

Data Analysis of Health Insurance in France



Statistical data on the fees of liberal health professionals

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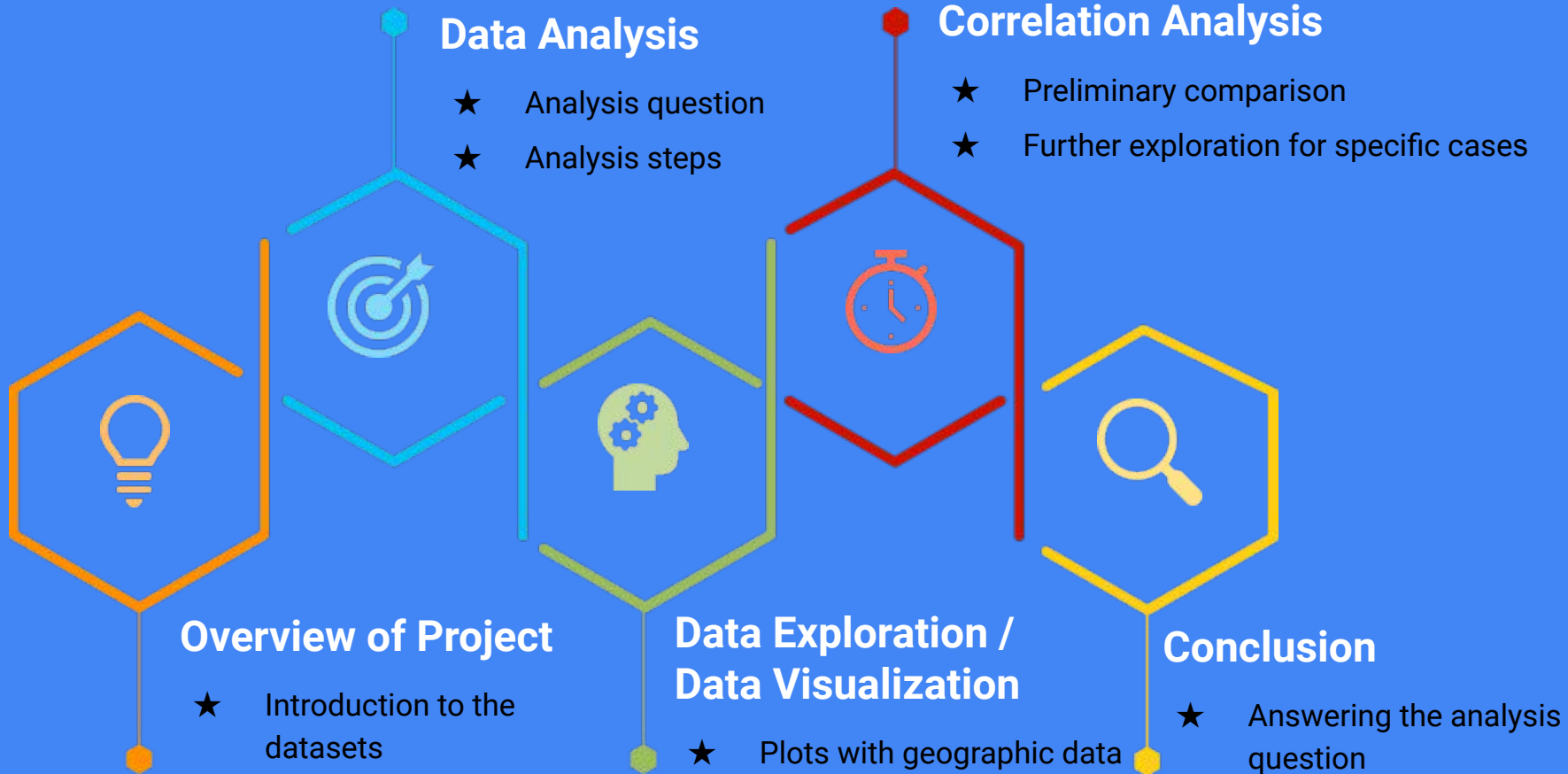


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OUTLINE :





PROJECT OVERVIEW

Understanding the
datasets for analysis

Overview of the Data

- **Datasets:**
 - Workforce and Density by Department
 - workforce, population, density of liberal health professionals
 - Total Fees of Health Professionals by Department
 - fees, fee overruns and annual travel expenses for all liberal health professionals
 - **Scope:** Whole France (metropolitan and overseas) in 2018
 - **Sources:**
 - Amos (Assurance Maladie offre de soins)
 - Snir (système national interrégimes)
-

Health Professionals

Categories/Specialties:

- Specialists
 - Generalists and MEP
 - Dentists and ODF
 - Midwives
 - Medical auxiliaires
 - nurses, physiotherapists, pedicurists, speech therapists, orthoptists
 - Laboratories
-

Dataset 1: Workforce and Density by Department

- **Department**
- **Workforce - Effectif**
- **French Population**
- **Density / 100,000 habitants**

	Spécialistes	DEPARTEMENT	EFFECTIF	POPULATION FRANCAISE	DENSITE /100 000 hab.
0	02- Anesthésie-réanimation chirurgicale	01- Ain	18	653688.0	2.753607

$$\text{Density} = (\text{Workforce} / \text{Population}) * 100,000$$

Dataset 2 : Total Fees of Health Professionals by Department

- **Department** - Departement
- **Workforce** - Effectifs
- **Fees without Excess** - Honoraires sans dépassement
- **Exceeding Fees** - Dépassement
- **Travel Expenses** - Frais de dépassement
- **Total Fees** - Honoraires Totaux

Total Fees = Fees without excess + Exceeding fees + Travel expenses



DATA ANALYSIS

To answer the proposed question, we use Python to explore and interpret the data through the following process.

