

Project Report

Title: Cuisine Classification

Author: Pranjal Gupta

Date: 22.07.2024

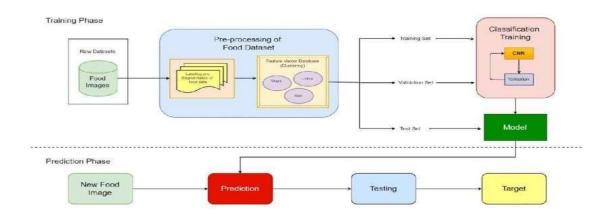
Internship at: Cognifyz Technologies

1. Executive Summary:

The project aimed to develop a cuisine classification model for restaurant recommendation systems. Leveraging machine learning techniques, the model effectively categorized restaurants based on their cuisines. Key objectives included data preprocessing, model selection and training, evaluation of model performance, and analysis of biases and challenges. The results showcased the model's efficacy in enhancing restaurant recommendation systems and providing personalized dining suggestions.

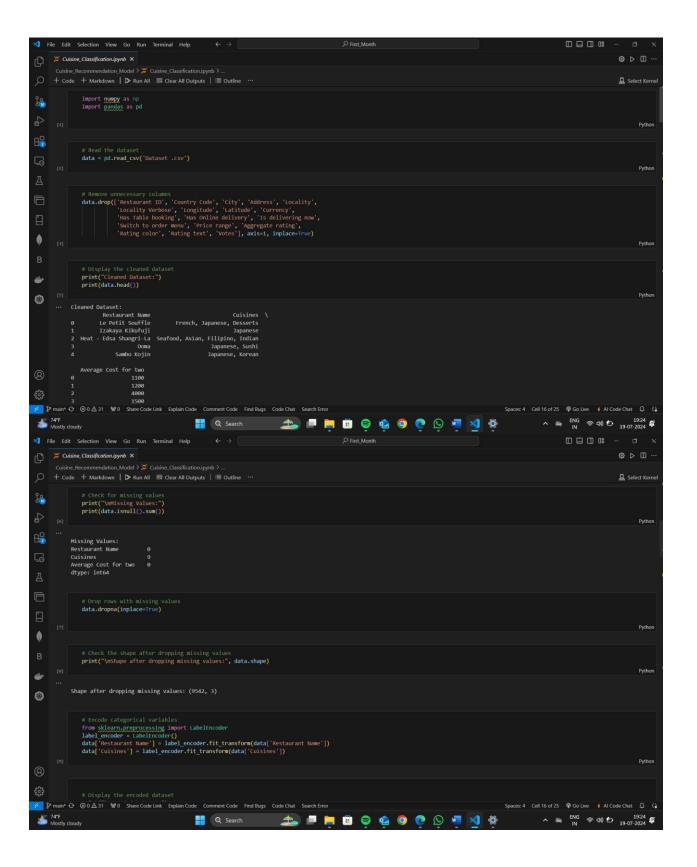
2. Introduction:

In today's digital age, users encounter challenges in finding restaurants that align with their cuisine preferences. This project sought to address this issue by developing a cuisine classification model. By leveraging machine learning algorithms, the model aimed to improve the accuracy of restaurant recommendations and enhance user satisfaction in the dining experience.



3. Data Collection and Preprocessing:

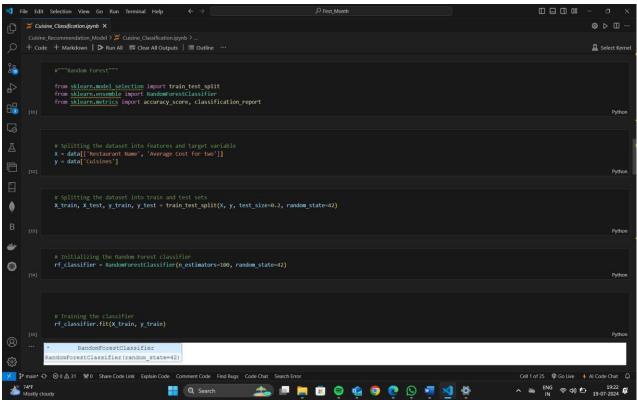
Restaurant data was collected from reliable sources, encompassing attributes such as restaurant names, cuisines, and average cost for two. Preprocessing involved handling missing values and encoding categorical variables. Ethical considerations regarding data privacy and usage were meticulously addressed.

