

Business Cases with Data Science
2019-2020 Nuno António

Business Case: Market Basket Analysis

Palm & Company

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Current Situation and Problems

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Increasing Competition

Increasing competition,
through new restaurants and
new delivery services



Decreasing profits

Company C is struggling to
keep profits



Missed opportunities

Outdated product offering
Non-differential approach to
different customer segments
Not taking full advantage of
data collection

Benefits of a data-driven solution

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Why should we use data-driven solution?



Creation of new products and menus

The analysis of customers patterns, we will suggest the creation of new products and menus up-to-date with the current market



Differentiation between customers

We will be able to differentiate delivery and dine-in customers, allowing Company C to have tailor-made services for each option



Creation of a Recommender System

Possibility to recommend customers additional products that are usually purchased together

Success Criteria

- Increase in sales
- Higher customer retention

Dinner time dominates daily orders

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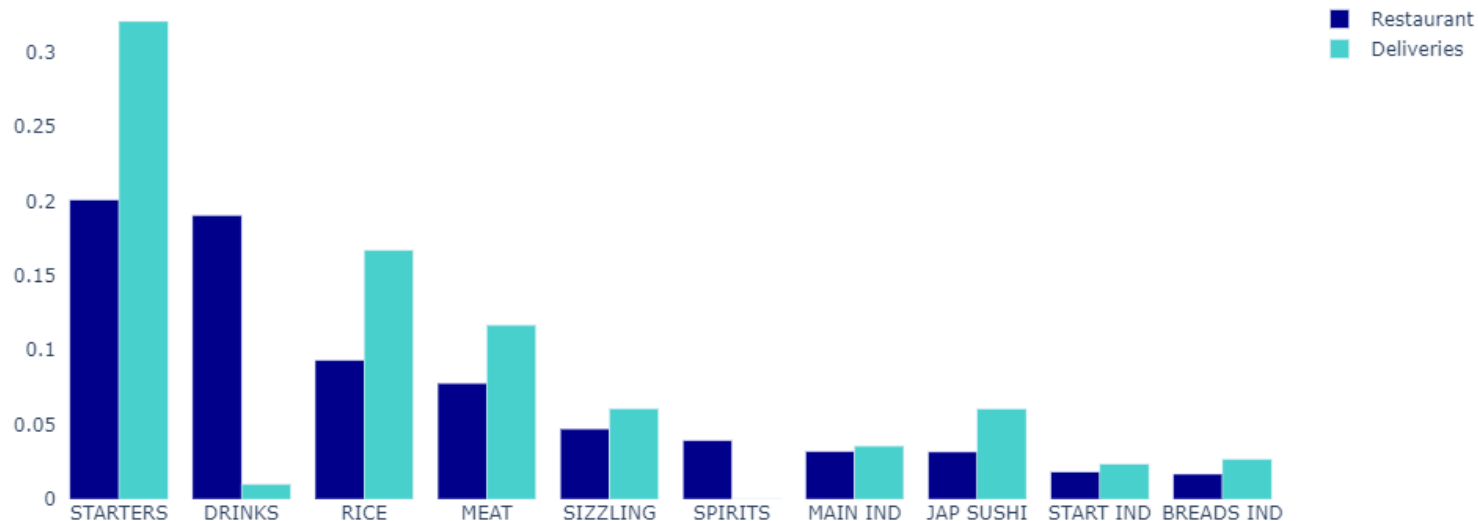
Number of orders over time



Starters are a “must”, but drinks only have demand on the restaurant

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Bestselling product families - proportions