ANALYSIS QUESTION:

Can we establish *a link* between the **density of physicians*** by specialty and by territory and the **practice of exceeding fees?**

ANALYSIS PROCESS :

Importing the
Datasets in Python

Data Wrangling

Visualization

Interpretation

Grouping Data:

* Speciality * Region

Filtering Data

* specialists > 11 effectifs

Spécialité		Spécialistes
0	Spécialistes	TOTAL MEDECINS
1	Spécialistes	TOTAL SPECIALISTES
2	Spécialistes	02- Anesthésie-réanimation chirurgicale
3	Spécialistes	03- Pathologie cardio-vasculaire
4	Spécialistes	04- Chirurgie générale
...
135	Dentistes et ODF	TOTAL CHIRURGIE DENTAIRE (19, 36, 53, 54)
136	Laboratoires	30- Laboratoires

DEPARTEMENT		REGION
0	01- Ain	Auvergne-Rhône-Alpes
1	02- Aisne	Nord-Pas-de-Calais-Picardie
2	03- Allier	Auvergne-Rhône-Alpes
3	04- Alpes-Hte-Provence	Provence-Alpes-Côte d'Azur
4	05- Hautes-Alpes	Provence-Alpes-Côte d'Azur
...
96	971- Guadeloupe	Guadeloupe
97	972- Martinique	Martinique

	Spécialistes	DEPARTEMENT	EFFECTIFS	DEPASSEMENTS (Euros)
3	02- Anesthésie-réanimation chirurgicale	04- Alpes-Hte-Provence	4	nc
4	02- Anesthésie-réanimation chirurgicale	05- Hautes-Alpes	6	nc
7	02- Anesthésie-réanimation chirurgicale	08- Ardennes	6	nc

To avoid this



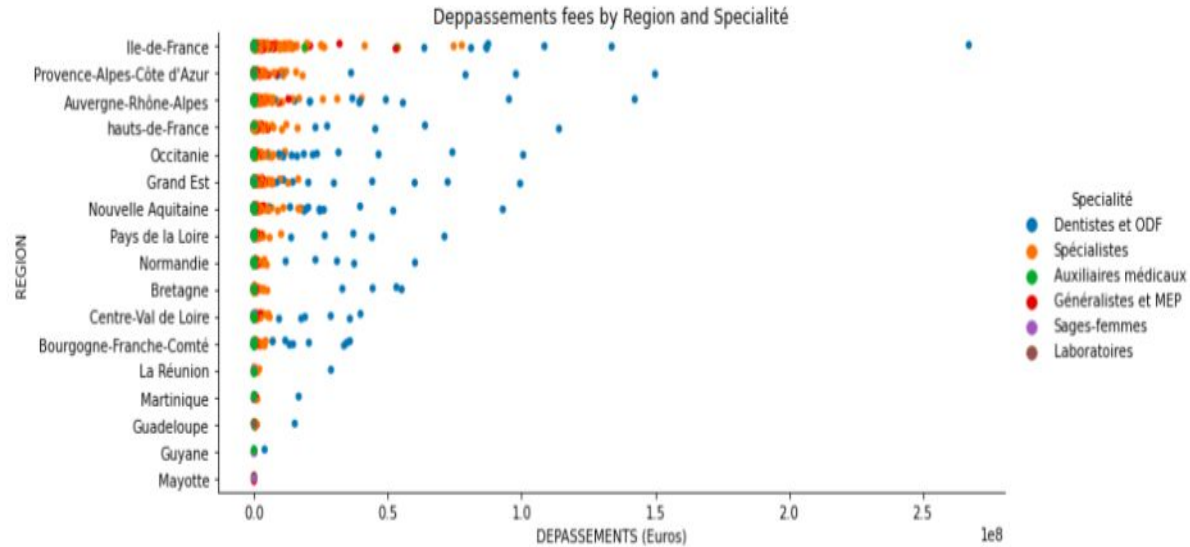
A hand in a dark suit jacket points with the index finger towards the right side of the frame. The hand is resting on a light-colored surface, possibly a desk. In the background, there is a blurred image of a city at night with bokeh lights from buildings and streetlights.

