WEATHER ETC.

Wachirawit Yeamsansuk
Attaphat Chana

Today's Topics

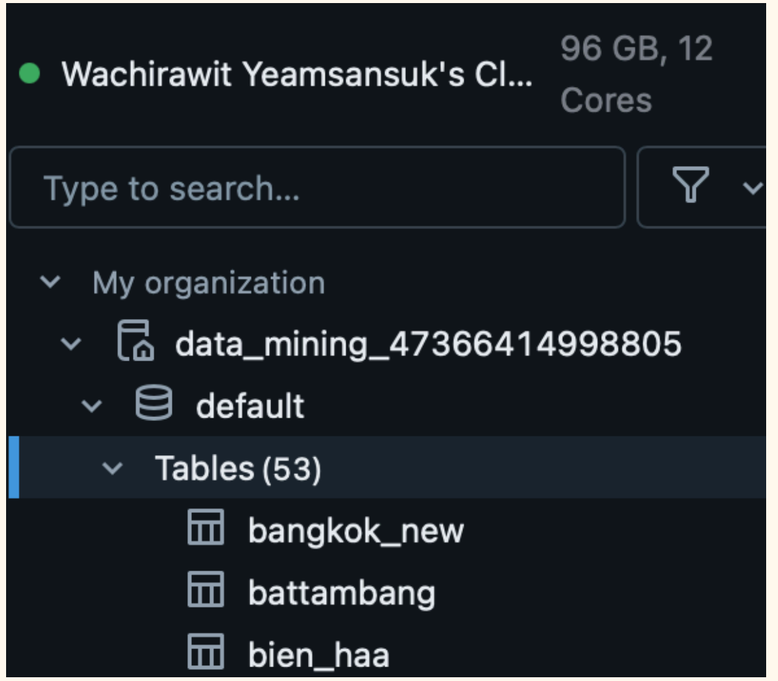
1. Overview
2. Dataset
3. Questions
4. EDA + Conclusion