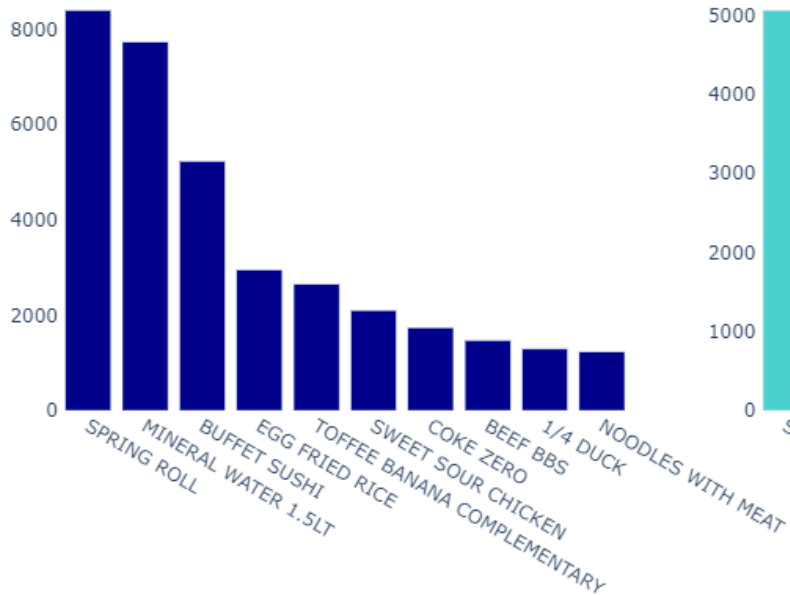


Spring Roll stands out as the most requested product

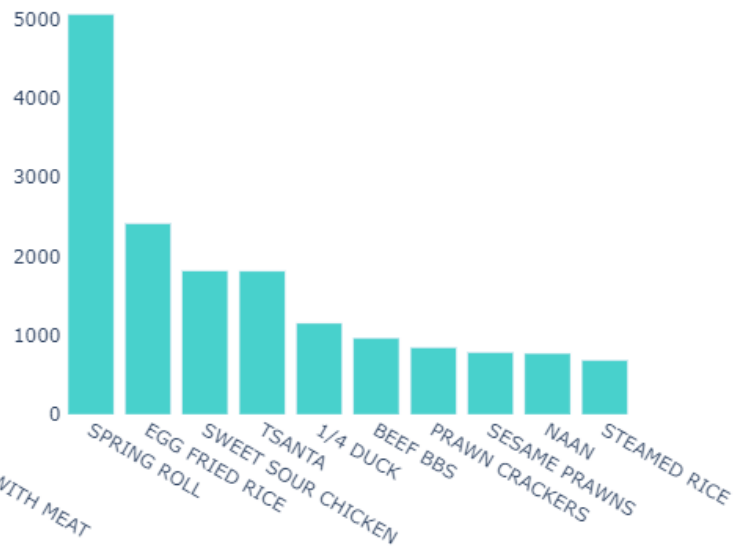
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Bestselling products

Restaurant



Delivery

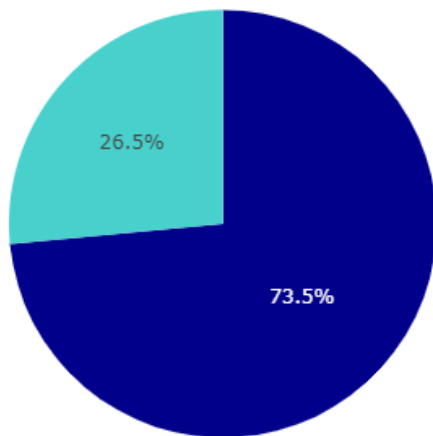


Although the number of orders are similar, dine-in customers spend, on average, more than delivery customers

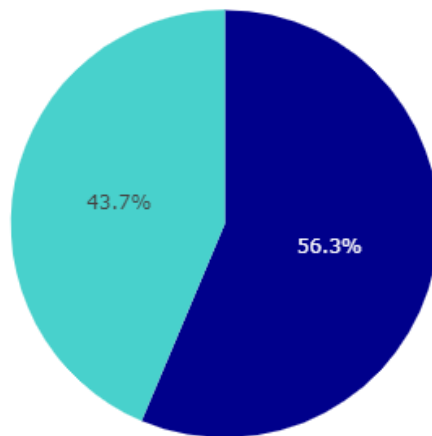
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Restaurant vs. Delivery

