Precipitation in Australia

Overview and Influencing factors

成昊国 42054026
姜萌 42054031

Team_3

Research Questions

- Precipitation conditions in various Australian cities (regions).
- Variation in rainfall trends in Australia.
  - Years
  - Months of the same year
- Factors influencing whether or not rain will fall in the Australian cities (regions) tomorrow.

Variable Description of Dataset

- **Location**：The common name of the location of the weather station
- **MaxTemp**：The maximum temperature in degrees Celsius
- **Evaporation**：The so-called Class A pan evaporation (mm) in the 24 hours to 9am
- **WindGustDir**：The direction of the strongest wind gust in the 24 hours to midnight
- **WindDir9am**：Direction of the wind at 9am
- **WindSpeed9am**：Wind speed (km/hr) averaged over 10 minutes prior to 9am
- **Humidity9am**：Humidity (percent) at 9am
- **Pressure9am**：Atmospheric pressure (hpa) reduced to mean sea level at 9am
- **Cloud9am**：Fraction of sky obscured by cloud at 9am, which is measured in "oktas",
- **Temp9am**：Temperature (degrees C) at 9am
- **RainToday**：Boolean: 1 if precipitation (mm) in the 24 hours to 9am exceeds 1mm, otherwise 0
- **lat, lon:** The latitude and longitude of the location
- **MinTemp**：The minimum temperature in degrees Celsius
- **Rainfall**：The amount of rainfall recorded for the day in mm
- **Sunshine**：The number of hours of bright sunshine in the day.
- **WindGustSpeed**：The speed (km/h) of the strongest wind gust in the 24 hours to midnight
- **WindDir3pm**：Direction of the wind at 3pm
- **WindSpeed3pm**：Wind speed (km/hr) averaged over 10 minutes prior to 3pm
- **Humidity3pm**：Humidity (percent) at 3pm
- **Pressure3pm**：Atmospheric pressure (hpa) reduced to mean sea level at 3pm
- **Cloud3pm**：Fraction of sky obscured by cloud (in "oktas": eighths) at 3pm.
- **Temp3pm**：Temperature (degrees C) at 3pm
- **RainTomorrow**：The amount of next day rain in mm

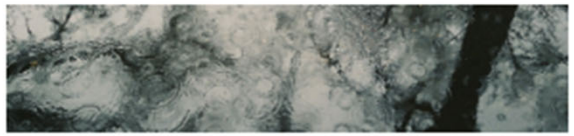
Data Process

- Delete the null numbers
- Delete outliers
- Randomly select 50,000 data

```
# see if there are null data
df.isnull().sum()

#delete null infomation
df.dropna(inplace=True)

# process the data
def delete_outlier(dfs, i):
    zscore = i + '_z'
    dfs.zscore = (dfs[i] - dfs[i].mean())/dfs[i].std()
    dfs = dfs[(dfs.zscore > -3) & (dfs.zscore < 3)]
    return(dfs)

numerical_features = []
for col in df.columns:
    if df[col].dtype != "object":
        numerical_features.append(col)
for i in numerical_features:
    delete_outlier(df, i)

# random sample 5000 rows
df = df.sample(50000, ignore_index=True)
```

Main functions of the Streamlit Page

- Map of regional rainfall in Australia, with a slider which filtered for average rainfall.
- Histograms of rainfall by year and by month
- The tab blocks show the 9 variables that affect rainfall and the relationship between the variable and the forecast for tomorrow's rainfall in different tabs.
- Sidebar which users can enter the names of different areas to see statistics on rainfall at different times of the year and whether it will rain today or tomorrow.