pandas


databricks


APACHE
Spark™

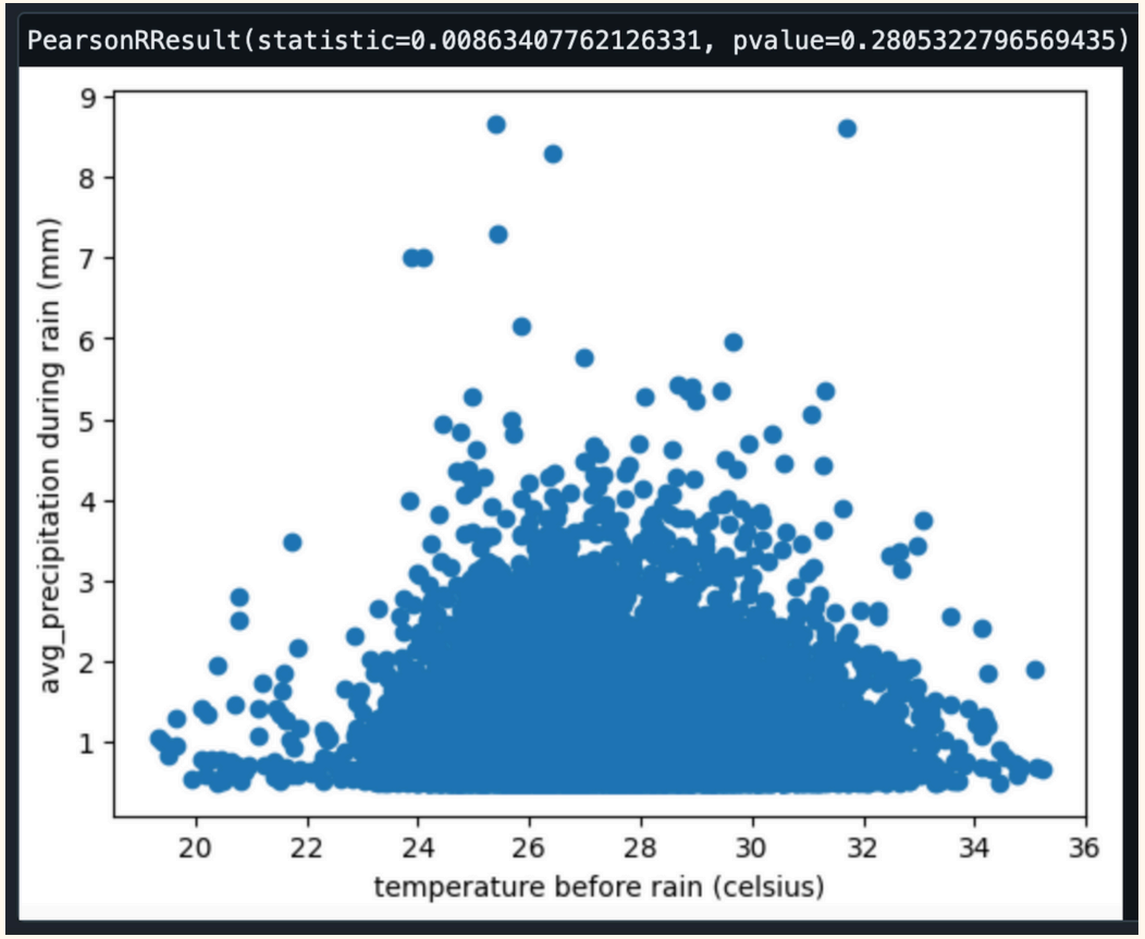

LONGDO Traffic
เลี่ยงรถติดชีวิตดีขึ้น


Wachirawit Yeamsansuk's Cl...
96 GB, 12 Cores
Type to search...
My organization
data_mining_47366414998805
default
Tables (53)
bangkok_new
battambang
bien_haa


om


kaggle

How do you know when should you bring an umbrella?

