

# IBM APPLIED DATA SCIENCE CAPSTONE

The Battle of Neighborhoods



# INTRODUCTION

- Luxembourg is one of the founding countries of the EU
  - Renowned for high-income market economy and high level of innovation
  - Divided in 12 cantons and 102 municipalities
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- ➔ Demographic analysis to understand overall development within country at local view
  - ➔ Venue descriptors to augment demographic analysis
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- ➔ Find differences/similarities within municipalities and cantons
  - ➔ Provide guideline for potential immigrants to choose optimal residence based on analysed metrics

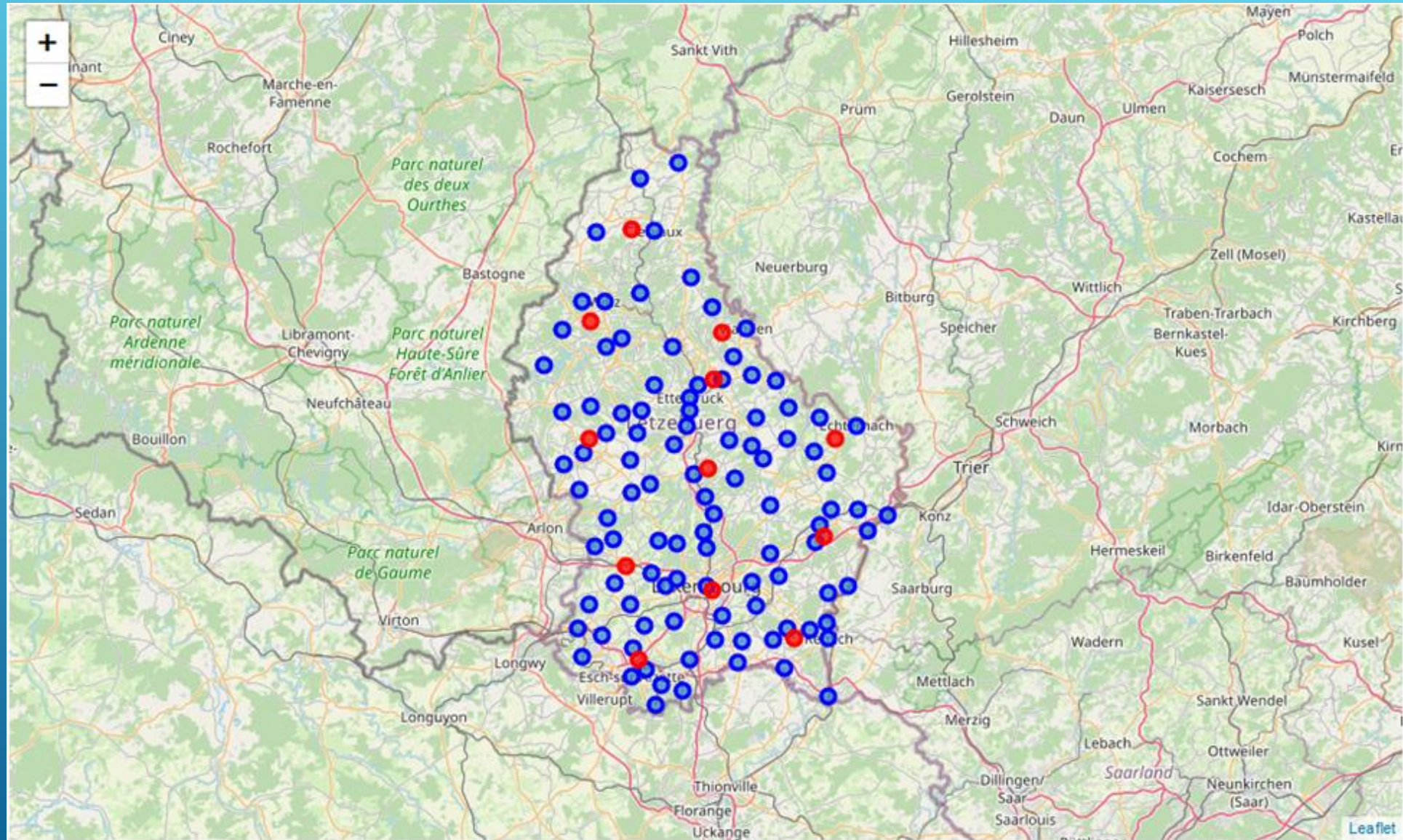


# DATA ACQUISITION AND CLEANING

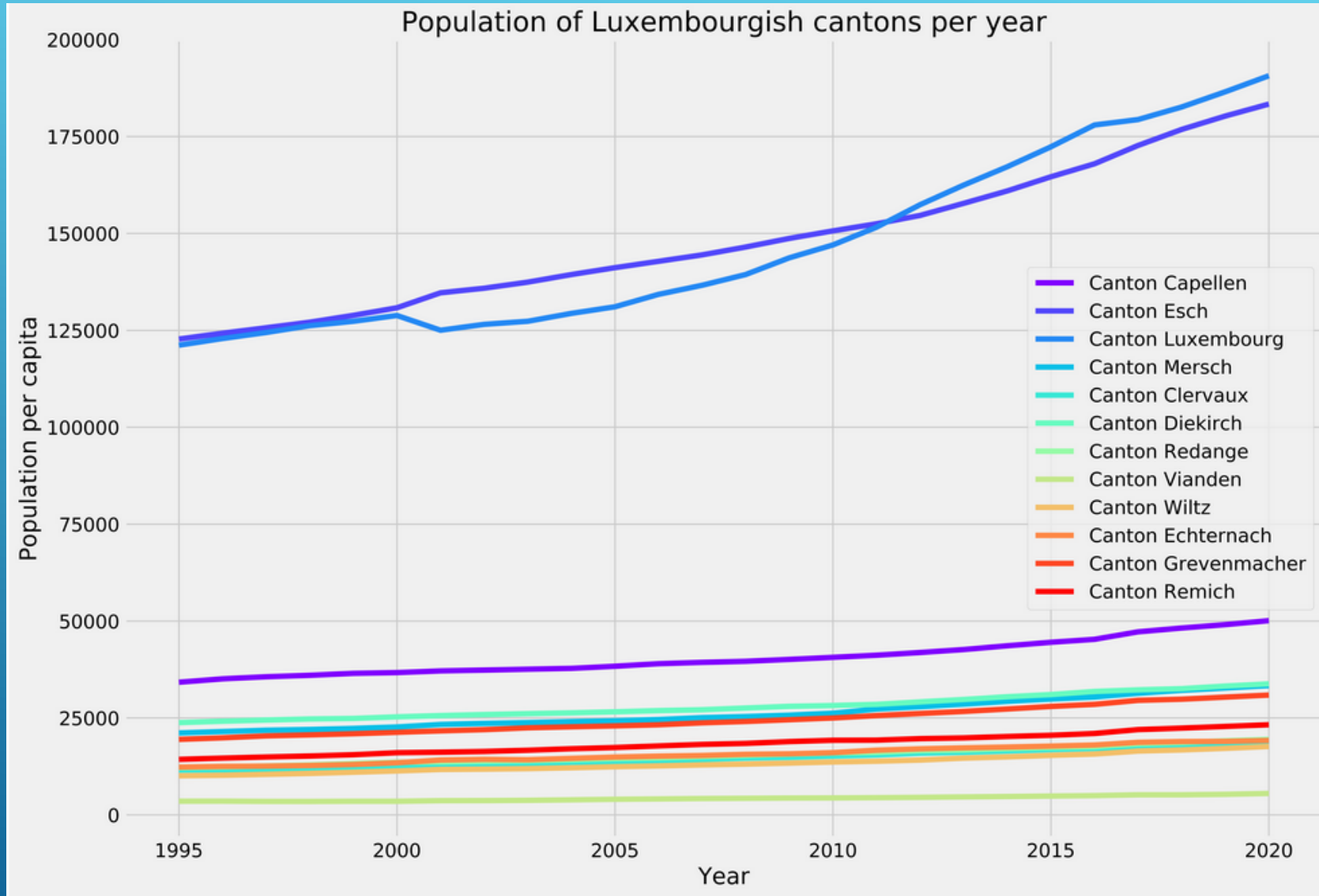
- Data acquired from <https://statistiques.public.lu/en/index.html>
- Data sets free to download in xls-format → data cleaning required to have it in manageable format
- Population per canton and municipality (1995-2020)
- Population Density per canton and municipality (1995-2020)
- Unemployment rates per canton and municipality (per yearly document 2010-2018)
- Net Migration within cantons and municipalities (2010-2018)
- Victims in accidents per canton and municipality (per yearly document 2010-2018)
- Foursquare location data extracted with Foursquare API