Overview of precipitation in Australia and its influencing factors

See average rainfall of each city in Australia less than the value

Average rainfall

0.00

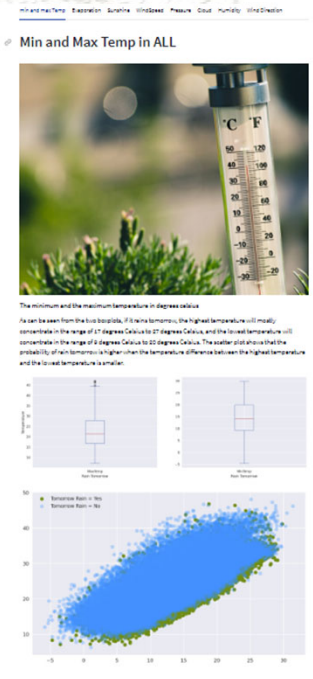
0.00 0.00

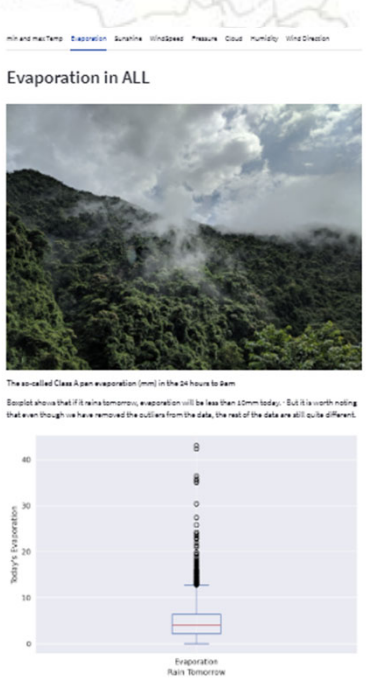
Overview of Precipitation in Australia

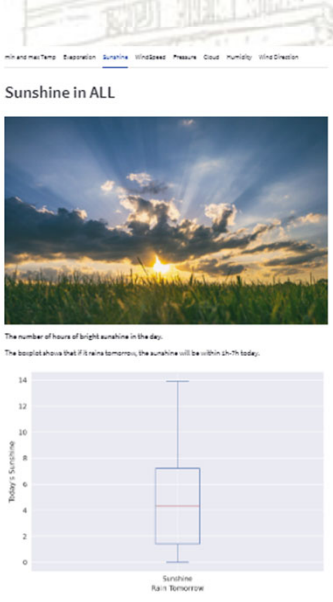
Select an option to see how this factor relates to whether rain will fall tomorrow in the city you enter

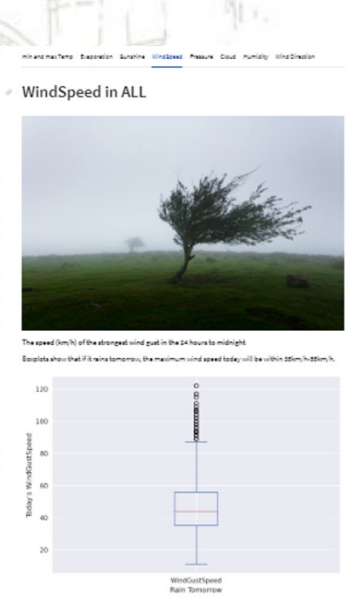
Show conclusion

min and max Temp | Evaporation | Sunshine | WindSpeed | Pressure | Cloud | Humidity | Wind Direction









Overview of precipitation in Australia and its influencing factors

See average rainfall of each city in Australia less than the value

Average rainfall

4.10

0.00 8.00

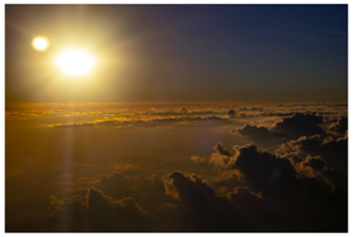
Overview of Precipitation in Australia

Select an option to see how this factor relates to whether rain will fall tomorrow in the city you enter

Show conclusion

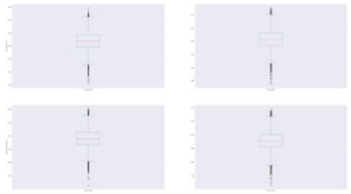
min and max Temp | Evaporation | Sunshine | WindSpeed | Pressure | Cloud | Humidity | Wind Direction

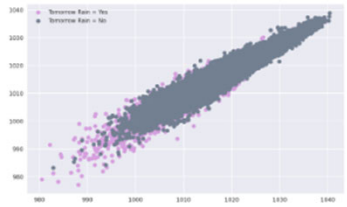
Pressure in ALL



Atmospheric pressure (hpa) reduced to mean sea level at 9am and 3pm

Comparing the pressure value of the next day rain and without rain, we can conclude that if the pressure value is low today, there is a higher probability of rain tomorrow.

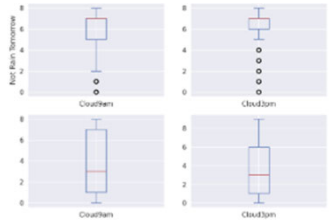




Cloud in ALL

Fraction of sky obscured by cloud at 9am and 3pm. This is measured in "oktas", which are a unit of eighths.