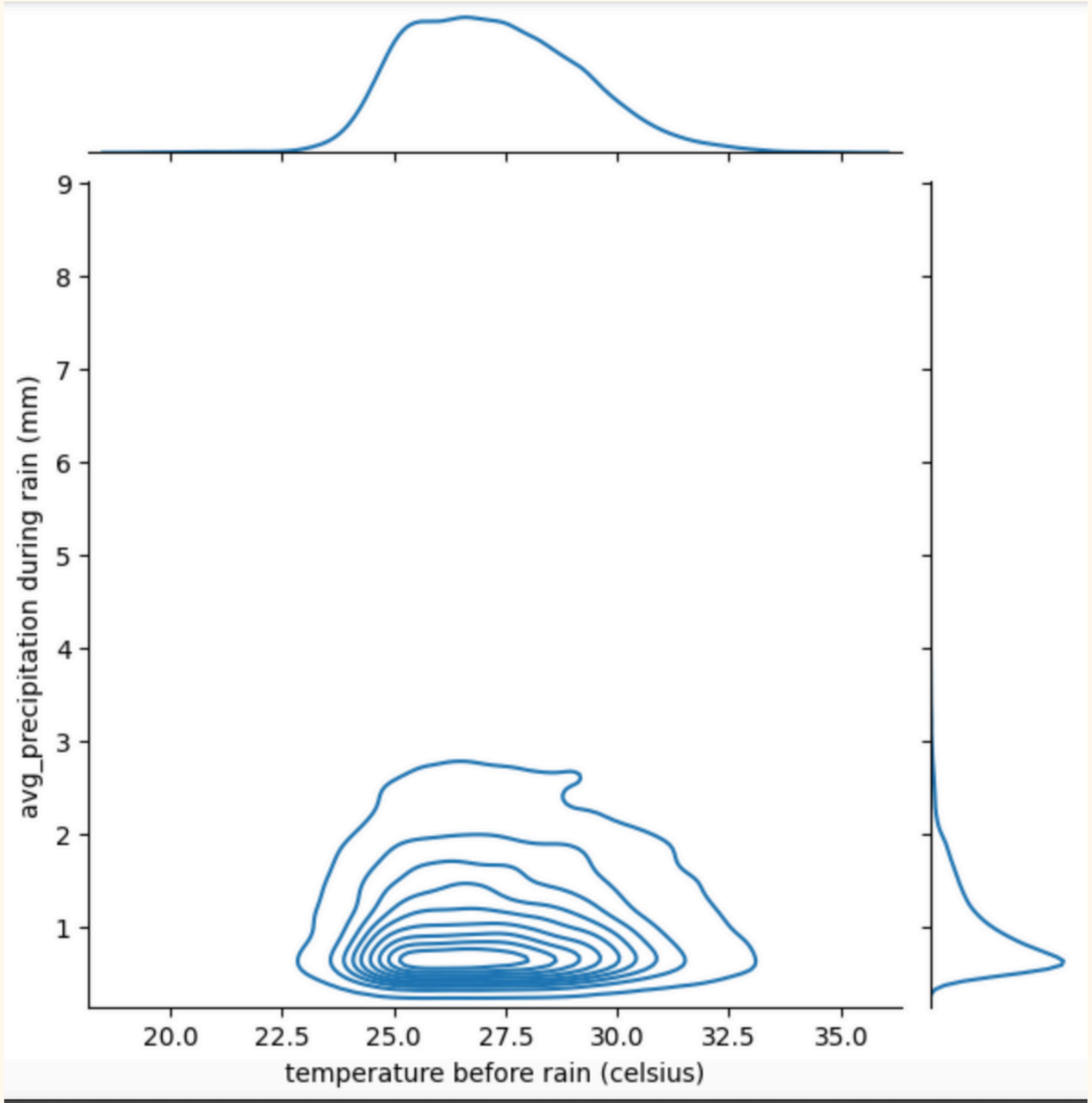


We can see from the scatter plot, there's a lot of points at our cutoff/the bottom.

Since we want to find the trend of how things before rain this is bad as a lot of points pull curve fitting towards the bottom. Thus rather than trying to correlate to a data set that has a lot of noise, what if we try to see the trend of when do we get a lot of rain.

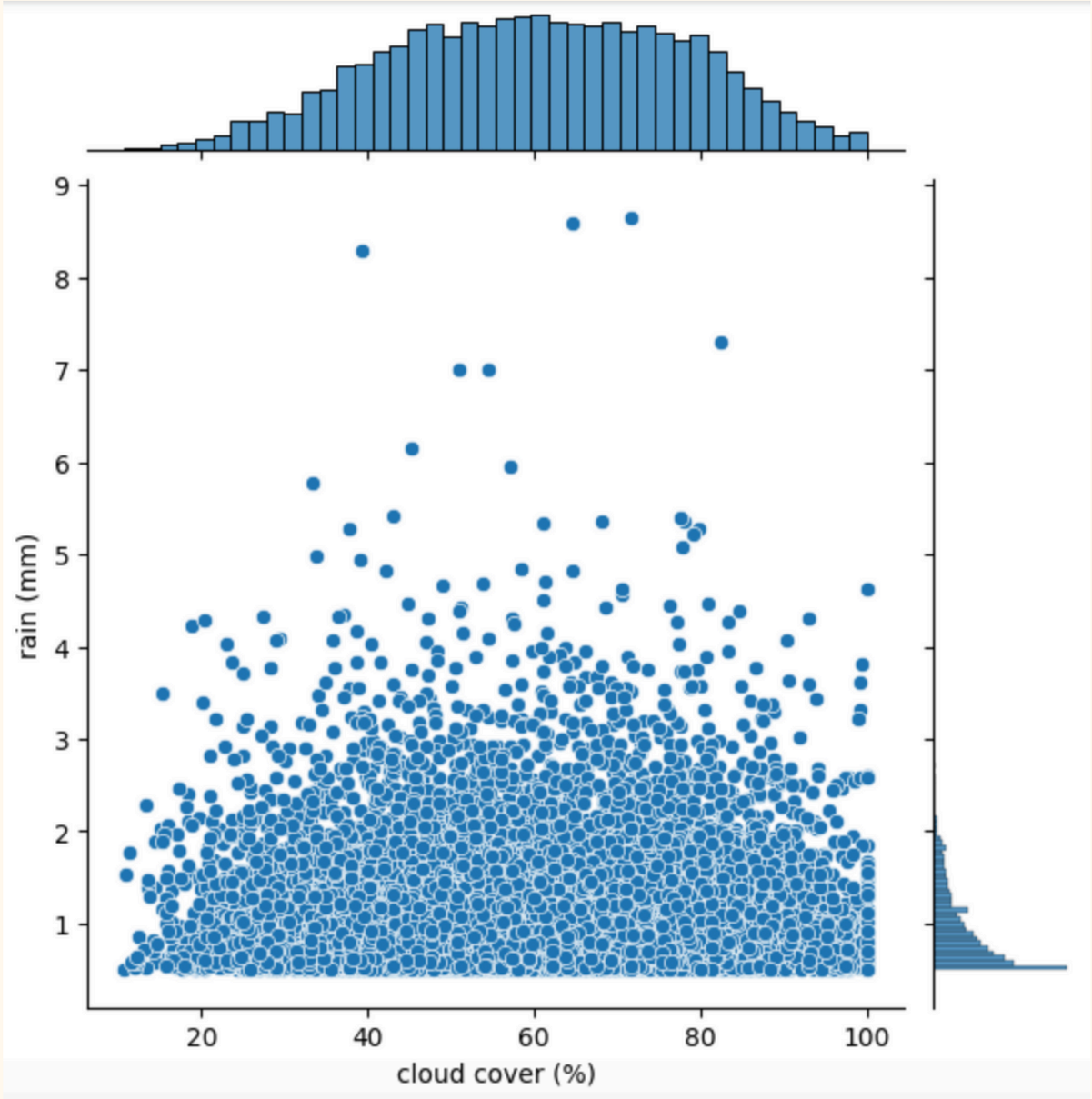
That being said P(rain>0.5|20<temp<31)=0.03 and P(rain>0.5|cloud>50)=0.21, or the data is pretty concentrated for temperature we can conclude

```
PearsonRResult(statistic=0.0019248958614788733, pvalue=0.8098825478496333)
```

