

Professional Data Science Certificate

Capstone Project _ Week 1 _ 03/29/2020



1. Background: problem (1/2)

When customers choose to visit a restaurant, they are looking for a memorable gastronomical experience. This experience depends on different parameters:

- quality, freshness, and taste of food;
- décor, ambiance and hygiene level;
- staff courtesy and prompt service...

Soliciting customer feedback can give to the restaurant owners an insight into what customers like about the restaurant and what they expect.

Based on comments and opinions from customers, restaurant owners can work on customer loyalty.

1. Background: problem (2/2)

Unfortunately, from a research published by Shephyken ('Create A Customer Service Culture):

43% of customers who were surveyed stated that they don't complain or leave feedback because they don't think 'that the business cares.' Out of these same customers, 81% admitted that they would be willing to give feedback if they are assured that they would get a fast response.

Now that it has been established that customer feedback is extremely important, the next is to understand how to gather this feedback.

2. Background: discussion (1/2)

What are the different methods of collecting customer feedback ?

- 1. Face-to-Face Feedback:** When the waitstaff directly asks the customer for feedback.
- 2. Feedback Forms:** Distributing printed forms among customers to obtain their feedback.
- 3. Mobile POS Feedback System:** Using a tablet connected to POS to collect customer feedback based on what the customer had ordered and how their particular experience was.
- 4. Social Media Feedback:** Responding to comments on different social media apps and platforms like Zomato is important for online reputation and understanding the customer feedback in the restaurant.
- 5. Online Customer Feedback:** Another technique to obtain customer feedback is to have an online survey form which the customers can fill at their leisure.

2. Background: discussion (2/2)

What are the different methods of collecting customer feedback ?

6. Focus Groups: Collecting true customer feedback by creating focus groups of target audience and interviewing them. This method of customer feedback collection should be carried out periodically.

7. Community Groups And Discussion Boards: Be a part of different social media groups and communities to understand what the customers are saying about a specific restaurant.

8. Web Analytics: Use POS and analyze the performance of various dishes and different feedbacks collected from customers to understand what they like about you as a whole.

Key point: behind all these different methods, one key point is machine learning algorithm choice and efficiency: this project demonstrates importance of this point.

2. Data (1/3)

Machine algorithms are tested and selected on different datasets (2 datasets in this project).

These datasets are obtained from a few restaurant owners who accept to collect and share data.

Data collection method: no question is asked to customers. Instead of that, the restaurant owners who participate to this study, record 3 elements for each of their customers:

- Is this customer a regular one ?
- How much time is measured between customer' s arrival in the restaurant and the real lunch/dinner start time ? (fitting with waiting time from the customer)
- What is the bill total for this lunch/dinner ?

These datasets merge two populations among the customers:

Regular customers;

Customers who visited once a restaurant, and didn't come back.

2. Data (2/3)

One point that could be discussed in this study is about the small number of parameters taken into account in what a feedback directly received from customers could really collect: the 2 parameters studied are:

- Waiting time (= WAITING in the datasets, expressed in minutes);
- Bill total (= BILL in the datasets, expressed in euros).

Actually, there are different significant advantages of this data collection type with only 2 parameters:

- Time and money will always stay very important parameters, or key parameters, even if relations with regular customers are built thanks to many other factors;
- These are parameters that are collected by restaurant owners themselves (no issue of missing data, no staff involvement in this collecting task, continuous data, factual data);
- In this project context (or for a potential demonstration by a company to restaurant owners about company skills in machine learning), a study with only 2 parameters can allow to visualize easily machine learning choice and efficiency as a key point for every analysis.

2. Data (3/3)

Data collected for regular customers, in 6 restaurants in Paris, France:

Restaurant Id	Minimal bill (€)	Maximal bill (€)	Minimal waiting time (mn)	Maximal waiting time (mn)
1	17	19	1	5
2	20	21	5	6
3	22	23	6	7
4	24	25	7	8.5
5	26	27	8.5	10
6	28	29	10	11.5

Data collected for passing customers, in 5 restaurants in Paris, France:

Restaurant Id	Minimal bill (€)	Maximal bill (€)	Minimal waiting time (mn)
7	35	39	27
8	40	44	41
9	45	49	54
10	50	54	74
11	55	59	100

3. Problem Solving

Project purpose: 2 different aspects:

- Design of a computer application for restaurant owners that allows them to predict if a customer will come back to their restaurants: this could allow them to manage better future potential investments: in a first step, a demonstration application is designed to be presented to the most frequented restaurants in each of the 20 Paris districts;
- Search for the most frequented restaurants in Paris, using Foursquare.

3. Problem Solving: Machine Learning

Implementation of a clustering algorithm with the following steps:

- Learning on data (search for the 2 clusters (regular customers / passing customers));
- Prediction with the algorithm settings found from the first step;
- Graphical plots of the clusters and centroids, for the learning data ;
- Test on other data, and discussion about classifying errors.

