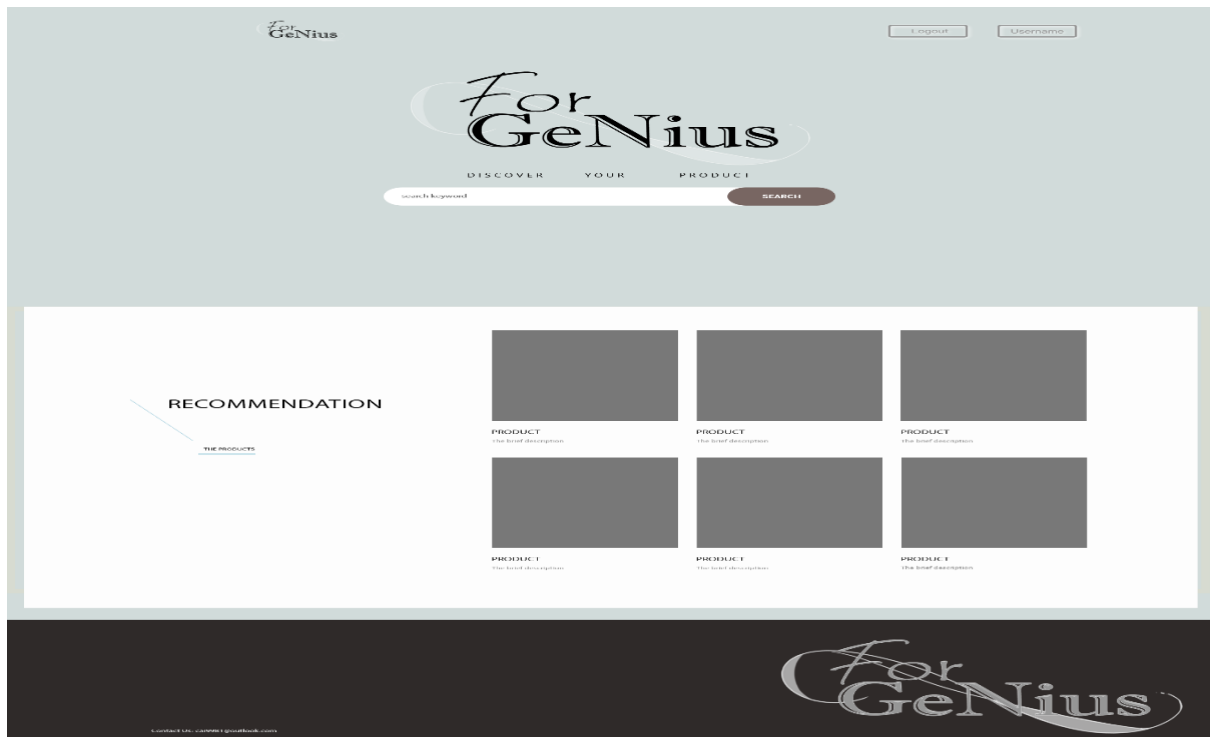


Figure : 5.2.2: Home page With recommendations (Customer Logged In)

5.3 Advantages:

There are several advantages of having a recommendation system on an ecommerce website, including:

1. **Increased sales:** By providing personalized recommendations, customers are more likely to find products they are interested in and make purchases, resulting in increased revenue for the website.
2. **Improved customer experience:** Personalized recommendations can make the shopping experience more enjoyable and convenient for customers, as they are able to find products that fit their interests and needs more easily.
3. **Increased customer retention:** By providing personalized recommendations and improving the overall shopping experience, customers are more likely to return to the website for future purchases.
4. **Increased customer engagement:** Personalized recommendations can increase customer engagement and time spent on the website, leading to higher customer loyalty.
5. **Improved inventory management:** By analyzing customer behavior and preferences, a recommendation system can help ecommerce websites better manage their inventory and stock the most likely sell products.

CHAPTER 6

Conclusion

6.Conclusion

The admin-controlled webstore interface with machine learning/deep learning integration project aims to provide businesses with the tools to improve the shopping experience for their customers and optimize their operations. By leveraging machine learning and deep learning technologies, the webstore interface can analyze customer data and provide personalized product recommendations based on their search history and preferences. This personalized approach enhances customer engagement, improves customer loyalty, and increases revenue for businesses.

In addition to providing a personalized shopping experience, the webstore interface also offers businesses the tools to optimize their online store's operations. The real-time analytics allow businesses to track sales trends, monitor inventory, and manage their online store more efficiently. This technology enables businesses to make data-driven decisions, increasing their competitiveness in the e-commerce market.

However, it is essential to consider the potential ethical and privacy concerns associated with the use of machine learning and deep learning technologies. The webstore interface should be transparent in its data collection and usage, ensuring that customer data is kept confidential and secure. Appropriate measures should also be taken to address potential biases in the recommendation system and ensure that the technology is inclusive and fair.

Overall, the admin-controlled webstore interface with machine learning/deep learning integration is a promising solution for businesses to enhance the shopping experience for their customers and optimize their operations. By adopting this technology, businesses can stay competitive and meet the evolving needs of customers in the e-commerce market.

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