# OVERVIEW OF CANTONS AND MUNICIPALITIES

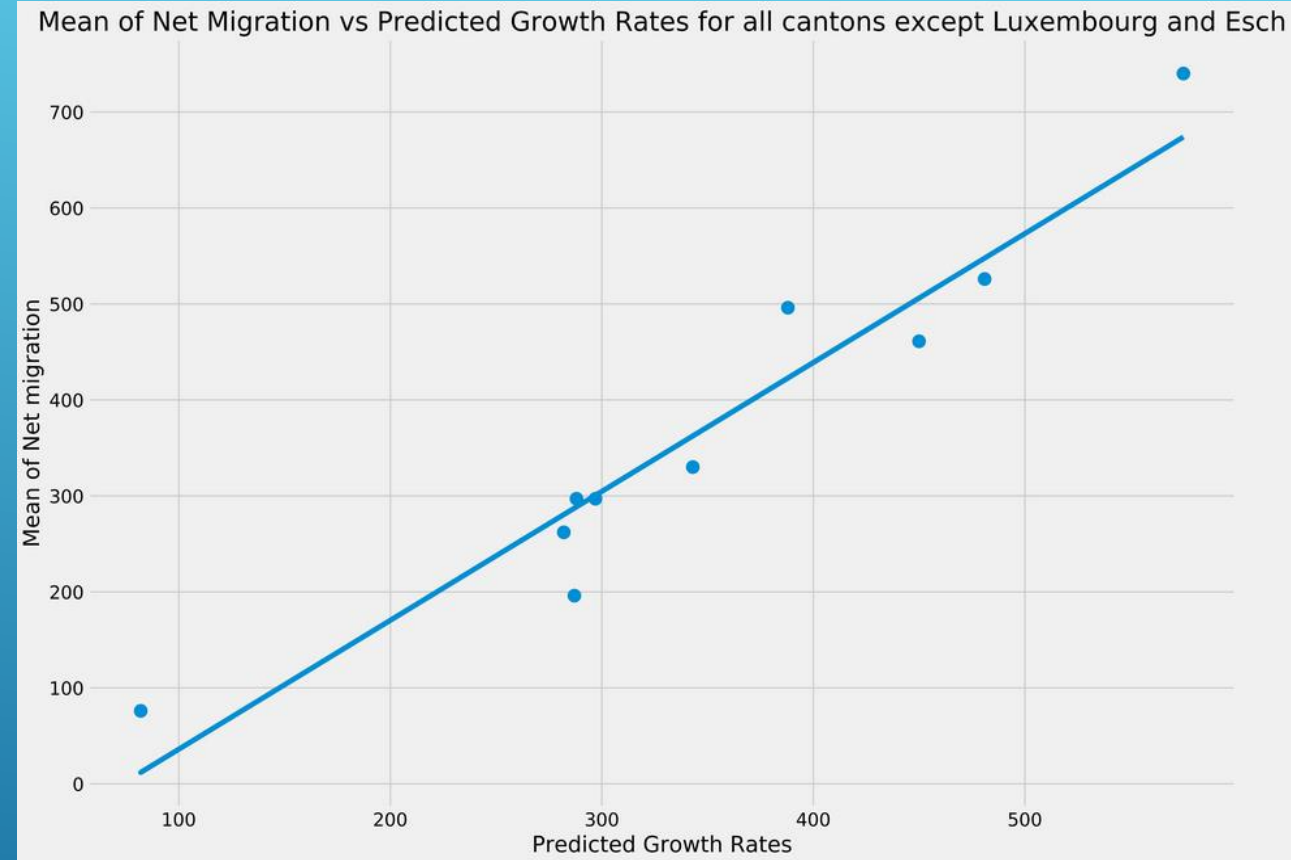
