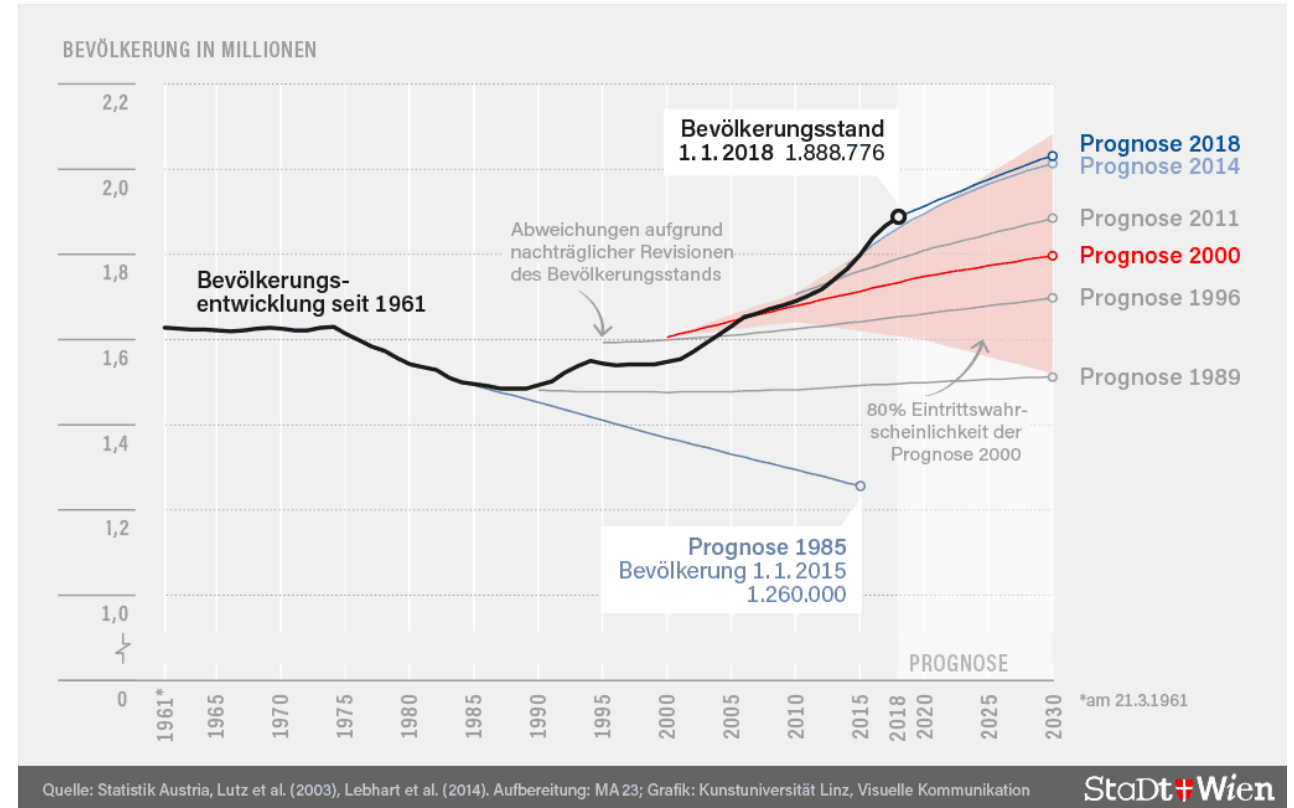


# Finding the best locations for new Pharmacies in Vienna

IBM DATA SCIENCE CAPSTONE PROJECT

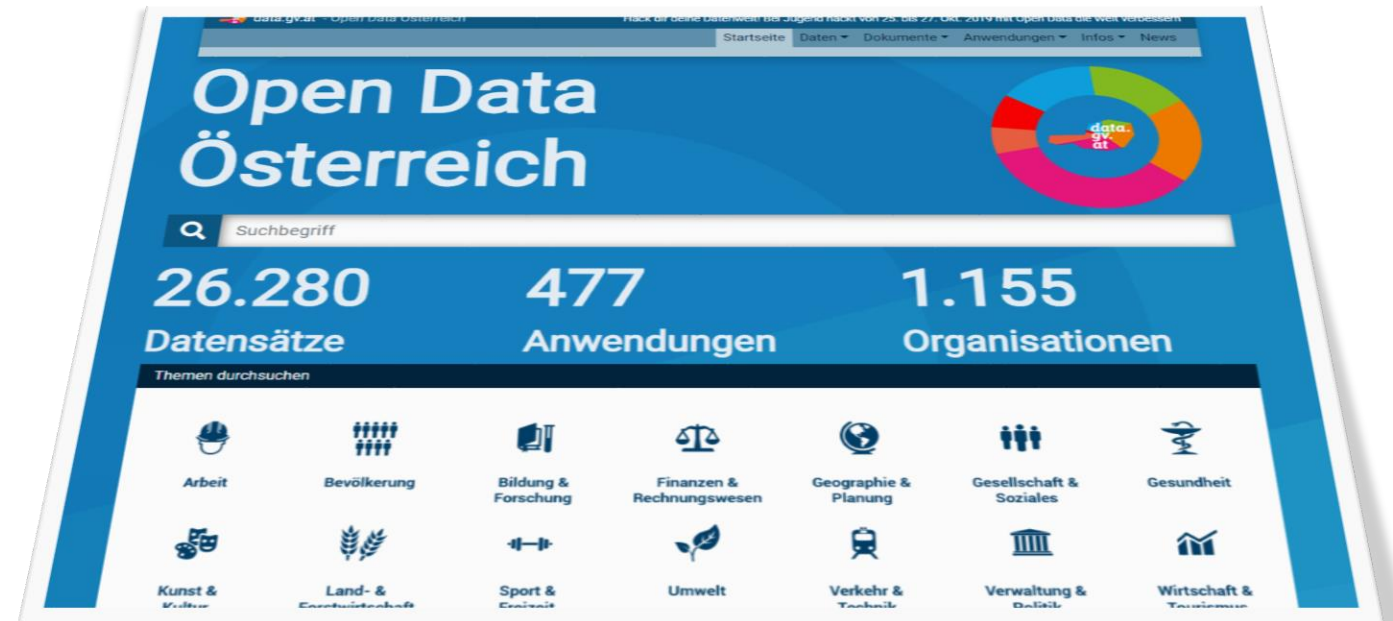
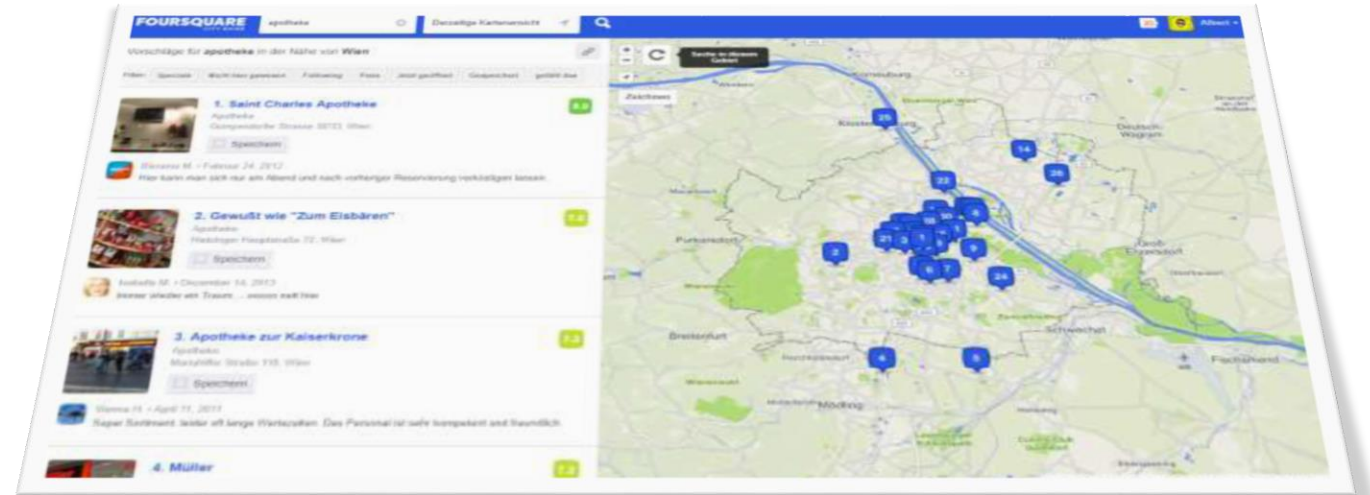
# Introduction / Business Problem

- Problem
  - Massive population growth
  - Healthcare system under stress
  - Shortages imminent until 2034
- Audience
  - Investors
  - Public administration
  - Universities
  - Politicians



# Data

- Foursquare
  - Locations
  - Venues
  - Places
- Open Data Austria
  - Population development
  - Pharmacy locations
  - District boundaries



# Methodology

- Data preparation
  - Retrieval
  - Preprocessing
- Exploratory analysis
  - Merging datasets
  - Statistical analysis
  - Plotting
- Clustering
  - Feature engineering
  - Machine learning

Population projection by sex and country of birth for districts in Vienna 2014 to 2034:

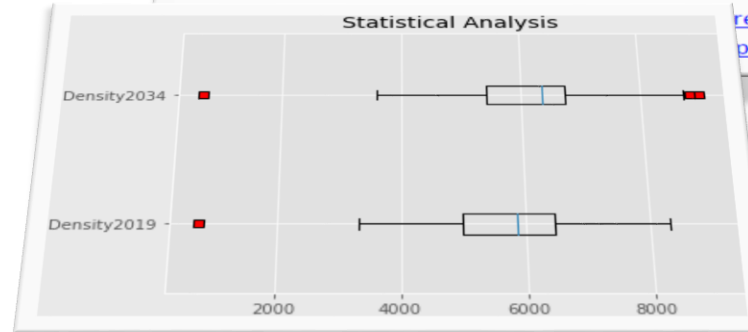
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Pharmacy locations Vienna:

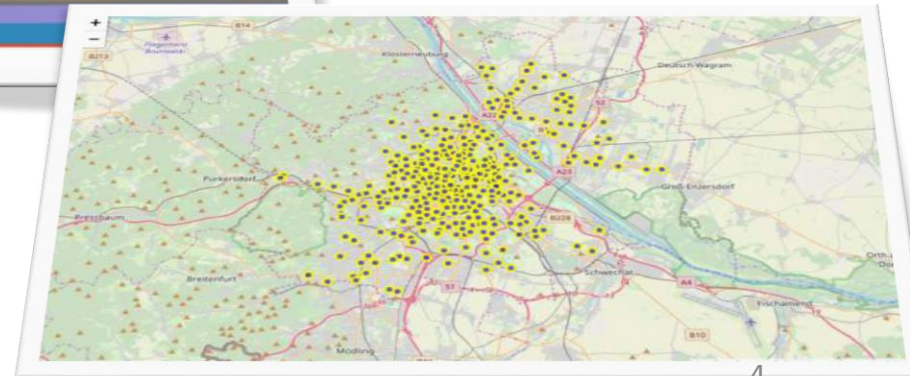
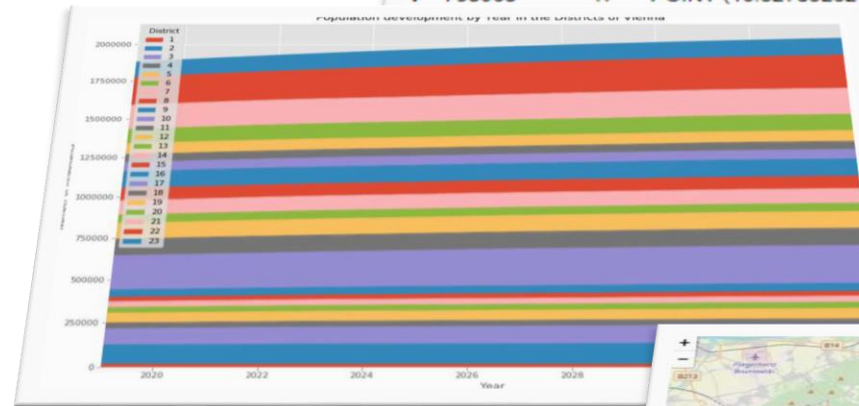
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Vienna District boundaries:

[request=GetFeature&version=1.1.0&typeName=ogdwie outFormat=json](https://data.wien.gv.at/daten/geo?service=WFS&request=GetFeature&version=1.1.0&typeName=ogdwie outFormat=json)