Revenue



Number of orders

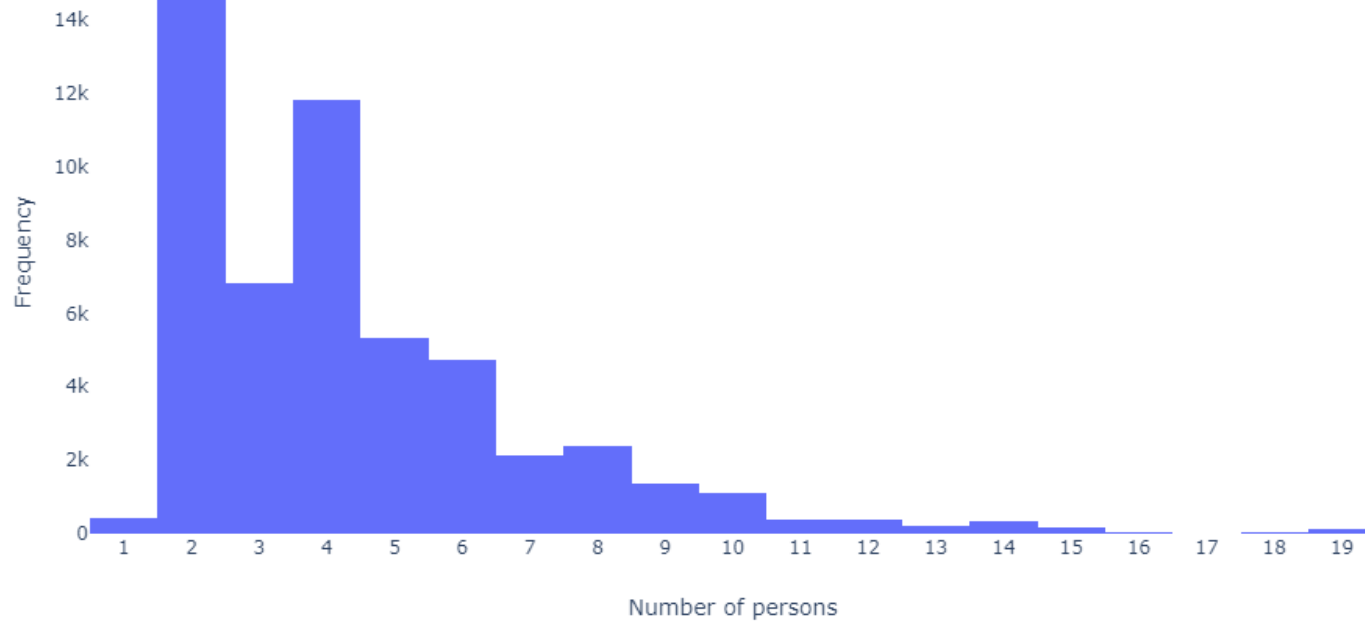


■ Restaurant
■ Delivery

Customers frequently dine-in in groups of two to four

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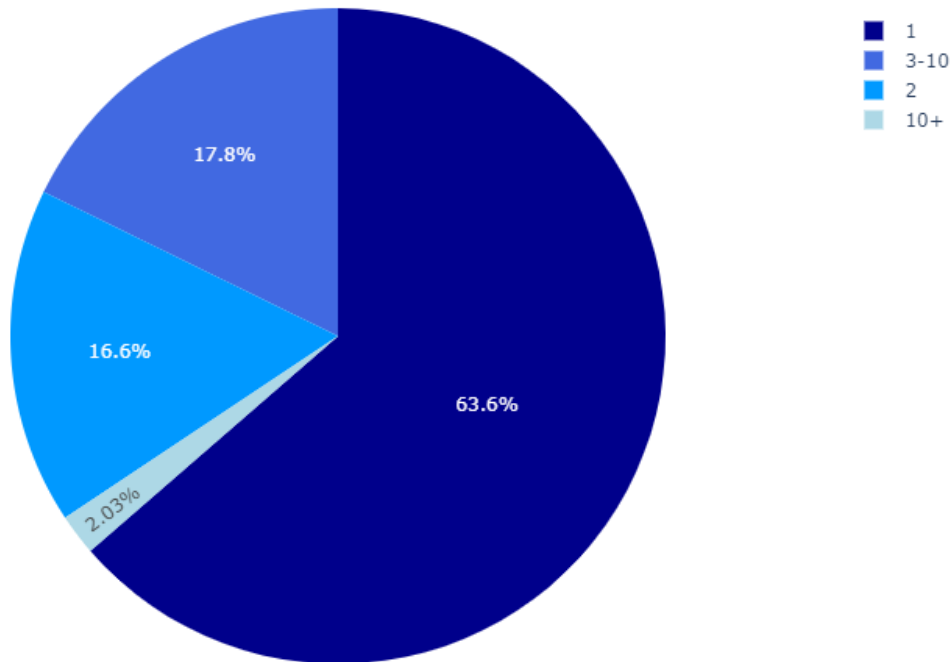
Number of persons per visit



