Data Visualization

ELEMENT 2: CLIMATE CHANGE VISUALISATIONS

GROUP ID: DELTA

W9505792, W9543071, W9533735, W9558264, W9546579
TEESSIDE UNIVERSITY | 2020/21

Introduction

This is Data visualization for the climate history of top 5 cities in Spain (Barcelona, Bilbao, Madrid, Seville, Valencia). Report is presenting various climate parameters temperature and humidity for these cities, what are trends over years and over specific times of the day.

team members of delta are going to present this project.

Project Brief

Objectives

This visualization is to explore the climate of various cities of Spain over the year. This will give a comparison of climate for these cities over a period of the year, period of the day. Also, what is the most common weather in these cities?

1. Which city is more hot/ cold/ humid?
2. What time of the year does temperature rise drops for the cities?
3. What time of the day does the temperature rise or fall?
4. What is the overall weather condition over the year?
5. Does the geographic location of the city have specific weather conditions?

Dataset

This dataset is downloaded from the Kaggle site
https://www.kaggle.com/nicholasjhana/energy-consumption-generation-prices-and-weather

We have used weather data CSV from this dataset. It provides weather data for the cities mentioned above for 3 years (2015 to 2018). It has data per hour for temperature changes and humidity.
This will be used to explore the weather trends of these cities.

Data Types

Data has following columns

Columns	Data Types	Unit
dt_iso	Datetime	
City_Name	Text	
Temp	Number	Kelvin
temp_min	Number	Kelvin
temp_max	Number	Kelvin
Humidity	Number	%
wind_speed	Number	m/s
Rain (in last 3 hr)	Number	mm
Snow (in last 3 hr)	Number	mm
Weather_main	Text	

While using columns for analysis, we have converted the Kelvin values to Celsius and then pivoted the columns to have all the number values in one column.

For visualization, Relationships are created between city and date table with fact data

Audience

The target audience of the project is Spain people ad government. The dataset helps the Spain people and government to understand the weather changes. The weather dataset and its impacts on the Spain people have created a motivation to work on this project. The project creates interest to classify the hottest to coldest cities in Spain. The changes in the temperature between various cities are creating more interest to learn the impacts of climate change in Spain. The commercial context of this project is to present the temperature change visualizations among different cities in Spain. This can be utilized for reducing the impact of climate change in Spain. Using this visualization, the Spain Government and People might take action to reduce the hottest climate impacts.

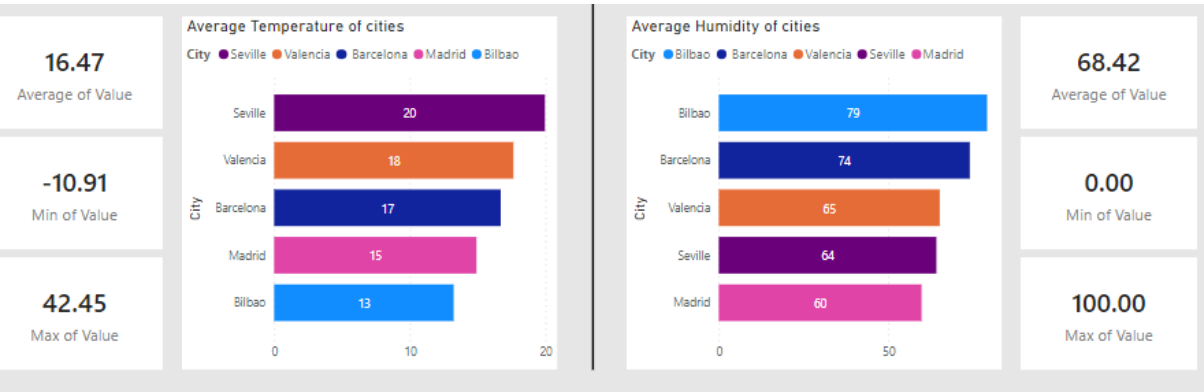
Data Analysis

These visualizations are created in Power BI, we have used the Pie charts, KPI cards, text, Trend charts and bar charts to explore the data.