DATA EXPLORATION

Overview of the relations between the density of physicians by speciality and by regions, and the practice of exceeding fees

Exceeding Fees by Regions and Specialties

Visualization

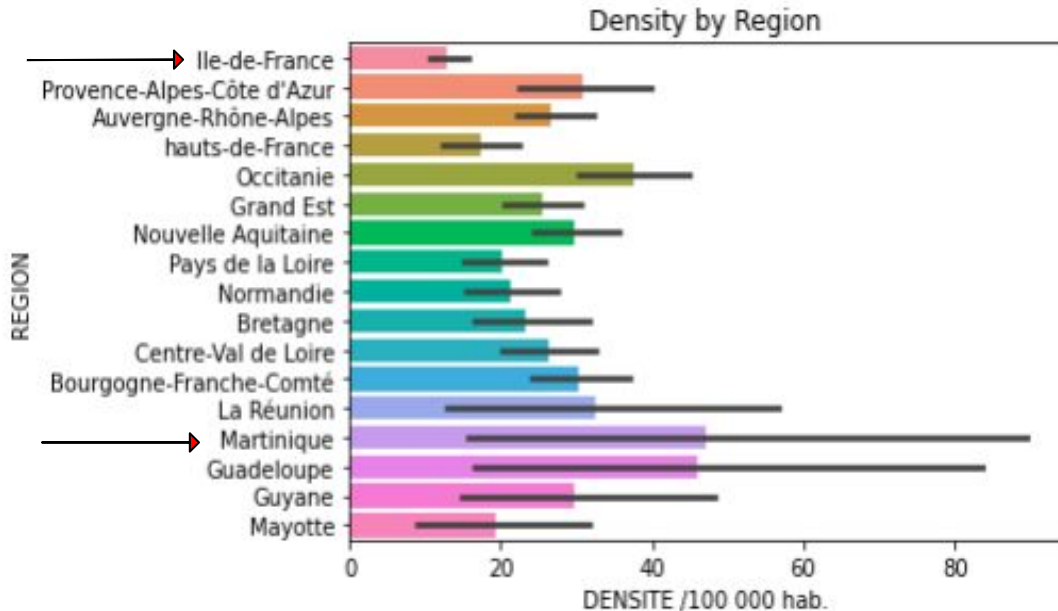


- In each region we see a tendency that the top 2 specialties (**Dentists** and **Specialists**) have higher exceeding fees than other specialties.



Health Professionals Density by Regions

Visualization



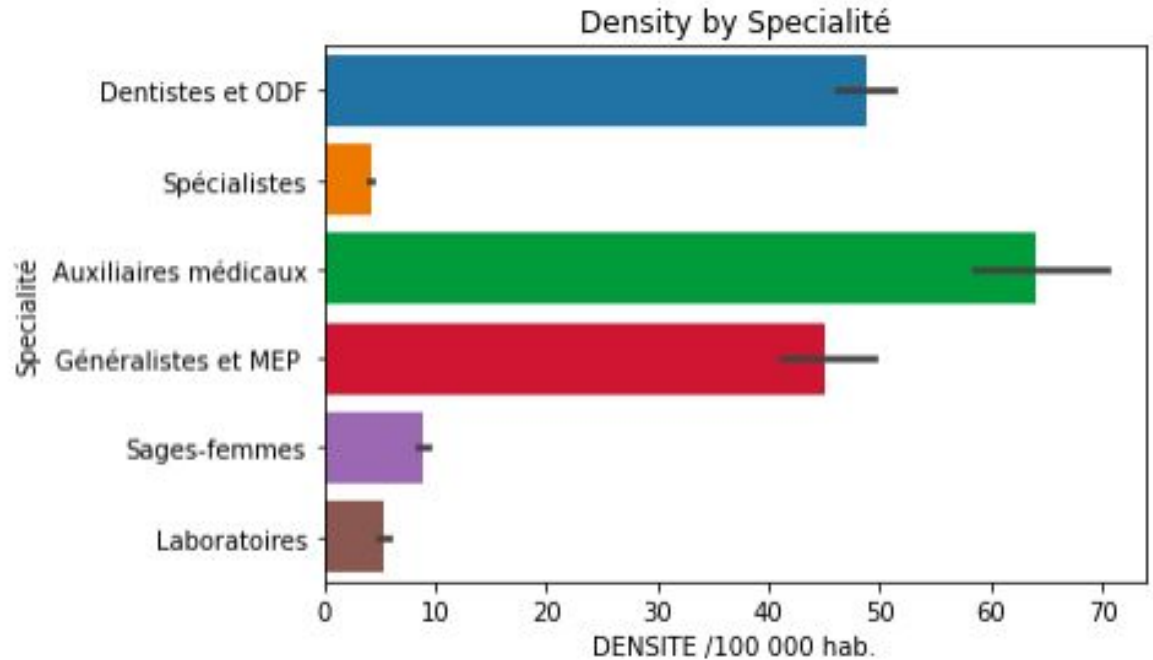
Interpretation

- **Ile-de-France** is the region with the highest exceeding fees, but its density is the lowest.
- **Martinique** and **Guadeloupe** have low exceeding fees but the highest density.