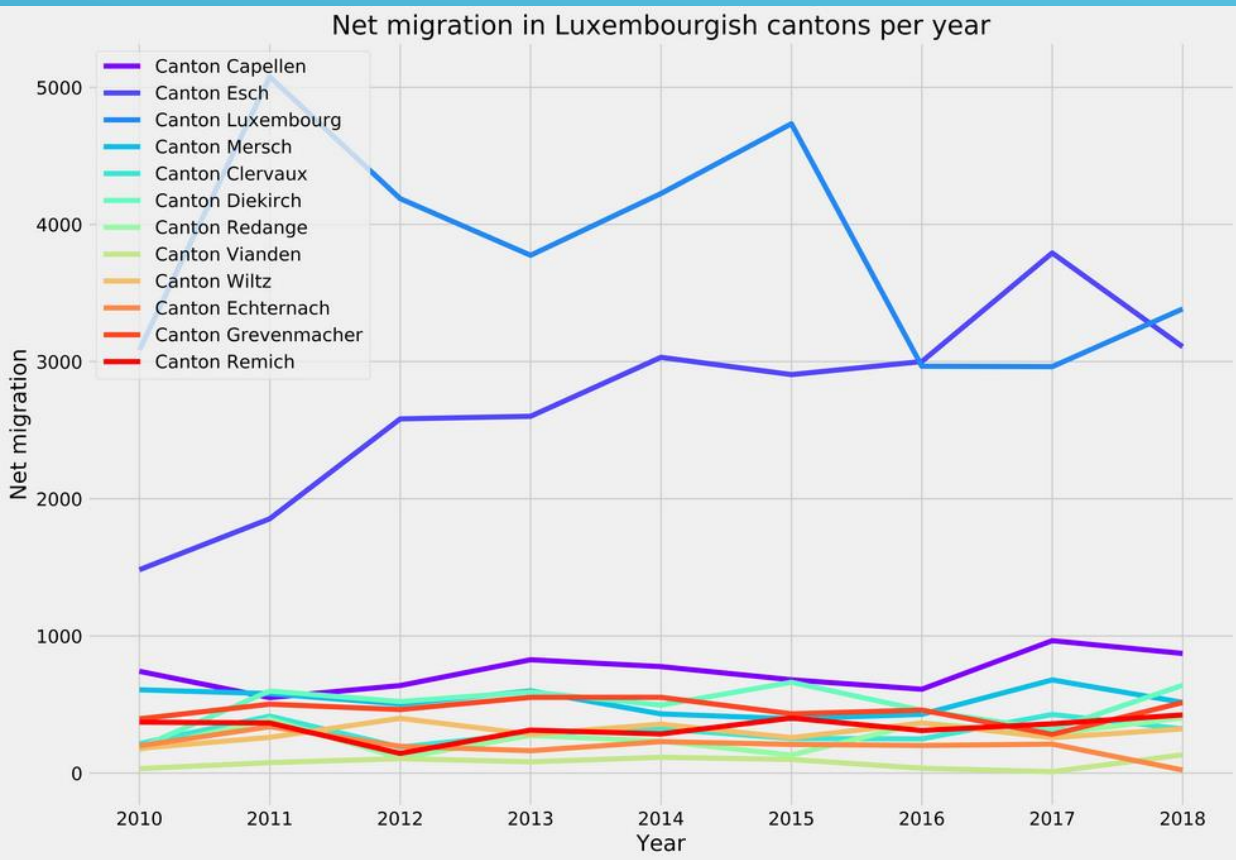