KPI cards show the key numbers whereas Trend lines will give us details on how values trend over time. Trendlines are helpful to find patterns in the data. In our case Trendline over the date will who that temperature rise and fall over in specific months. Whereas humidity for Madrid and Seville rises and falls in specific months but for other cities, it is mosty consistent over all the months.

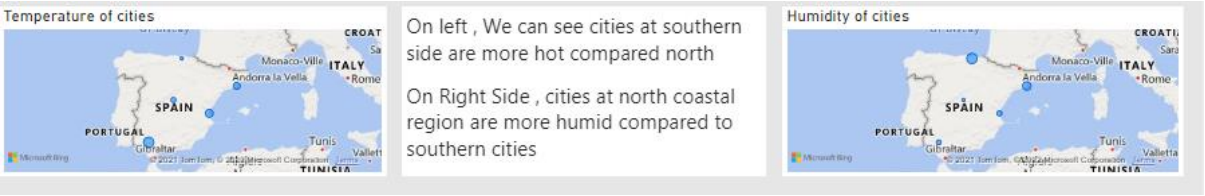
Data Narrative

KPI cards to show Average, Min and Max values of the Temperature and Humidity across all 5 cities. Whereas bar charts showing city-wise average temperature and humidity

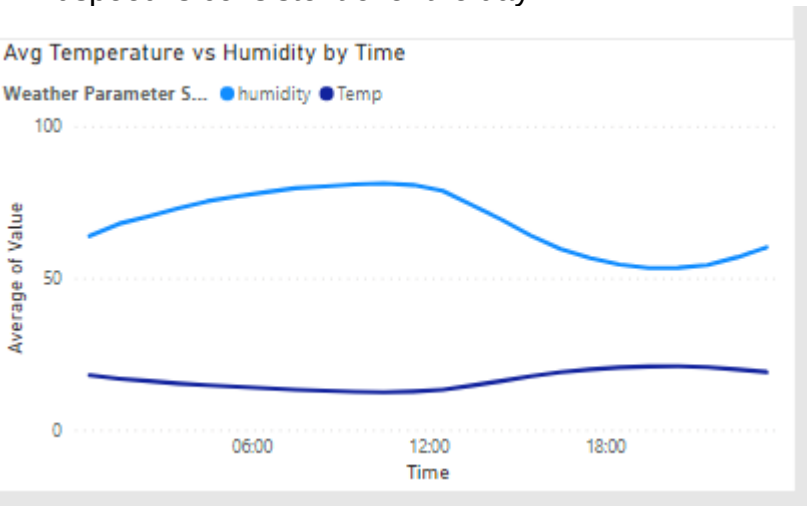


W9505792, W9543071, W9533735, W9558264, W9546579

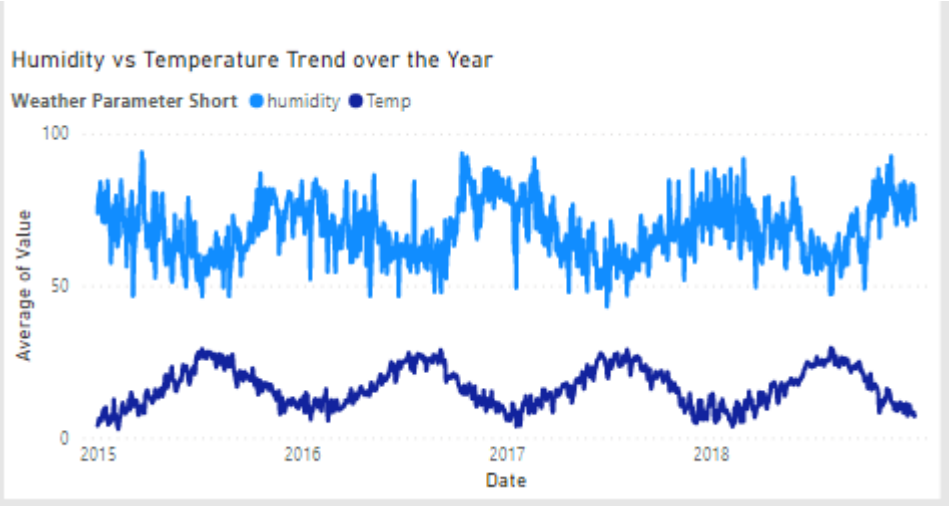
Map Chart shows the cities location and values for the weather conditions, here we are checking humidity percentage of each city. We can say that cities at coastal region are more humid than central cities.