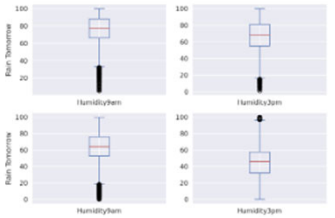
The box plot shows the amount of cloud cover today; if it rains the next day; ->By comparison, we can conclude that cloud cover has no significant effect on whether it will rain tomorrow

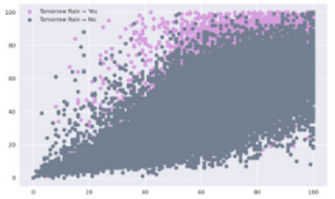


Humdity in ALL

Humidity (percent) at 9am and 3pm

By comparing the boxplot of not rain tomorrow and the boxplot of rain tomorrow, it can be concluded that if it rains tomorrow, the humidity will be higher today.





If tomorrow will rain, today's wind guest direction are as follows

RainTomorrow	
E	0.0582
ENE	0.0481
ESE	0.0459
N	0.0691
NE	0.0463

If tomorrow will rain, today's wind direction at 9am are as follows

RainTomorrow	
E	4.9628
ENE	5.3983
ESE	4.0374
N	12.3027
NE	5.6342

If tomorrow will rain, today's wind direction at 3pm are as follows

RainTomorrow	
E	4.9628
ENE	5.3983
ESE	4.0374
N	12.3027
NE	5.6342

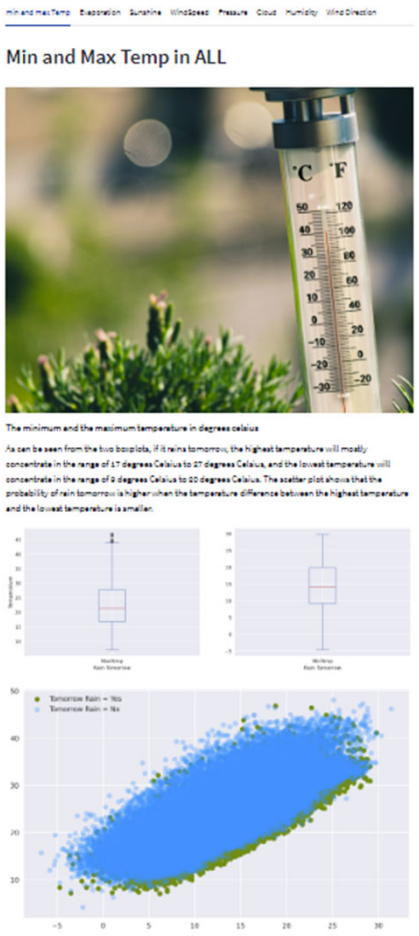
min and max Temp | Evaporation | Sunshine | WindSpeed | Pressure | Cloud | Humidity | Wind Direction

Enter the city where you want to search for precipitation information (enter ALL to reset)

ALL

Apply

	Location	Rainfall	RainToday
0	WaggaWagga	0.0000	No
1	Portland	3.6000	Yes
2	MelbourneAirport	0.0000	No
3	AliceSprings	0.0000	No
4	WaggaWagga	0.0000	No

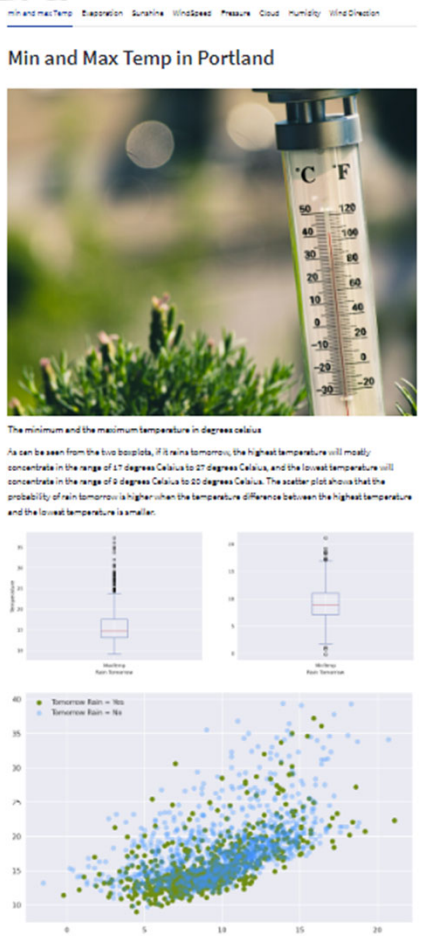


Enter the city where you want to search for precipitation information (enter ALL to reset)

Portland

Apply

	Location	Rainfall	RainToday
10	Portland	0.2000	No
18	Portland	1.2000	Yes
24	Portland	11.8000	Yes
25	Portland	2.8000	Yes
31	Portland	15.6000	Yes



See more information in our pages!
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