Restaurant Management

RS Term Project (Spring 2023)

Group Members

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Introduction & Method

Aim of the project

In today's fast-paced society, finding the perfect dining spot can be a daunting task amidst the vast sea of options available. Fortunately, technology comes to our rescue with innovative solutions like content-based filtering. Our project aims to design and develop a restaurant recommendation system that leverages the power of content-based filtering techniques to provide personalized and accurate suggestions to users. By analyzing the unique preferences, tastes, and characteristics of both restaurants and users, our system promises to deliver tailored top ten restaurant recommendations, ensuring an enhanced dining experience for every individual. So, join us as we dive into the realm of content-based filtering and explore the endless possibilities it offers in revolutionizing the way we discover and enjoy culinary delights.

Methodology

The content-based restaurant recommendation system, utilizing the Zomato dataset, follows a comprehensive methodology to provide personalized suggestions. Initially, unnecessary columns are identified and removed, streamlining the dataset for efficient analysis. Duplicates are then eliminated to ensure data integrity and accuracy. The subsequent step involves removing NaN values, minimizing any potential bias or distortion in the recommendations. To enhance readability and clarity, column names are modified, facilitating better comprehension of the dataset's attributes. Next, data transformations are performed to prepare the dataset for analysis. Text preprocessing steps are implemented, such as lowercasing, punctuation removal, stopword elimination, and URL removal. These actions help extract meaningful information from the textual data, eliminating noise and enhancing the quality of the recommendations. Additionally, spelling correction techniques are applied to improve the accuracy of the textual content. Furthermore, to provide a user-friendly interface for the content-based restaurant recommendation system, the deployment of a graphical user interface (GUI) was implemented using Streamlit. Through the Streamlit-powered user interface, users can access the full functionality of the content-based restaurant recommendation system effortlessly. Finally, a crucial aspect of the content-based restaurant recommendation system is the development of a function that generates recommendations. By utilizing various features, such as cuisine type, location, user preferences, and restaurant characteristics, the function identifies restaurants that align closely with the user's preferences. This approach ensures that the recommendations are tailored to each user's specific tastes and requirements, enhancing the overall dining experience. In summary, this content-based restaurant recommendation system, employing the Zomato dataset, employs a systematic approach encompassing data cleaning, text preprocessing, and personalized recommendation generation. By leveraging these methodologies, the system assists users in discovering restaurants that best match their individual preferences, revolutionizing the way they explore and enjoy culinary delights.

Tools, Technologies & Programming Concepts Used

Tools Used

1. PyCharm and Jupyter Notebook
2. Content Based Filtering
3. Numpy
4. Seaborn
5. Pandas
6. Machine Learning
7. Scikit Learn
8. NLTK
9. Streamlit

Applications

The content-based restaurant recommendation system using the Zomato dataset has a wide range of real-world applications. Firstly, it enables individuals to enjoy a personalized dining experience by providing restaurant suggestions tailored to their preferences, dietary restrictions, and location. Secondly, tourists can utilize the system to explore the local culinary scene when visiting new cities or countries. It helps them discover authentic local cuisine and find restaurants that meet their specific needs. Moreover, the food and hospitality industry can incorporate the system into their platforms to enhance customer satisfaction and engagement by offering personalized recommendations. Event planners can benefit from the system when selecting suitable restaurants for corporate events or special occasions, ensuring they align with attendees' preferences. Additionally, online review platforms can leverage the system to provide personalized suggestions to their users, enhancing user engagement and satisfaction. Lastly, food bloggers and influencers can use the system to discover new restaurants to feature and review, enabling them to showcase a diverse range of culinary experiences. Overall, the content-based restaurant recommendation system serves as a valuable tool across various domains, enriching user experiences, promoting exploration, and facilitating informed decision-making.

Timeline

Stage 1 Base structure including collecitng the data, researching about the project and considering the feasibility to use our preferred recommendation system technique.

Stage 2 Implementing the RS with our data, shortening the data to see if that improves our time to test out bugs etc. Also includes cleaning the data.

Stage 3 testing the system for corretc outputs and with different input data and also the performance with the full data file that included over 54k records.

Stage 4 Implementing the system with streamlit so that the project has a prettier face and an easier to read interface, testing out final bugs also included in this stage.

