**AI Customer Purchase Trends**

Delali K. Nsiah-Asare

Ashesi University

delali.nsiah[@ashesi.edu.gh](mailto:delali.nsiah@ashesi.edu.gh)

Justice K. Quagraine

Ashesi University [justice.quagraine@ashesi.edu](mailto:justice.quagraine@ashesi.edu.gh)

**1** **INTRODUCTION AND MOTIVATION**

AI is growing rapidly in recent times and it has helped industries to make many breakthroughs [1]. For businesses, understanding customer behaviour and predicting their shopping trends have become crucial for businesses to optimise inventory management, personalise marketing strategies, and enhance overall customer experience to maximise profit. Even though retail has a large amount of data, technological advancement is required to make sense of the data and this is where the proposed project comes in [2]. In this context, the proposed project aims to develop an AI-driven predictive model to forecast items customers are likely to purchase given the purchases by customers during shopping activities. The primary motivation is to empower stakeholders with insights derived from predictive analytics, aiding in informed sales strategies and improved customer engagement. This project will help business managers to adjust strategies in order to increase their sales (number of items customers will purchase)

**2** **PROBLEM STATEMENT**

The lack of predictive analytics in retail settings often leads to suboptimal inventory management, ineffective marketing strategies, and missed opportunities for personalized customer experiences. There is a need for a robust predictive model that can accurately forecast the items likely to be purchased by customers based on their shopping behaviour.

**3 OBJECTIVES OF THE PROJECT**

**Specific.** Develop a machine learning model using historical shopping data to predict items a customer is most likely to purchase in certain circumstances.

**Measurable.** Achieve a prediction accuracy of at least 65% after training and testing.

**Achievable.** Employ various feature engineering techniques and model optimization to enhance prediction performance.

**Relevant.** Utilise state-of-the-art algorithms and methodologies in machine learning to extract meaningful patterns from the data and ensure efficient algorithms are used and maintainability of the code.

**Time-Bound.** Complete model development, validation and deployment with streamlit within a 6-week timeline.

**4** **PROJECT SCOPE**

**Functionality and Features:**

**Graphical User Interface (GUI).** Develop a user-friendly interface that is pleasing and easy to use.

**Customer prediction.** Companies will be able to determine their customer purchases in many scenarios example, season changes and

**Technical specifications:**

**Data.** Collecting data from credible websites for training.

**Machine Learning.** Use deep learning and machine learning techniques to predict customer purchase decisions.

**Stakeholders:** Businesses who seek to take control over how much their customers will purchase from their shops by knowing their customers' needs in certain scenarios.

**Limitations:** Data access of customers is limited due to customer privacy issues.

**5** **TECHNICAL REQUIREMENTS**

The project requires the use of a dataset which will be used to train and test the performance of a model. The dataset should contain information about customers and how their behavior given different scenarios. From obtaining the dataset we will need to clean the data using simple imputer and also encode categorical columns to make the dataset numeric.

The project also makes use of existing machine learning algorithms and methods like ANNs in creating a model for prediction and optimizers like Adam optimizer to improve the performance of the model to its best with the given dataset. The model will also be evaluated to check its performance: mean absolute error will be used in evaluating the performance of the model. To ensure better performance of the model we will use cross validation techniques to avoid overfitting the model. Also grid search will be used to tune the hyperparameters of the model.

**REFERENCES**

[1] V. Scott, “How Artificial Intelligence is Transforming Every Industry,” *Supply Chain*

*Connect*,May25,2023. <https://www.supplychainconnect.com/supply-chain-technology/article/21266348/how-artificial-intelligence-is-transforming-every-industry>

[2] B. Morgan, “10 Examples Of Predictive Customer Experience Outcomes Powered By

AI,”*Forbes*.

<https://www.forbes.com/sites/blakemorgan/2018/12/20/10-examples-of-predictive-customer-experience-outcomes-powered-by-ai/?sh=7a141bf5d0b4>

‌