Comparative Analysis of Machine Learning Prediction Models Used by YouChat and ChatGPT for Conversational AI

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INTRODUCTION

ChatGPT has had a transformative impact on the field of artificial intelligence due to its ability to understand natural language and generate responses that are almost indistinguishable from human-generated ones. Although ChatGPT is an impressive AI tool, there are other similar tools in the market that can also "chat" with humans. In this project, we will compare ChatGPT with YouChat by using e-commerce shipping prediction as an example. We will evaluate their features, strengths, and limitations, as well as explore their potential applications.

OBJECTIVES

The objective of this project is to conduct a comparative analysis of two chatbot tools, ChatGPT and YouChat. We will analyze their differences, features, and capabilities, and evaluate their suitability for data science projects. We will use standard benchmarks and develop criteria to measure the accuracy and efficiency of each model, and compare the results of two chatbot tools. Based on our analysis, we will make recommendations on the preferred chatbot tool for different user cases.

QUESTIONS TO ANSWER

- How do ChatGPT and YouChat differ in terms of their underlying architecture and design?
- What are the strengths and limitations of using ChatGPT versus YouChat for building chatbots for predictive modeling?
- How do the user experiences of interacting with two tools compare in terms of ease of use, speed of response and other criteria?
- How do the results of our predictive modeling compare with those generated by ChatGPT and YouChat? What are the differences and similarities between the two approaches?

KEY ASSUMPTIONS

- Both YouChat and ChatGPT operate similarly to other internet search engines such as Google, allowing users to perform straightforward web searches in a conversational style. However, both chatbots are cautious with their responses, ensuring accuracy and reliability.
- Both YouChat and ChatGPT are given the same script to ask for solve a predictive machine learning projects.
- The E-Commerce shipment datasets used to train the machine learning models are same in size, variables, quality, and relevance.
- The variables in the dataset includes ID, warehouse block, prior purchase, cost of the products, weight, discount, gender, customer rating etc.
- The performance metrics used to compare the two chatbots are valid and appropriate for the specific prediction tasks being analyzed.

METHODOLOGY

Problem Definition: The aim of the project is to determine whether an e-commerce product can be delivered on time.
Data Collection: Product Shipment Tracking data is fetched from Kaggle.com.
Project Planning: Come up with steps to build an end-to-end generic portfolio project starting from data preparation and preprocessing to model selecting and evaluating.
Script Design: Develop and fine-tune the prompt until both ChatGPT and YouChat can thoroughly understand and respond comprehensively.
Criteria Development: Create a set of criteria that will be utilized for comparisons including accuracy, speed, customizability, ease to use etc.
Testing and comparison: Test the finished scripts step by step and compare their performance using developed criteria.
Conclusion and Recommendation: Summarize the project and model comparison and then develop insights to make recommendations.

PROS & CONS

ChatGPT

Pre-trained language model by machine learning and deep learning

- 👍 Refuse to answer if uncertainty;
- 👍 Recall previous conversation;
- 👍 Optimized answers per response;
- 👎 Rely on the data only available;
- 👎 Long Time Processing;

VS

YouChat

Open-source chatbot owned by a search engine

- 👍 Faster response;
- 👍 Always provide answers and guidance;
- 👎 Offer guidance to damaging questions as well;
- 👎 Answer short and forget previous chats;

GENERAL COMPARISON

General Criteria	ChatGPT	YouChat
Design	5 ★★★★★	5 ★★★★★
Ease to Use	5 ★★★★★	5 ★★★★★
Customizability	4 ★★★★☆	3 ★★★☆☆
Speed	4 ★★★★☆	5 ★★★★★
Availability of Resouces	4 ★★★★☆	5 ★★★★★
Accuracy of Responses	5 ★★★★★	4 ★★★★☆

COMPARISON RESULT

Steps	ChatGPT	YouChat	Our Work
I. Data Imported	• Able to read data • Detailed coding steps	• Unable to read data • Provided sample code for downloading • Failed the task	• Able to read data
II. End-to-End steps	• Listed steps • Detailed code • Aimed accuracy result	• Listed steps • Missed steps: Feature engineering and Hyperparameter tuning	• Structured the steps • Customized the models upon the data
III. EDA, Feature Engineering, Data Preparation	• Detailed code with observations • Column name is wrong used	• Detailed code without observations • Column name is wrong used	• Detailed code • Column name correctly • Check if outliers remove required in different pipelines
IV. Model Selection and Results	• Error occurred; • Extra step in the code: model is evaluated by using cross validation	• Sample code with simple explanation • No evaluation result	• Keep testing until the model succeed
Final result	• Test Accuracy: 0.83 • Precision: 0.82 • Recall: 0.75 • F1 Score: 0.78 Higher score but overfitting issue occurred as training score is much higher.	• No result, just code suggestion	• Accuracy: 0.72 • Precision: 0.74 • Recall: 0.72 • F1 Score: 0.72 Lower score but no overfitting issues

CONCLUSION

- While YouChat's combination of search and generative AI engine is unique, ChatGPT's versatility and advanced features make it the preferred choice for users seeking a more personalized and intelligent conversational experience.
- Although YouChat responds faster and offers broad guidance, it may fail to complete tasks, miss coding steps, and provide no additional information such as observations and explanation.
- In contrast, ChatGPT can fine-tune its model for specific tasks, provide detailed coding steps, and offer extra observations and steps to improve accuracy. However, the final result may be subject to overfitting, and errors can occur due to instability.
- To achieve a higher quality of response, ChatGPT can be optimized by clearly defining its role, targeting specific audiences, and formatting outputs in markdown language.
- Overall, compared to YouChat, ChatGPT is more powerful and efficient in terms of ease of use, speed of response, and accuracy of result.

REFERENCES

[1]"E-Commerce Shipping EDA - Prediction," kaggle.com. https://www.kaggle.com/code/ahmetcalis/e-commerce-shipping-eda-prediction (accessed Apr. 14, 2023).
[2]S. Conroy, "ChatGPT vs YouChat," WePC | Let's build your dream gaming PC, Mar. 01, 2023. https://www.wepc.com/tips/chat-gpt-vs-youchat/ (accessed Apr. 14, 2023).
[3]P. Cheguri, "ChatGPT vs YouChat: Which AI Online Search Engine Will Win?," Analytics Insight, Dec. 26, 2022. https://www.analyticsinsight.net/chatgpt-vs-youchat-which-ai-online-search-engine-will-win/ (accessed Apr. 14, 2023).