Conclusion

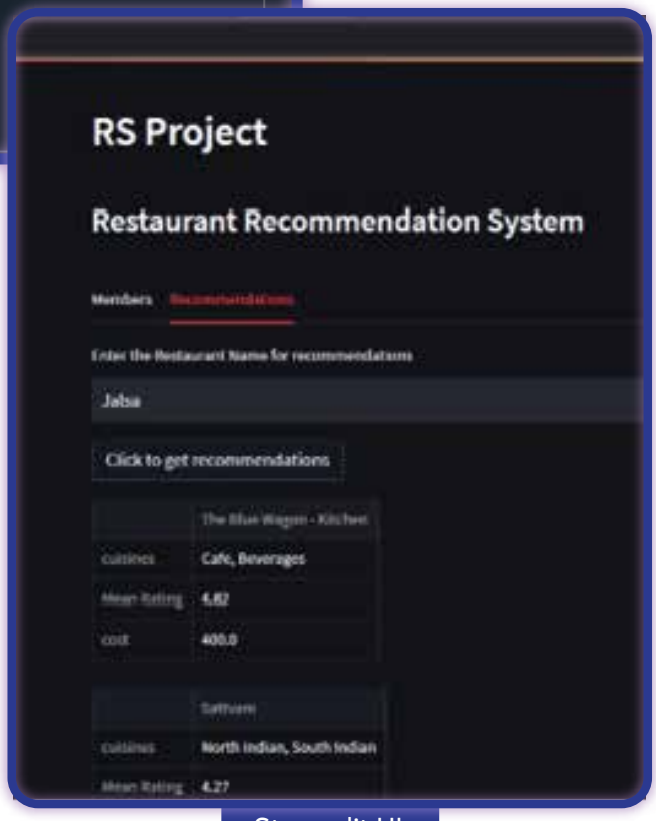
In conclusion, the development of the content-based restaurant recommendation system using the Zomato dataset has showcased its potential to revolutionize the way individuals discover and enjoy dining experiences. Through a systematic approach encompassing data cleaning, text preprocessing, and personalized recommendation generation, the system offers tailored suggestions based on user preferences, dietary restrictions, and location. By leveraging the power of content filtering techniques, the system enhances user experiences, providing personalized and accurate recommendations that align with individual tastes and requirements. The real-world applications of this project are vast, benefiting not only individuals seeking personalized dining experiences but also the food and hospitality industry, tourists, event planners, online review platforms, and food bloggers/influencers. By integrating the system into various platforms and interfaces, businesses can enhance customer satisfaction, engagement, and revenue generation, while users can explore new culinary delights and make informed dining choices. Moreover, the deployment of a user-friendly interface using Streamlit has improved the accessibility and usability of the recommendation system, allowing users to interact seamlessly and effortlessly with the system's functionalities. The graphical user interface empowers users to input their preferences, view restaurant details, and access personalized recommendations in an intuitive and visually appealing manner. As the demand for personalized experiences continues to grow, the content-based restaurant recommendation system represents a valuable solution that leverages data-driven insights to transform the way individuals discover, select, and enjoy restaurants. By combining the power of data analysis, text preprocessing, and user-centric design, this project lays the foundation for a future where dining experiences are enriched, personalized, and tailored to individual preferences, making every meal an unforgettable adventure.

Results

Some screenshots are attached of the program running as intended.

```python
def display_recommendations(df):
    if df.empty:
        st.write("No recommendations found.")
    else:
        for i in range(0, min(9, len(df))):
            st.write(df.iloc[i])
        st.write("Thank you for taking recommendations!")

    return 1

st.header("RS Project")
st.subheader("Restaurant Recommendation System")
#st.caption("20K-0199\n20K-1744\n20K-0134\n20K-0355")

tab1, tab2 = st.tabs(["Members", "Recommendations"])

with tab1:
    st.subheader("20K-0199 - Anmol Zehrah")
    st.subheader("20K-1744 - Hamza Sameer Khan")
    st.subheader("20K-0134 - Manahil Fatima")
    st.subheader("20K-0355 - Usman Yaqoob")


with tab2:
    torec = st.text_input("Enter the Restaurant Name for recommendations")

    if st.button("Click to get recommendations"):
        recommendations = recommend(torec)
        display_recommendations(recommendations)

#recommend('Jalsa')
```

Code snapshot



Streamlit UI