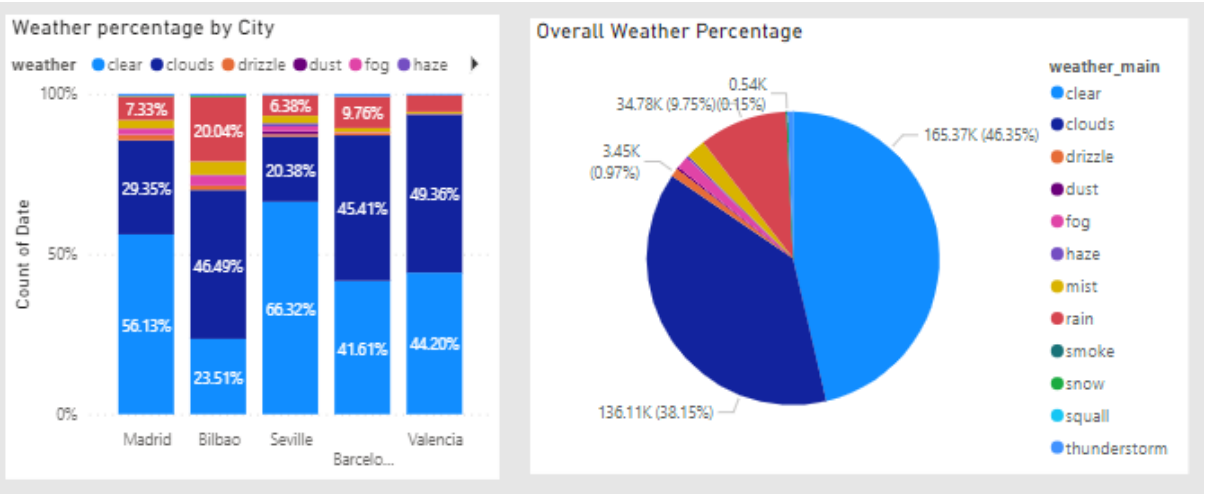
Trend line for hour of the day, we are showing how different temperature and humidity changes during hour of the day, we can see that humidity increases during day and falls at night whereas temperature rises at night compared to day time. Windspeed is consistent over the day.



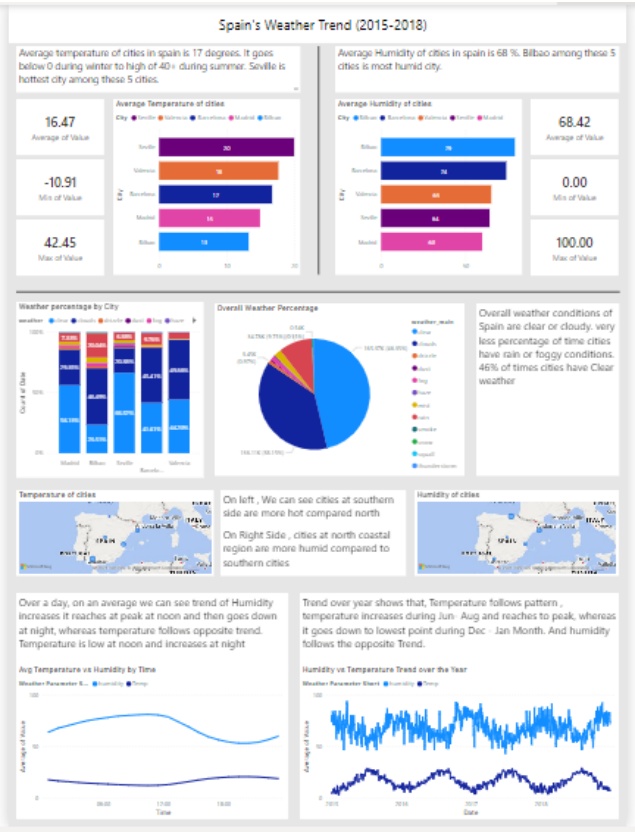
Trend line over the days, showing temperature and humidity change over days, it show the pattern of , temperature rises during June-Aug and falls during Dec-Jan