Majority of delivery customers only ordered once

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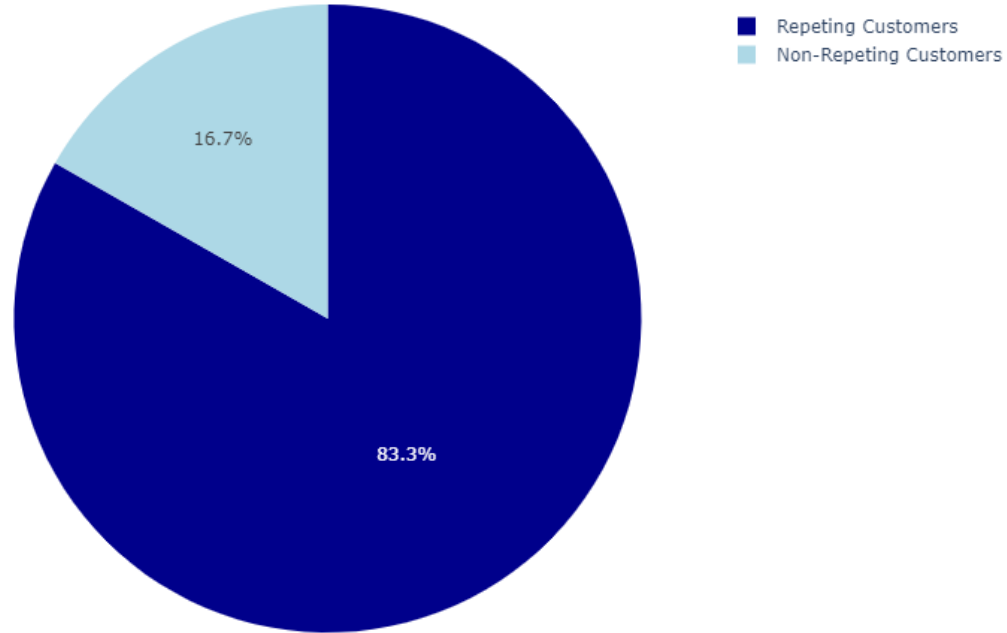
Number of visits per customer



Customers have favorite products and like to re-order them

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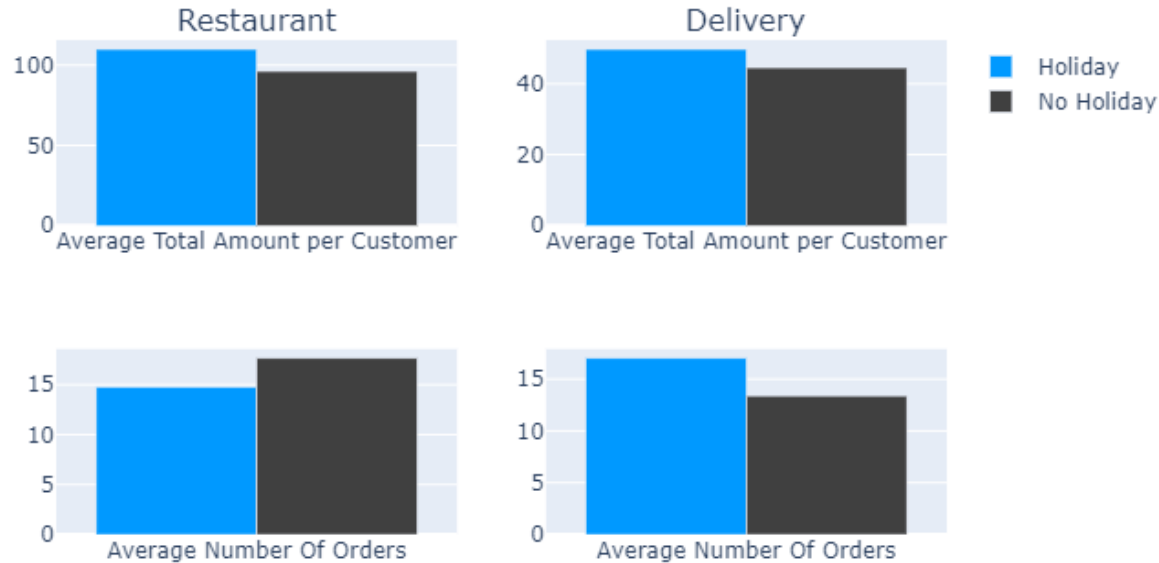
Order pattern of online customers