Density by Healthcare Specialties

Visualization



2 noteworthy specialties :

- **Paramedic** (Auxiliaires médicaux) have a very high density
- **Specialists** have the lowest density



Interpretation

Specialities Ranked by Exceeding Fees / Density

Visualization

Specialité	EFFECTIFS	DEPASSEMENTS (Euros)	POPULATION FRANCAISE	DENSITE /100 000 hab.
✕ Dentistes et ODF	349.120000	4.194006e+07	6.672233e+05	48.745788
✕ Spécialistes	40.452621	2.448603e+06	1.038449e+06	4.179538
Généralistes et MEP	308.760925	1.265176e+06	8.369204e+05	45.146767
✕ Auxiliaires médicaux	424.311547	2.286952e+05	7.015549e+05	64.076763
Sages-femmes	64.365591	4.966296e+04	7.052445e+05	8.909656
Laboratoires	46.946667	6.622410e+03	8.443845e+05	5.350645

Specialité	EFFECTIFS	DEPASSEMENTS (Euros)	POPULATION FRANCAISE	DENSITE /100 000 hab.
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Laboratoires	46.946667	6.622410e+03	8.443845e+05	5.350645
✕ Spécialistes	40.452621	2.448603e+06	1.038449e+06	4.179538

Interpretation

- **Dentists** have the highest exceeding fees with a high density.
- **Spécialists** have high exceeding fees whereas their density is the lowest.
- **Medical auxiliaries** have the low exceeding fees but with highest density.