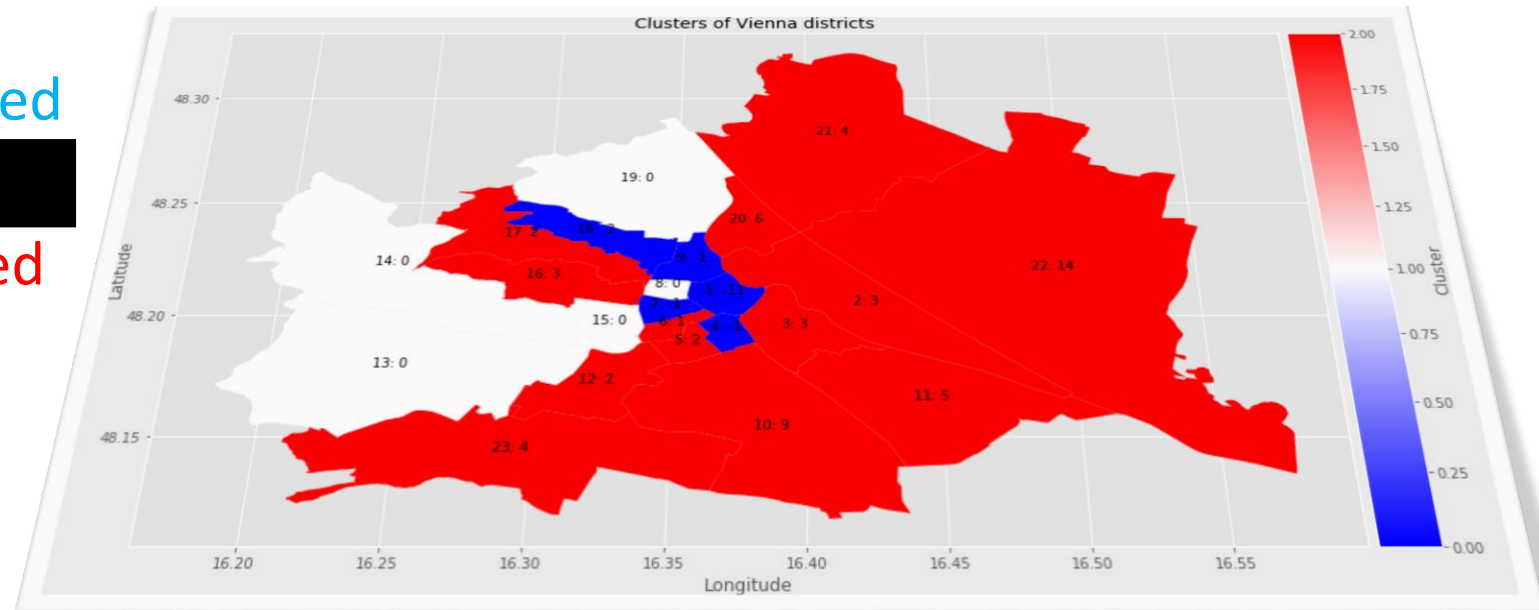
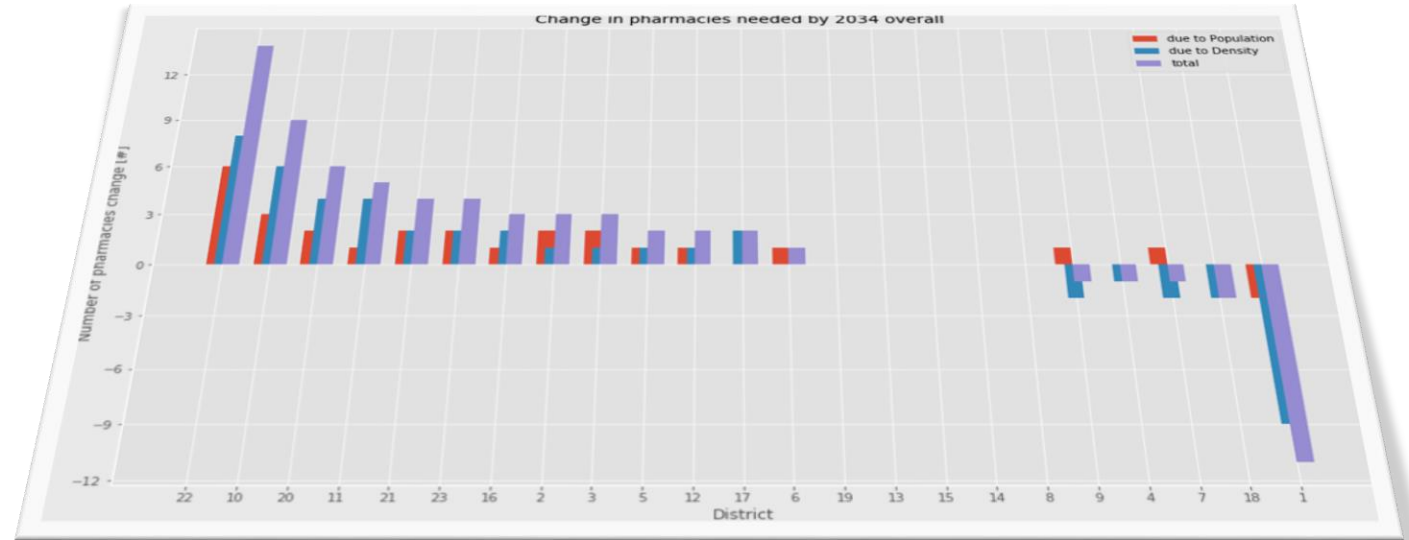


	ID	District	geometry	Longitude	Latitude
0	798067	16	POINT (16.30518521580027 48.21007436224088)	16.305185	48.210074
1	798068	17	POINT (16.3278525218971 48.21553926756905)	16.327853	48.215539
			POINT (16.318416 48.222332)	16.318416	48.222332
			POINT (16.326131 48.219355)	16.326131	48.219355
			POINT (16.301631 48.228519)	16.301631	48.228519



# Results

- Two main challenges
  - Population development
  - Density imbalance
- Three clusters
  - Fewer pharmacies needed
  - Just right
  - More pharmacies needed



# Outlook

- More detailed analysis needed to find specific locations
- Ongoing political debate regarding deregulation
- Further research needed regarding impact on public transport