# POPULATION IS STEADILY INCREASING

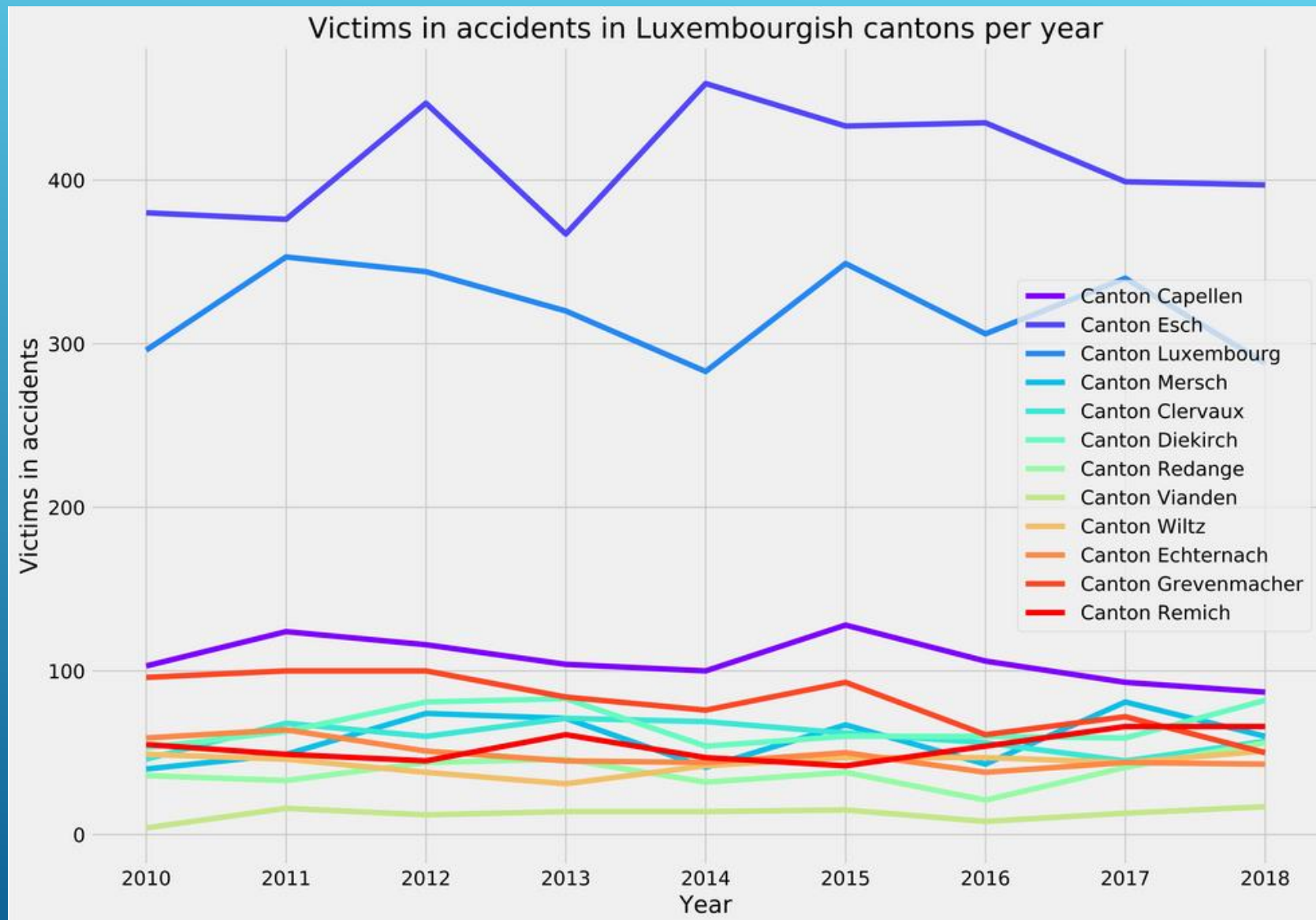




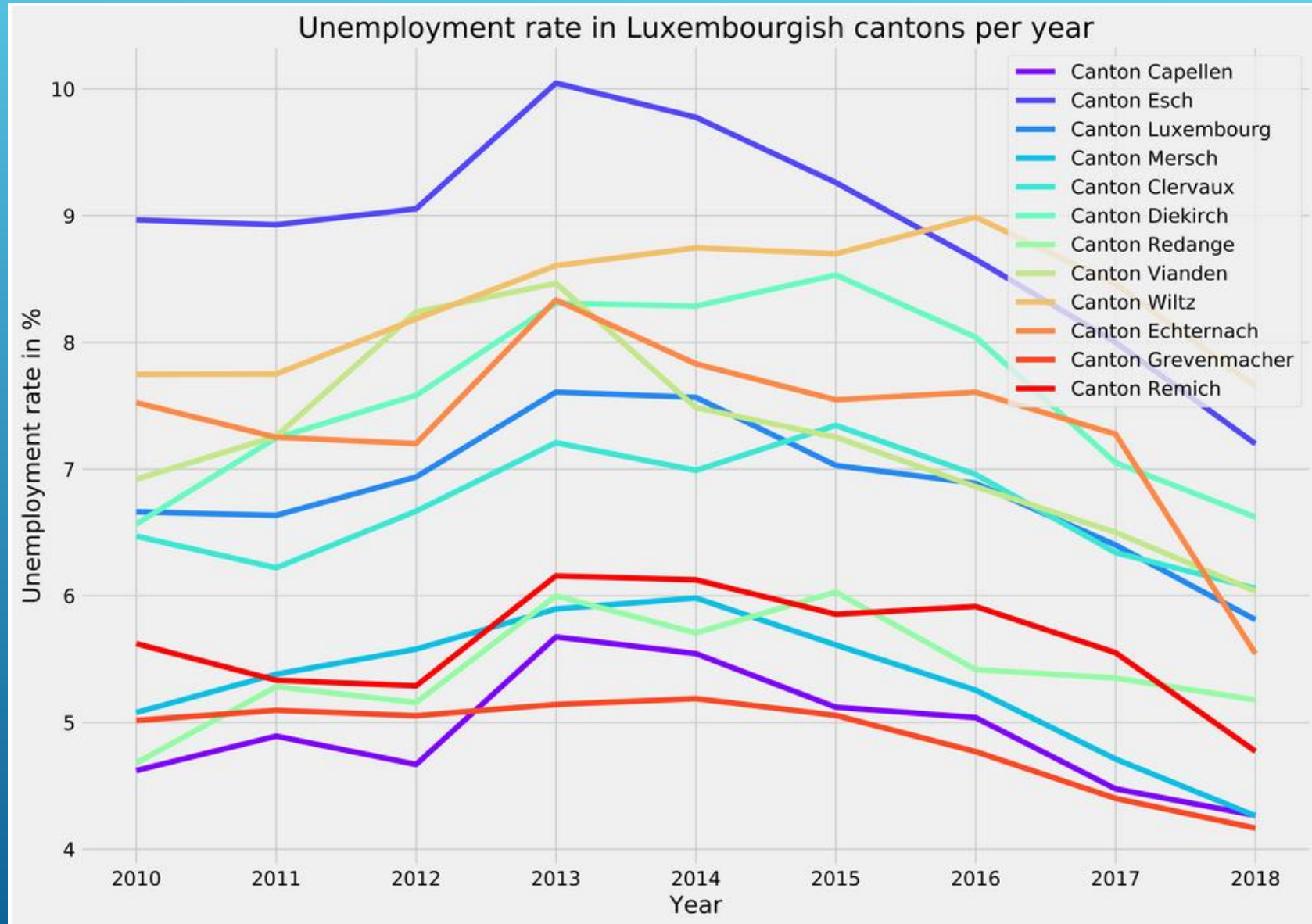
# NET MIGRATION IS CONSTANT AND CORRELATES WELL WITH POPULATION GROWTH RATES (FOR 10/12 CANTONS)