Pie chart, showing what is main weather condition is for all the cities, whereas 100% stacked bar shows what is percentage of common weather condition per city. In this case Madrid has clear weather for 56 % of time over the year and 29% of times its cloudy.



Data Representation



Critical Reflection

Exploratory analysis performed through this infographic's, answers most of the questions we are trying to answer.

1. Seville is the hottest city. Whereas Bilbao on average is more humid.
2. For all the cities temperature rises during the June-Aug timeframe and falls to a minimum during Dec – Jan months
3. All the cities see a drop in humidity after 5.30 PM and temperatures rise at the same time.
4. Only Bilbao had snow during the start of 2015 other cities did not have any snow during 2015-2018
5. Rain is also seen in Bilbao city.
6. All the cities have Clear and cloudy weather conditions

Charts created for the infographics are consistent to present the information related to specific cities and dates. Aesthetically placed in a way that it will present key information for city and weather parameters at the top and then in-depth trends over time.

Charts are easy to read, end-users can get key information and see the trend charts and find patterns in the weather of that city.

Charts created for infographics here are presenting clear information about how the weather trends in different cities of Spain. How cities that have the same geographic location have resembling weather.

Project Work Plan

S.No	Tasks	Dates	Durations	Responsibilities	Group Member Name
1	Finding the Dataset	1/11/2021	1 Week	• Analyze various dataset platforms to get right dataset. • Selecting dataset from Kaggle.	Sai Chandra
2	Selecting the Objectives	8/11/2021	1 Week	• Develop a meaningful objectives based on the dataset. • The objectives of the dataset should resemble climate change.	Naveen
3	Finalizing the Dataset	15/11/2021	1 Week	• Checking the appropriateness of the dataset. • Finalizing the dataset for analyzing climate change.	Sebin
4	Cleaning the Dataset	22/11/2021	1 Week	• Finding and removing all the irrelevant and duplicate data. • Removing unwanted observations from the dataset.	Praseena

				• Fixing the structural errors. • Filtering the unwanted outliers. • Handling the missing data. • Validating and checking the data quality.	
5	Building the Data Model for the Report	29/11/2021	2 Weeks	• To develop the data model select the appropriate tool. • Working with the team to create the data model. • Implementing data strategies.	sahitya
6	Creating Calculated Columns and Measure Values to Represent on Report	13/12/2021	1 Week	• Develop the calculated columns using Data Analysis Expressions (DAX) formulas. • Create a new measured column for reaching the objectives.	sahitya
7	Building Charts and Quality Criteria	20/12/2021	1 Week	• Perform analysis in the tool to build the charts. • Charts should include all the important dimensions and measures of the dataset. • Develop quality criteria for analysing the visualization effectiveness.	Sebin

8	Finding a Pattern of Data and Designing the Infographic	27/12/2021	1 Week	• From the data visualization identify the data patterns. • Develop the infographics for presenting the data visualization.	Naveen
9	Report Writing	03/12/2021	1 Week	• Present all the findings and process of data visualizations in the report.	praseena
10	Final Presentation	10/01/2022	1 Week	• Final project work is to be submitted for evaluation.	Sai Chandra