CORRELATION ANALYSIS



Dentist

- high exceeding fees / high density



Specialists

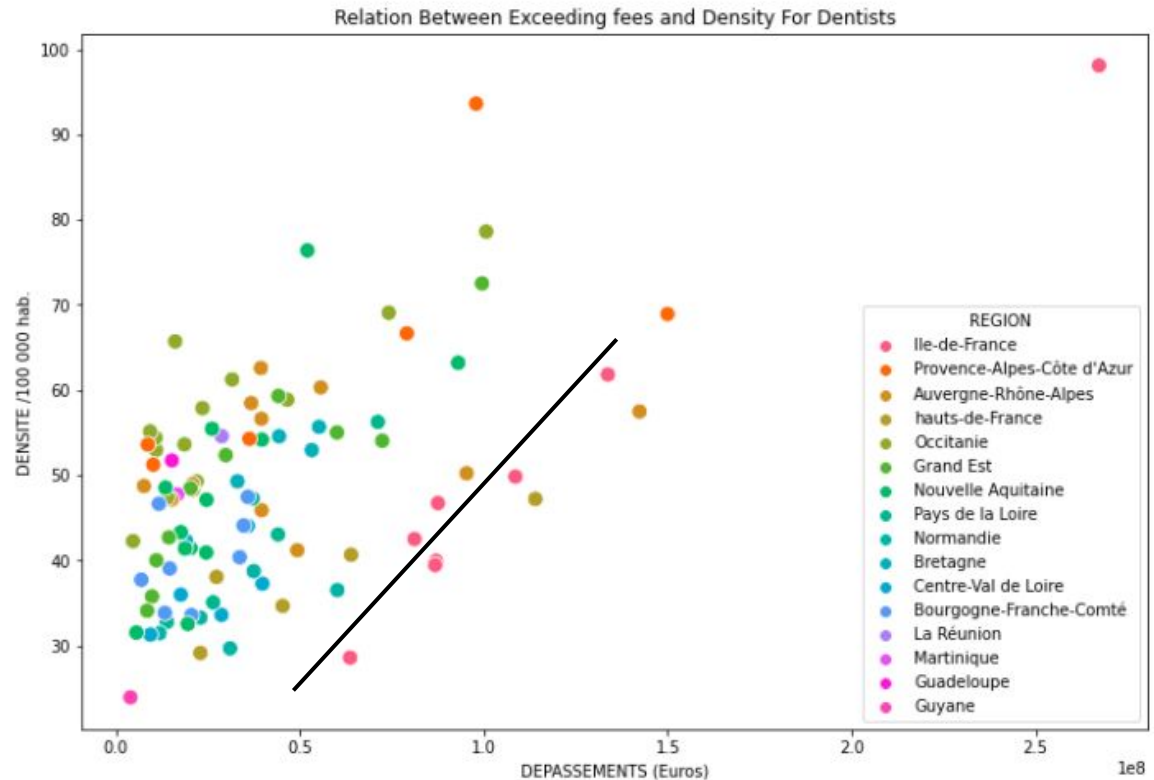
- high exceeding fees / low density



Medical auxiliaries

- low exceeding fees / high density

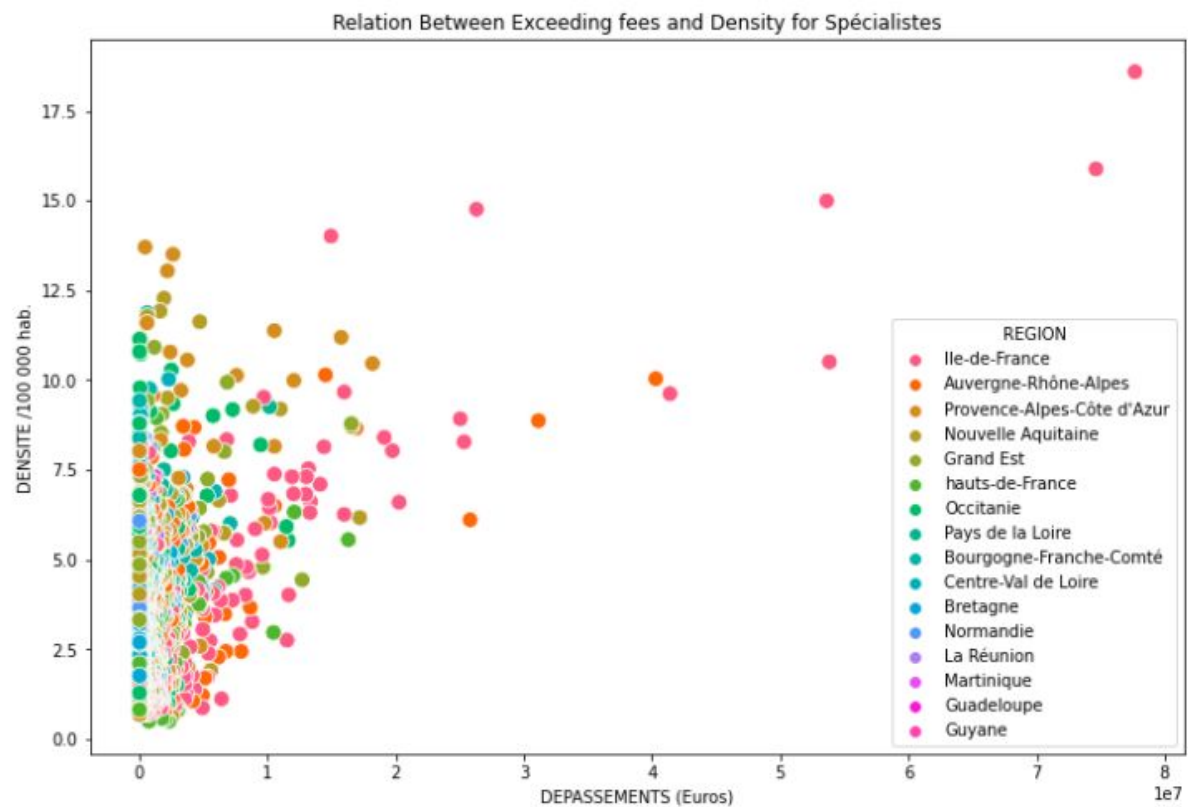