2 datasets are used, to compare efficiency (based on classifying error estimation) using 2 different clustering algorithms:

- K-Means
- Gaussian Mixture Models

3. Problem Solving: Foursquare usage

Problem, Problem Solving and tools used:

- Search for the relative coordinates of the 20 districts in Paris (package used: Geopy);
- Searching for the most famous venues in Paris (application used: Foursquare);
- Selecting of the top 5 restaurants listed in each district;
- Next step will be to propose a demonstration of the machine learning application, to the restaurant owners.

4. References (1/3)

Background and problem:

'How To Obtain Customer Feedback For Your Restaurant Using Different Methods':

<https://www.posist.com/restaurant-times/restro-gyaan/customers-want-conduct-surveys-collect-customer-feedback-restaurant.html>

Guest blog: rebuilding the foundations of customer support in the new world of software as a service

<https://hyken.com/customer-care/guest-blog-rebuilding-foundations-customer-support-new-world-software-service/>

Data collection:

'How long is too long to wait for a table at a restaurant ?':

<https://www.phoenixnewtimes.com/restaurants/how-long-is-too-long-to-wait-for-a-table-at-a-restaurant-6509473>

French and Americans are poles apart... when it comes to time spent eating:

<https://www.thelocal.fr/20180313/french-spend-twice-as-long-eating-and-drinking-as-americans>

OECD Gender Data Portal:

<https://www.oecd.org/gender/balancing-paid-work-unpaid-work-and-leisure.htm>

Cost of Living in France:

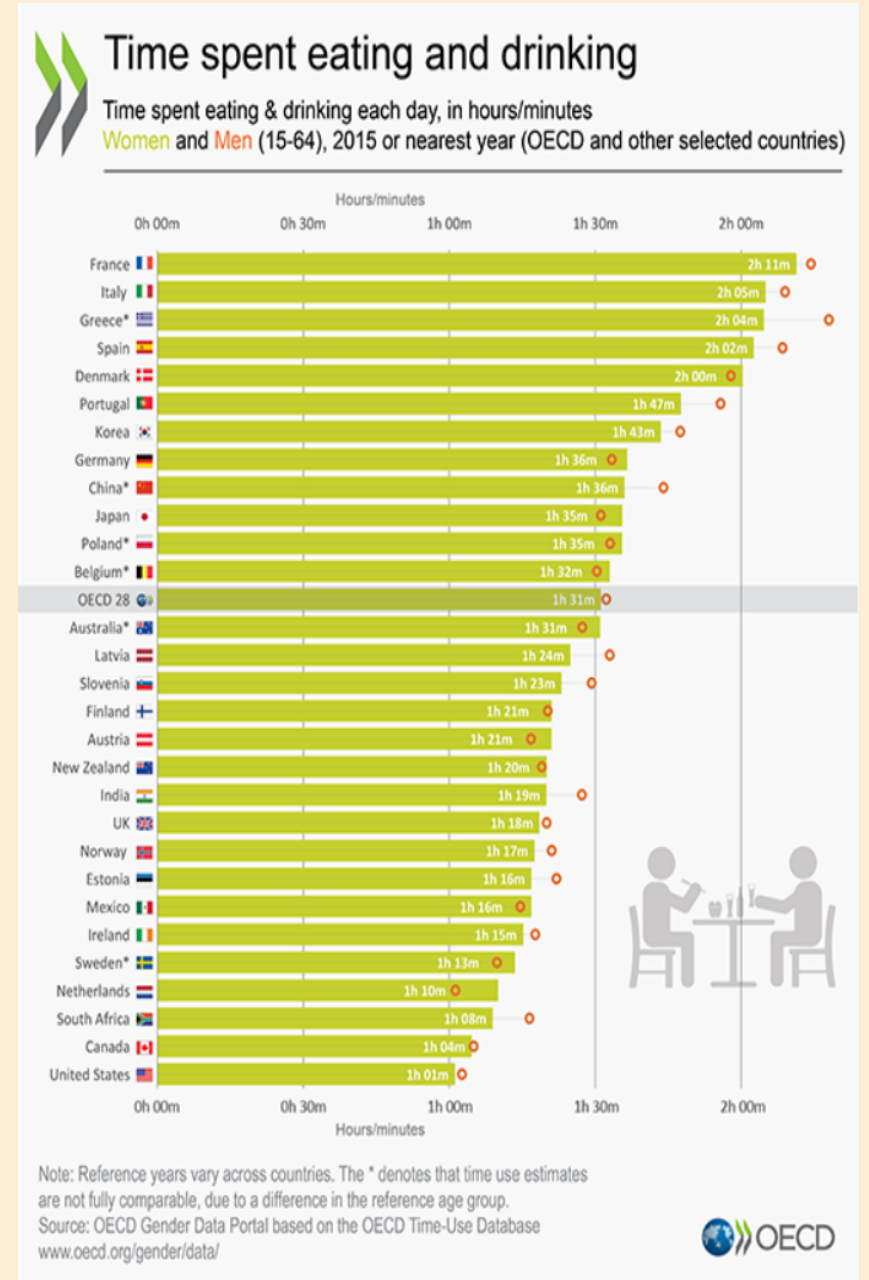
https://www.numbeo.com/cost-of-living/country_result.jsp?country=France

