Proposed Solution

1. Problem Statement

- For a restaurant dataset, the model aims to segment its audience based on spending patterns in order to create specialized marketing opportunities.

2. Idea/Solution description

- We first collect data about every restaurant order. The data includes customer reviews (as boolean variables), rating (like), age, gender and visiting frequency of the customer.

- Then we pre-process the dataset and perform data visualization on it. We identify trends and outliers in the dataset by using clustering algorithms.

- After pre-processing, we split the data into a training set and a test set. The training set is used to make three models: a KNN model, a logistic regressor and a random forest. We test each of the three models and then select the model with the best performance.

- We deploy the model as a web application and distribute it to marketing executives to help with customer segmentation.

3. Novelty/Uniqueness

- Use word embeddings and NLP techniques for sentiment analysis

- Detect anomalies which could represent emerging market segments

- Use alternative segmentation methods such as behavioral and psychographic segmentation.

= Experiment with advanced ML algorithms such as deep learning that can identify subtle patterns

- Implement a feedback loop mechanism to adapt to changing market dynamics

4. Social Impact/Customer Satisfaction

- By understanding our audience's spending behavior, we can optimize our marketing strategies to give more satisfaction. For example, if there is a segment which considers the products to be too expensive, we can market cheaper products and discounts to them.

- We can identify opportunities for growth and expand our audience. For example, through visualization we can recognize which demographics are underrepresented and devise marketing strategies for them.

5. Business Impact

- By increasing customer satisfaction, we boost the sales of our company and increase its profitability.

- More targeted marketing results in optimized supply chains, inventory management and resource allocation. This makes our business more efficient.

6. Scalability of the solution

- Dynamic segmentation is employed to adapt to changing market trends and business environments

- Automate the model and the data processing to analyze more data in less time and increase the model's efficiency.

- Optimize the system architecture to handle large amounts of data, e.g. use a distributed framework like Spark

- Utilize cloud servers to increase total storage and increase efficiency of gathering data

- Stick to ML algorithms with less computational complexity and monitor them on a constant basis.