Correlation between exceeding fees & density for the **dentists**



- A moderate positive correlation (corr coefficient = **0.55**)
- In specific regions strong correlations.



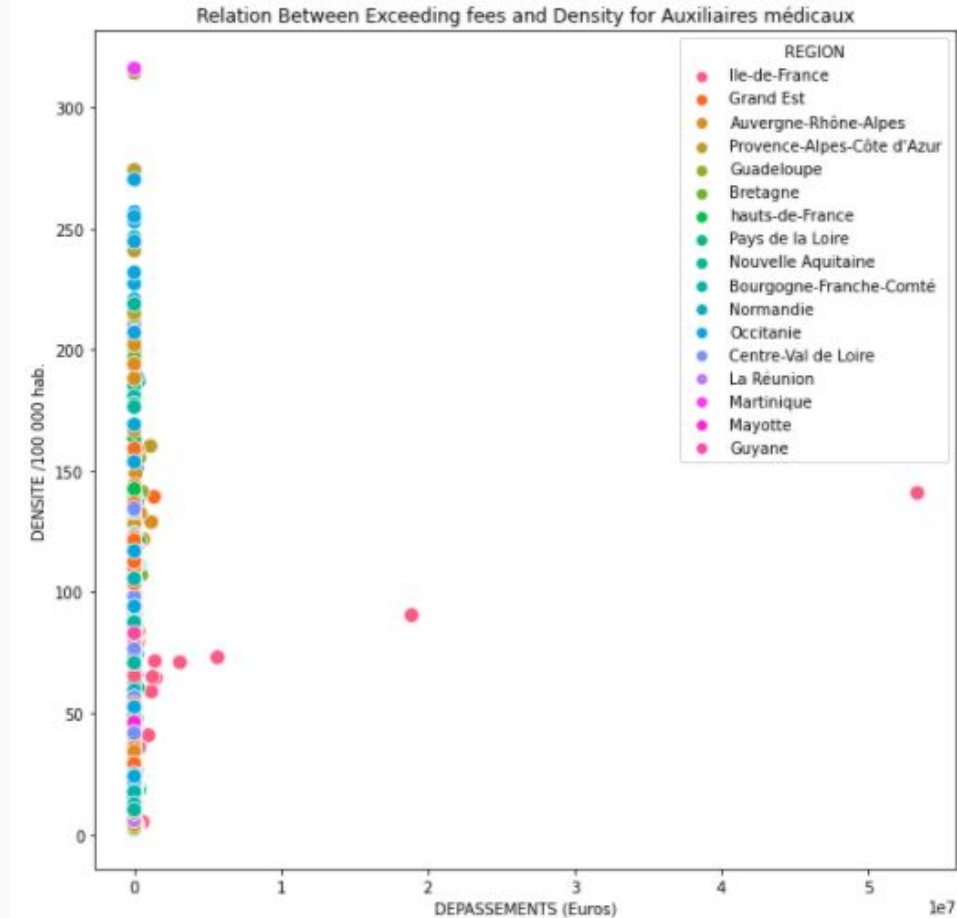
Correlation between exceeding fees and density for the **specialists**