Increased spending during holidays, but fewer people on the restaurants

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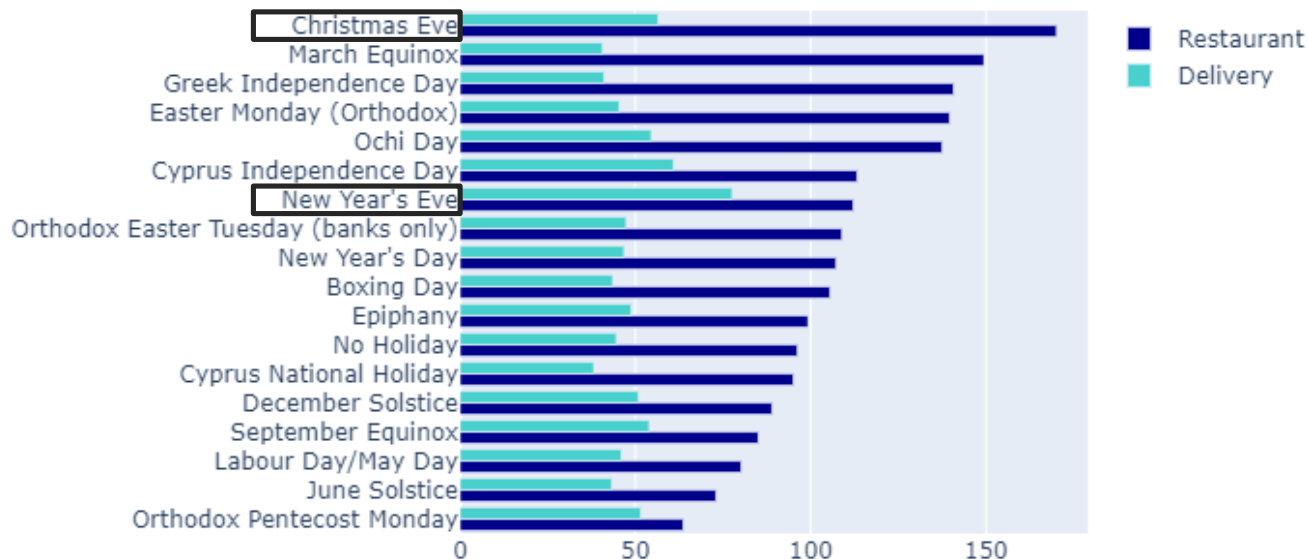
Do holidays have an impact on business?



Christmas Eve for dine-in while New Year's Eve dominates delivery

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Which holiday is the most important?