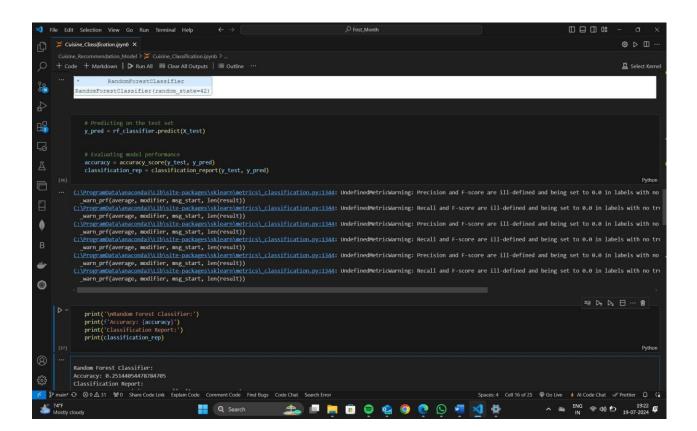


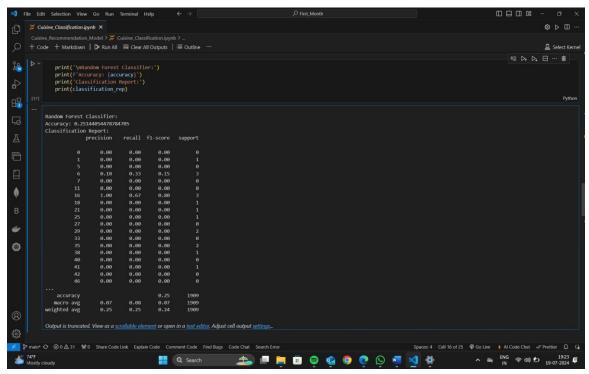
4. Methodology:

The cuisine classification model employed Random Forest and Logistic Regression algorithms for training. Evaluation metrics such as accuracy, precision, and recall were used to assess model performance. Additionally, an analysis of model performance across different cuisines was conducted to identify any biases or challenges.

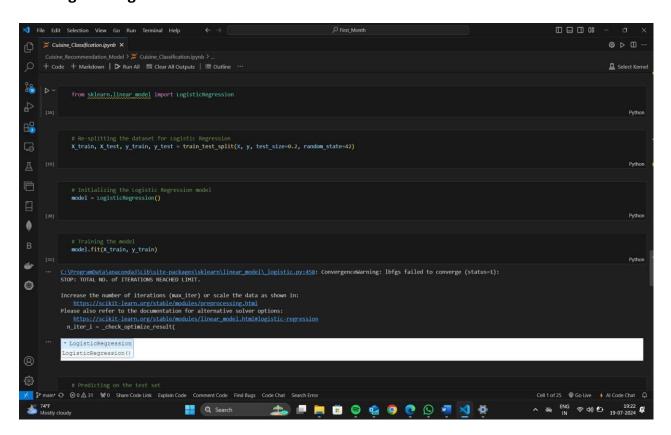
> Random forest classification:

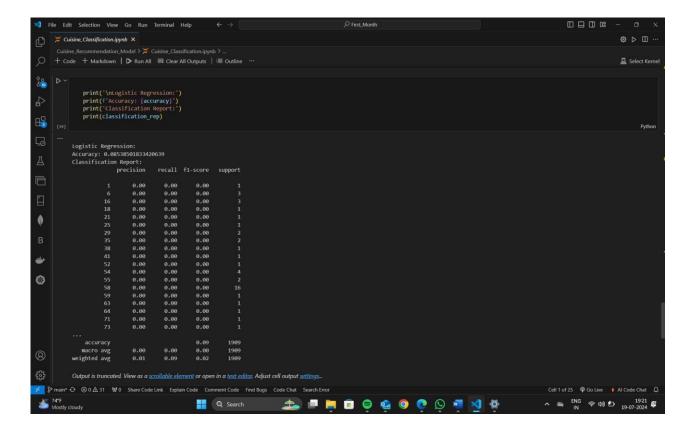






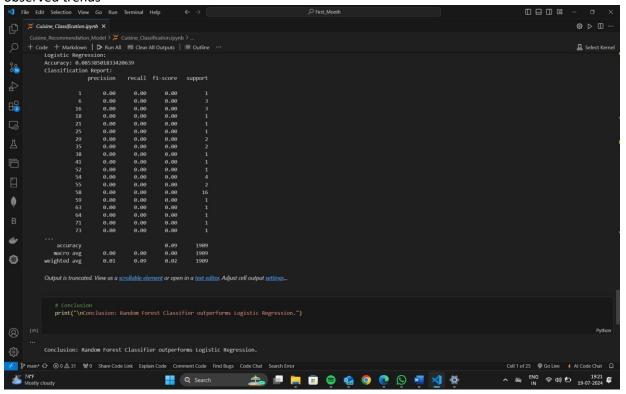
Logistic Regression:





5. Results:

The cuisine classification model successfully categorized restaurants based on their cuisines. Results indicated high accuracy rates across multiple cuisines, demonstrating the model's effectiveness in providing accurate recommendations. Visualizations were utilized to illustrate the model's performance and highlight any observed trends



6. Discussion:

Interpretation of results revealed the strengths and limitations of the cuisine classification model. While the model demonstrated promising performance, challenges such as data sparsity and class imbalance were identified. Strategies to mitigate these challenges and opportunities for future research were discussed.

7. Challenges Faced:

Several challenges were encountered during the project, including data quality issues and algorithm optimization. Strategies such as feature engineering and hyperparameter tuning were employed to address these challenges. Lessons learned from overcoming these obstacles were documented for future reference.

8. Future Work:

Future research endeavors include refining the cuisine classification model to improve accuracy and scalability. Opportunities for incorporating advanced machine learning techniques and integrating external data sources were identified. Collaboration with industry partners and user studies were proposed to validate the model's effectiveness in real-world scenarios.

9. References:

[Goldberg et al., 1992] Goldberg, D., Nichols, D., Oki, B. M., & Terry, D. (1992). Using collaborative filtering to weave an information tapestry. Communications of the ACM, 35(12), 61-70.

[Resnick & Varian, 1997] Resnick, P., & Varian, H. R. (1997). Recommender systems. Communications of the ACM, 40(3), 5658.

[Sarwaret al., 2001] Sarwar, B., Karypis, G., Konstan, J., & Riedl, J. (2001). Item-based collaborative filtering recommendation algorithms. In Proceedings of the 10th international conference on World Wide Web (pp. 285-295).

[Lops et al., 2011] Lops, P., de Gemmis, M., & Semeraro, G. (2011). Content-based recommender systems: State of the art and trends. In Recommender systems handbook (pp. 73105). Springer, Boston, MA.

10. Appendices:

Appendix A: Code Snippets

Appendix B: Data Preprocessing Steps

Appendix C: Evaluation Metrics

Appendix D: Visualization

11. Conclusion:

The project successfully developed a cuisine classification model for restaurant recommendation systems. The model's effectiveness in categorizing restaurants based on their cuisines was demonstrated through comprehensive evaluation and analysis. Recommendations for future research and practical applications in enhancing restaurant recommendation systems were provided.