- NO correlation in general from graph
- a weak correlation (corr coefficient = 0.42) from correlation table



Correlation between exceeding fees and density for the **medical auxiliaries**



- NO correlation from graph and no correlation (corr coefficient = **0.06**) from correlation table



CORRELATION ANALYSIS FOR SPECIFIC CASES



- Il de France
 - High exceeding fees
 - Low density



Martinique & Guadeloupe

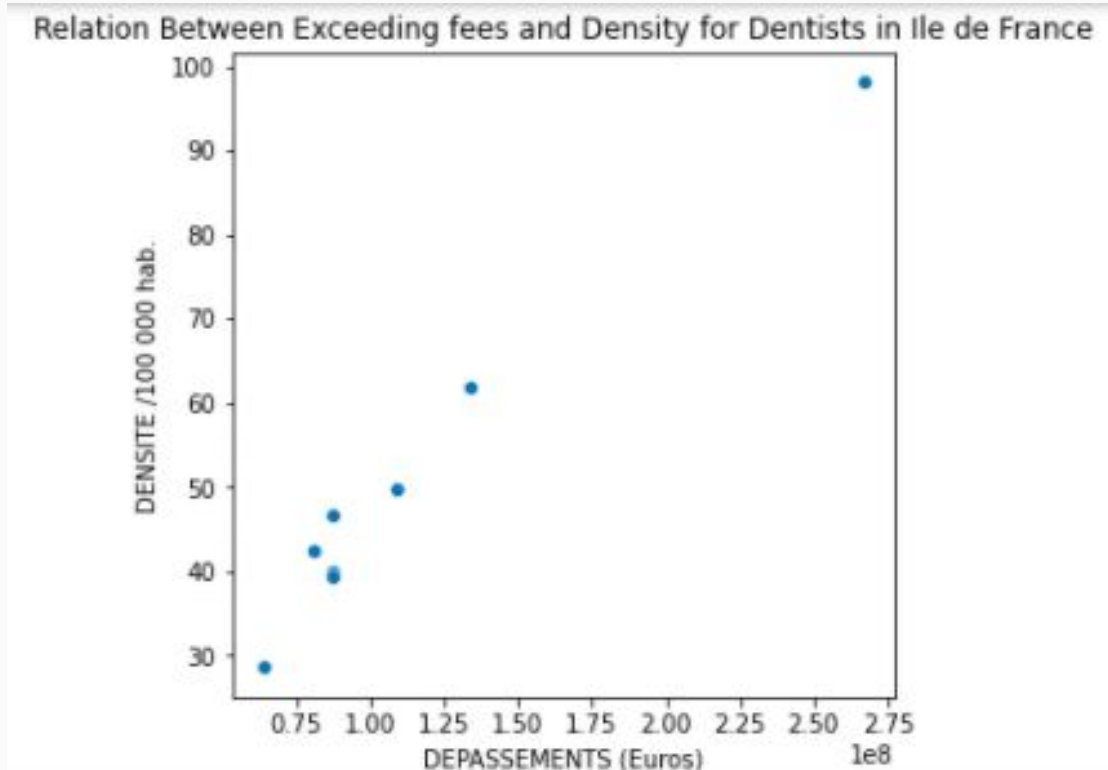
- Low exceeding fees
- High density



Correlation between exceeding fees and density for the **dentists**

Visualization

Interpretation



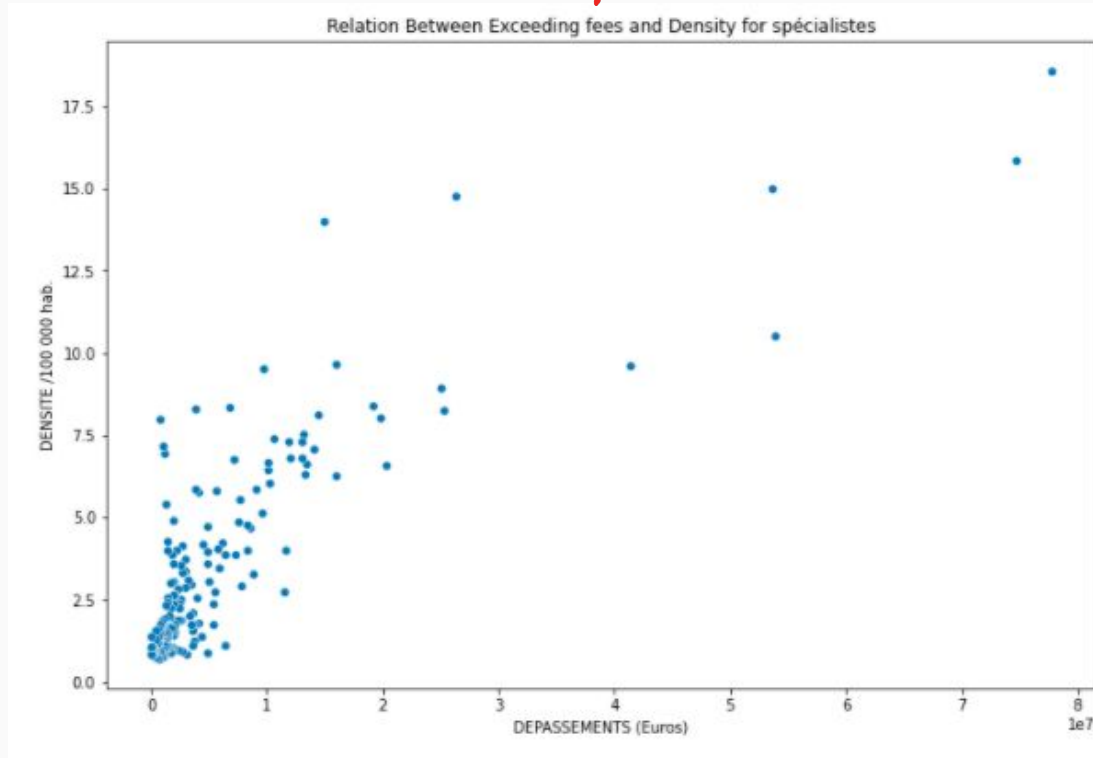
- Strong positive correlation (corr coefficient = **0.98**).
- The more dense of the dentists, the more exceeding fees.



Correlation between exceeding fees and density for the **specialists**

Visualization

Interpretation



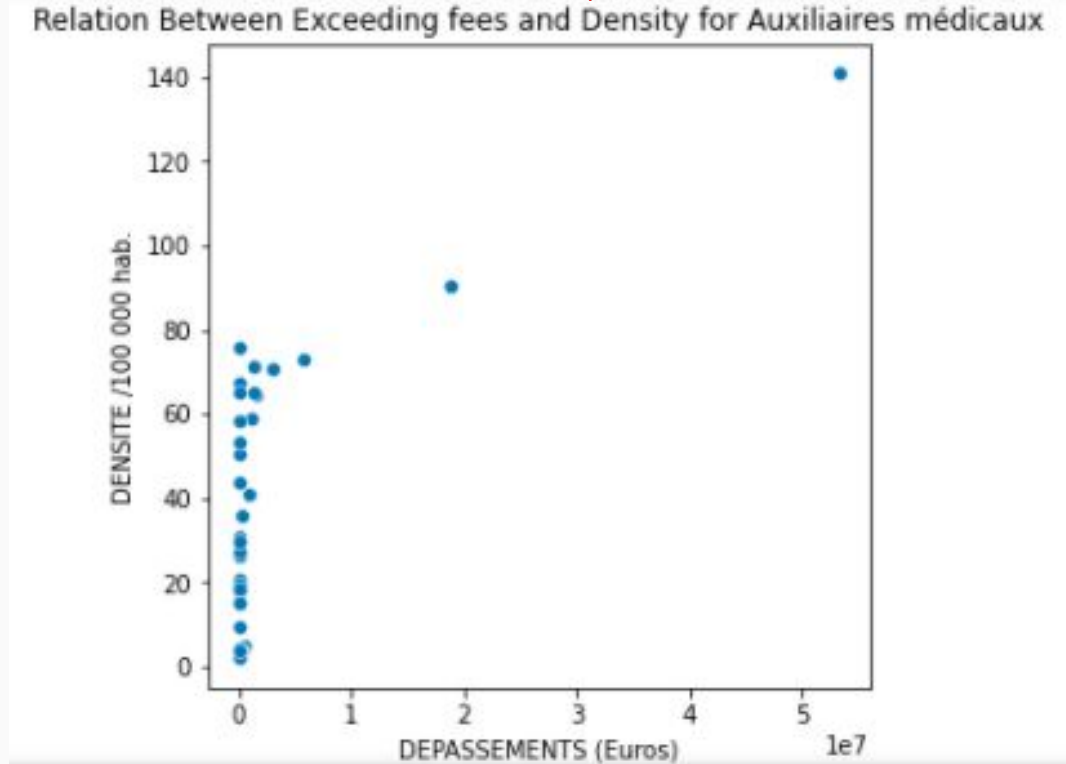
- There is a positive correlation (corr coefficient = **0.81**) with lots of outliers.