# AMOUNT OF ACCIDENT VICTIMS REMAINED CONSTANT FROM 2010-2018

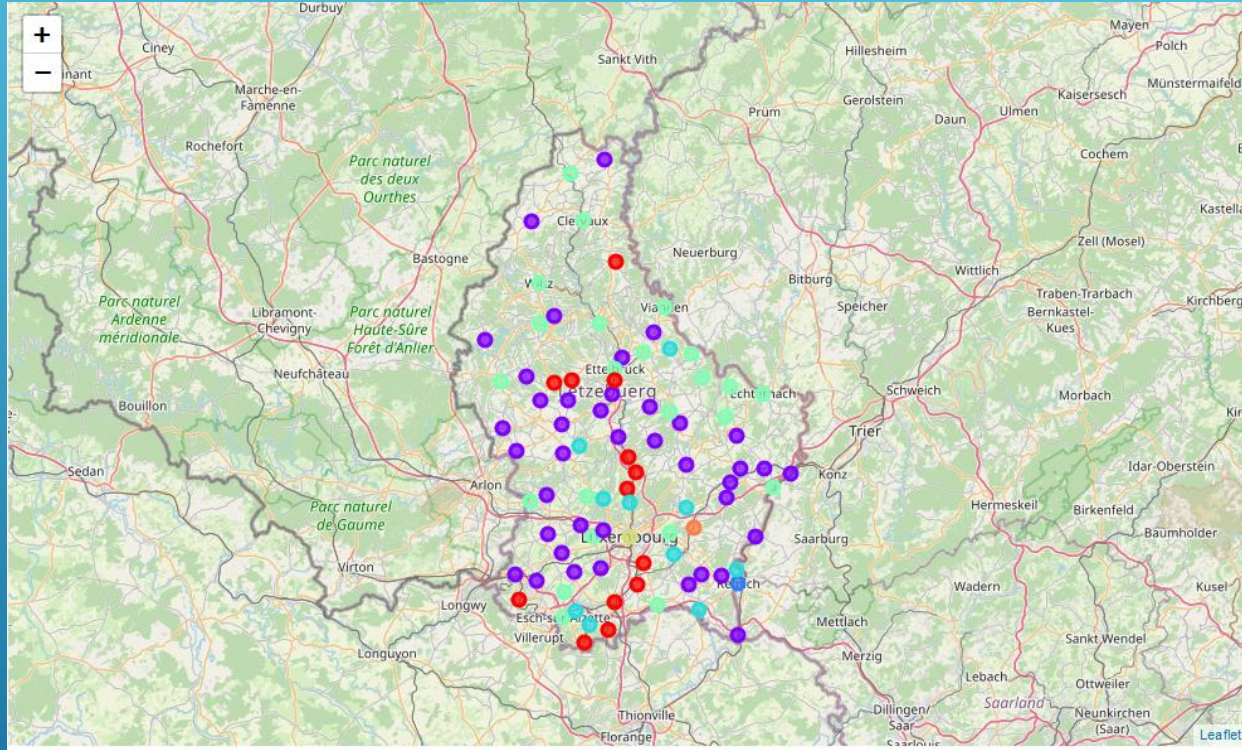


# UNEMPLOYMENT RATES ARE ON THE DECLINE



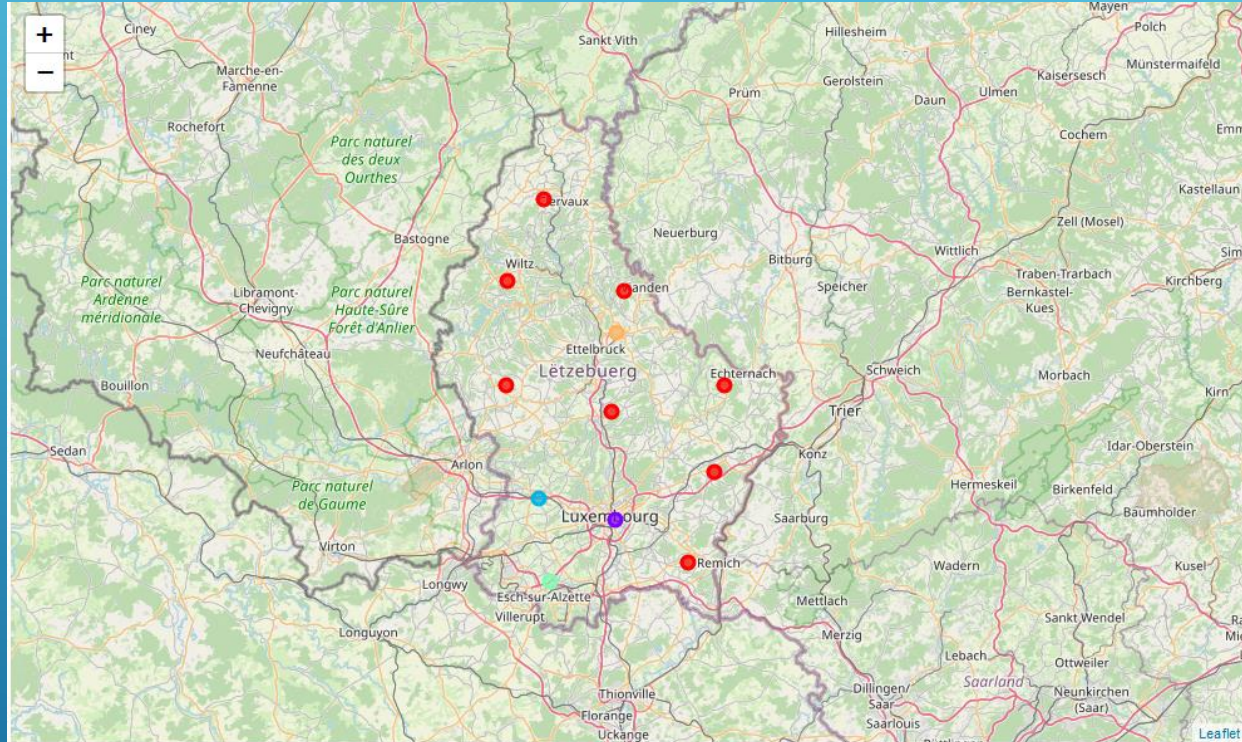


# MUNICIPALITIES ARE VERY SIMILAR



- Difficulties to find clear clusters with Kmeans → municipalities from one cluster spread over whole Luxembourg
- Indication that this local view, municipalities are very akin

# CANTONS SEGREGATE INTO 5 CLUSTERS



- Clustering of cantons is easier to understand
- Luxembourg, Esch, Capellen and Diekirch stand out as biggest cantons
- The remaining 8/12 are very alike



# TAKE HOME MESSAGES

- Luxembourg is growing steadily over the last 25 years
  - The unemployment rate is overall decreasing since 2010
  - 4 cantons stick out from the remaining 8
  - Municipalities are very alike throughout the whole country
- ➔ Guideline to assess future residence according to demographic indicators and local venue indicators was established