4. References (2/3)

Plot from OECD site:

OECD Gender Data Portal:

<https://www.oecd.org/gender/balancing-paid-work-unpaid-work-and-leisure.htm>



4. References (3/3)

List of Paris districts and population density:

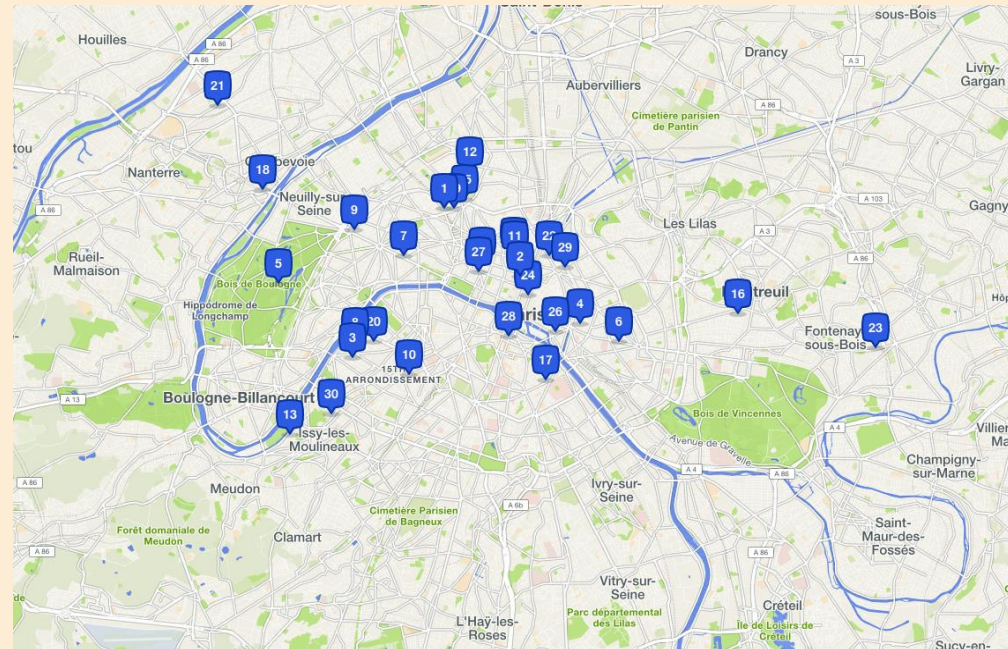
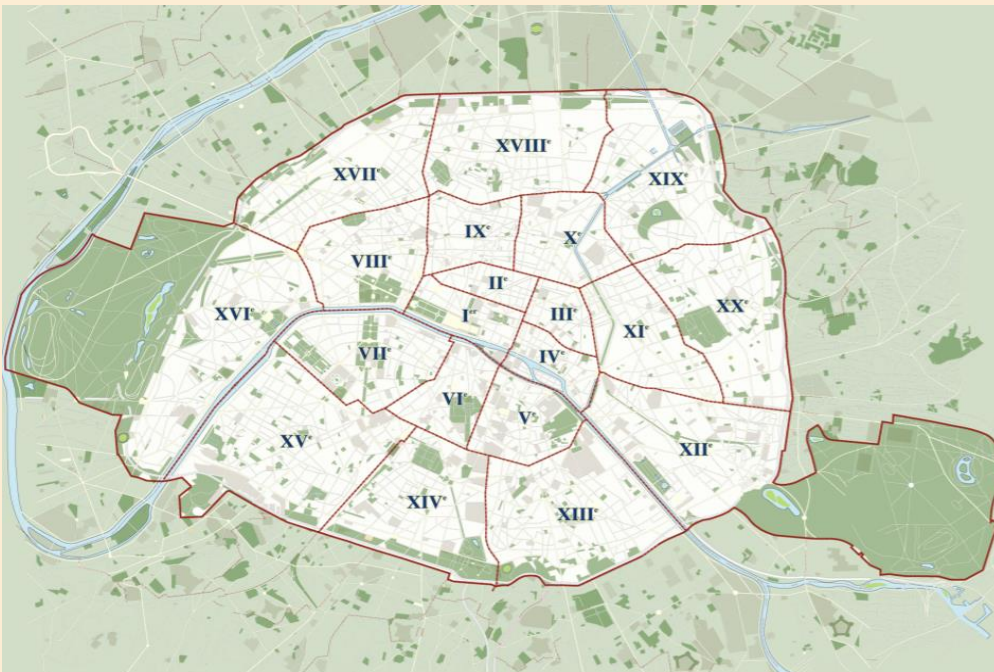
https://fr.wikipedia.org/wiki/Arrondissements_de_Paris


Paris maps:

<https://parismap360.com/paris-arrondissement-map#.XfVpqtEo91I>

Paris density population:

<https://www.insee.fr/fr/statistiques?collection=119>





Thank you for your attention

Capstone Project _ Week 1 _ End