Correlation between exceeding fees and density for the **medical auxiliaries**

Visualization

Interpretation



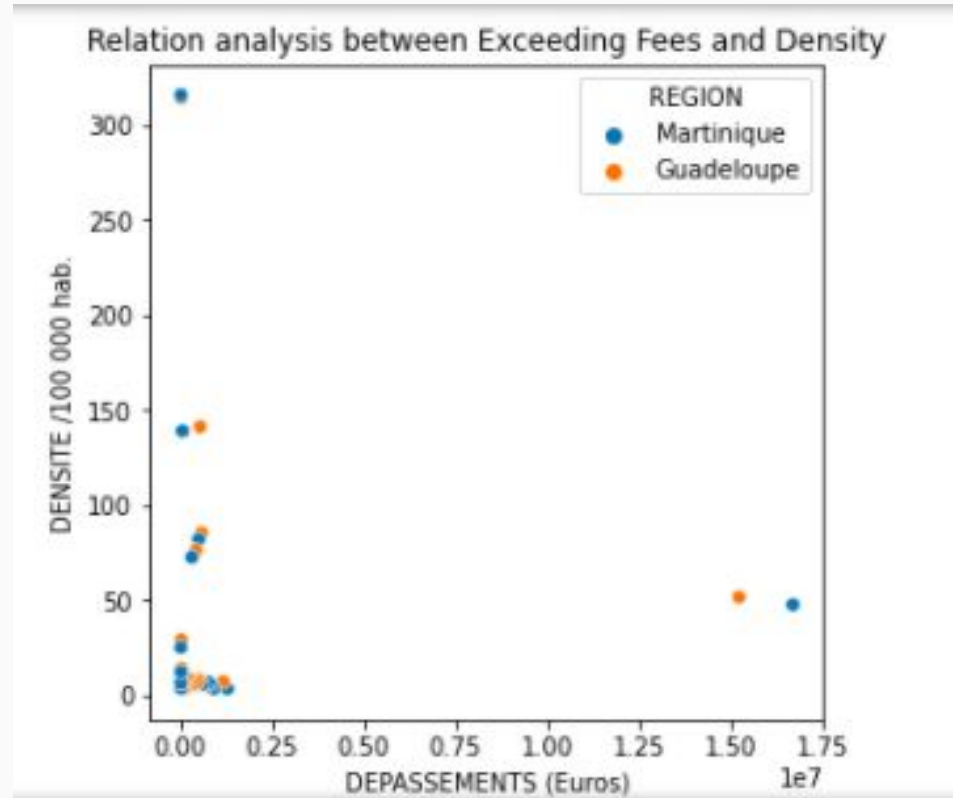
- There is almost NO exceeding fees in the field of medical auxiliaries so there is no possible correlation.



Correlation between exceeding fees and density for **Martinique** and **Guadeloupe**

Visualization

Interpretation



- There is no relation (corr coefficient < 0.01) between exceeding fees and density in Martinique & Guadeloupe.

CONCLUSIONS

An aerial photograph of the New York City skyline at dusk. The sky is a mix of dark blue and orange, with scattered clouds. The city is densely packed with skyscrapers, many of which are illuminated with their interior lights. The Empire State Building is prominent in the center, with its top lit in red and green. The Hudson River is visible on the right side of the image.

Results of Region Analysis

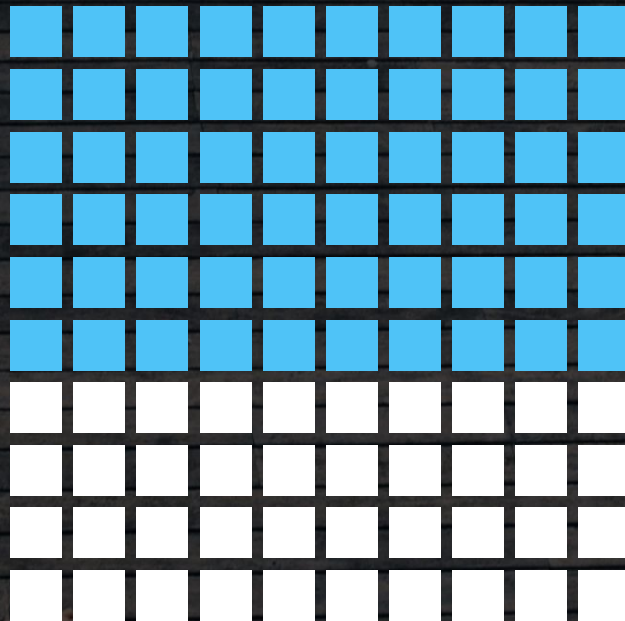
- Ile de France → high exceeding fees / low density
 - A significant **positive** correlation between exceeding fees and density for the dentists and the specialists, **NOT** for the medical auxiliaries.
- Martinique & Guadeloupe → low exceeding fees / high density
 - **NO correlation** between exceeding fees and density

Results of Specialty Analysis

- **Dentists** → high exceeding fees / high density
 - A high **positive** correlation between exceeding fees and density
- **Specialists** → high exceeding fees / low density
 - A **positive** correlation between exceeding fees and density
- **Medical auxiliaries** → low exceeding fees / high density
 - **NO** correlation between exceeding fees and density

CONCLUSION:

- In general, there is **NO** strong link between exceeding fees and density. However, we found some correlations when we specifically analyse by '**top**' specialities.
- **Dentists & Specialists** specialities are the top two in exceeding fees in comparison to other specialities, especially in **Ile de France, Martinique & Guadeloupe**.





Questions



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