Methodology

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Market Basket Analysis



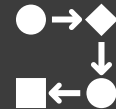
Usage of pre-defined rules:

- Confidence
- Support
- Lift



Analysis of consumption patterns:

- Frequency of purchases
- Substitute products
- Complementary products
- Product interaction



Introduction of a Recommender System

Introduction of New Menus and Products

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Restaurant & Delivery

Rules:

Confidence ≥ 0.5
&
Lift ≥ 4



No Meat \rightarrow Noodles with Meat
Confidence = 1
Lift = ± 5



Solution:

Plain Noodles

+

Own Customer Combination

Introduction of New Menus and Products

Palm & Company

Restaurant

Rules:

Confidence ≥ 0.5
&
Support ≥ 0.2

Spring Roll \rightarrow Egg Fried Rice

Confidence = 0.6
Support = 0.2

Sweet Sour Chicken \rightarrow Egg Fried Rice

Confidence = 0.7
Support = 0.2

Solution:

Spring Roll

+

Sweet Sour Chicken

+

Egg Fried Rice

Introduction of New Menus and Products

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Delivery

Rules:

Confidence ≥ 0.5
&
Lift ≥ 4

Confidence ≥ 0.5
&
Support ≥ 0.2

Jira Pulao \rightarrow Naan
Confidence = 0.5
Lift = 4.5

Sweet Sour Chicken \rightarrow Egg Fried Rice
Confidence = 0.6
Support = 0.2

Solution (Indian Menu):

Jira Pulao

+

Naan

Solution

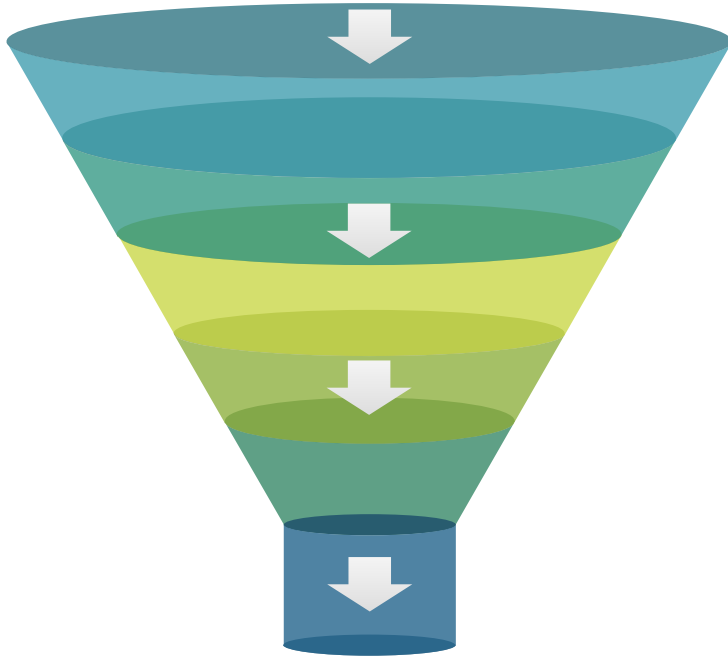
Sweet Sour Chicken

+

Egg Fried Rice

Recommender system

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01

Take the order

Enter the order items and some additional information into the system

02

Automatic Customer Segmentation

Filter database to get most similar customers and orders

03

Create Association Rules

Find products with the highest lift and a predefined minimum level of support and confidence

04

Get personalized recommendations

Products that this customers is likely to order

Deployment strategy

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Specific use case example for dine-in customers:

Recommending dessert based on starters and main dish



1. Taking the order

The waiter takes the order of a new customer and enters the items and the number of people into the POS system.



2. Customer Segmentation

The database will be filtered based on isDinner, isHoliday and number of people.



3. Association Rules

Based on the subset, the system creates association rules and returns a list of desserts, which have a high lift with the already ordered items.



4. Personalized recommendation

The waiter can make data-driven and personalized dessert suggestions, which lead to higher customer satisfaction and increasing revenue.

Future improvements

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Further Use Cases

Extend system with further use cases e.g. recommend extras in delivery purchases



Deeper Customer Segmentation

Collect more data about customers e.g. gender or number of children, and include more historical data



Include order history

The system can be improved by including order history of delivery customers



Supervised Learning Techniques

Improve the model by tracking the performance of the system i.e. the acceptance of the recommendation

Conclusion

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Recommender System



Introduction of New Menus
and Products

Tailor-made discounts



Further data gathering will
provide better results





Thank you!

Any questions?

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