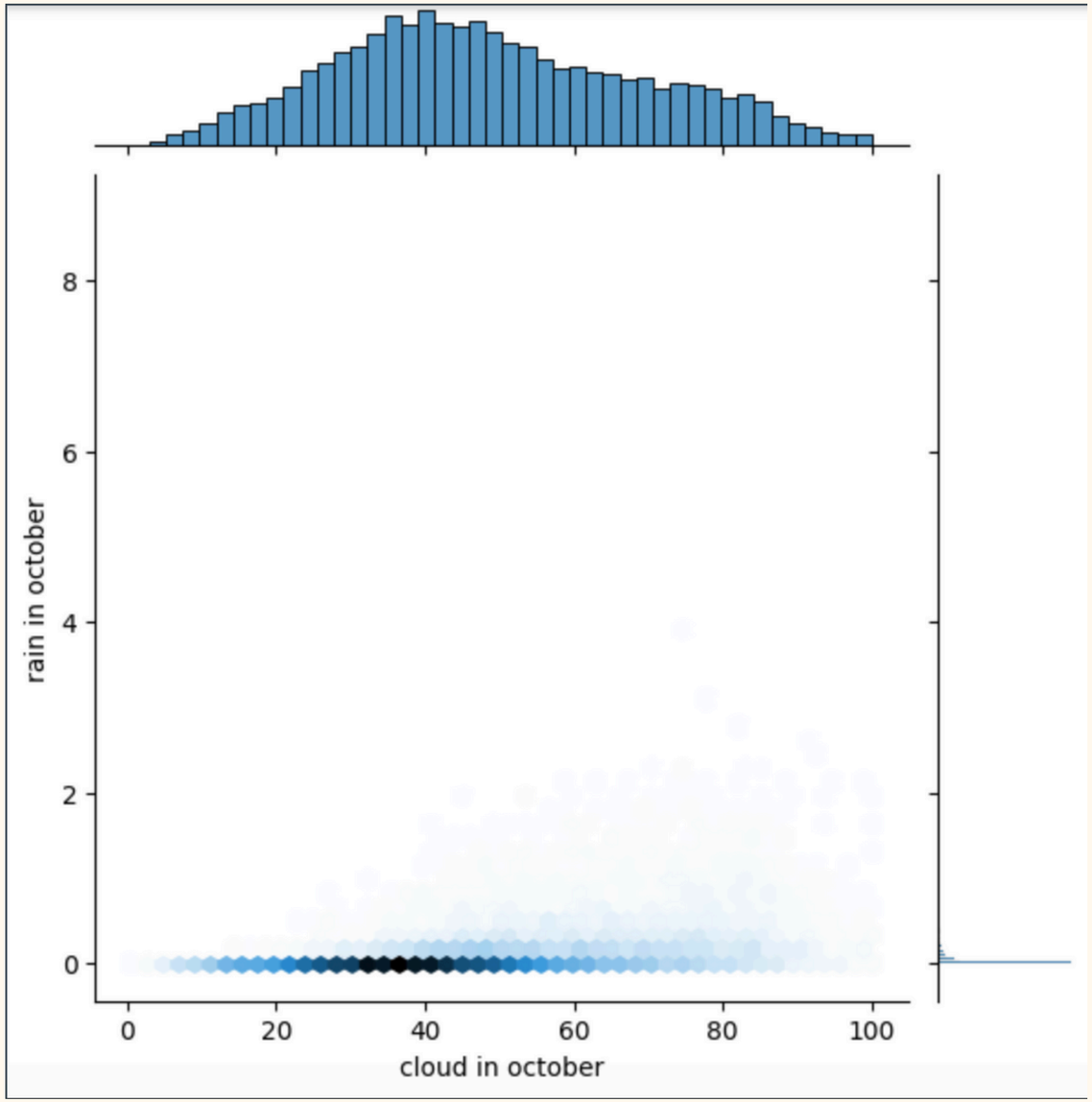


cloud before vs rain

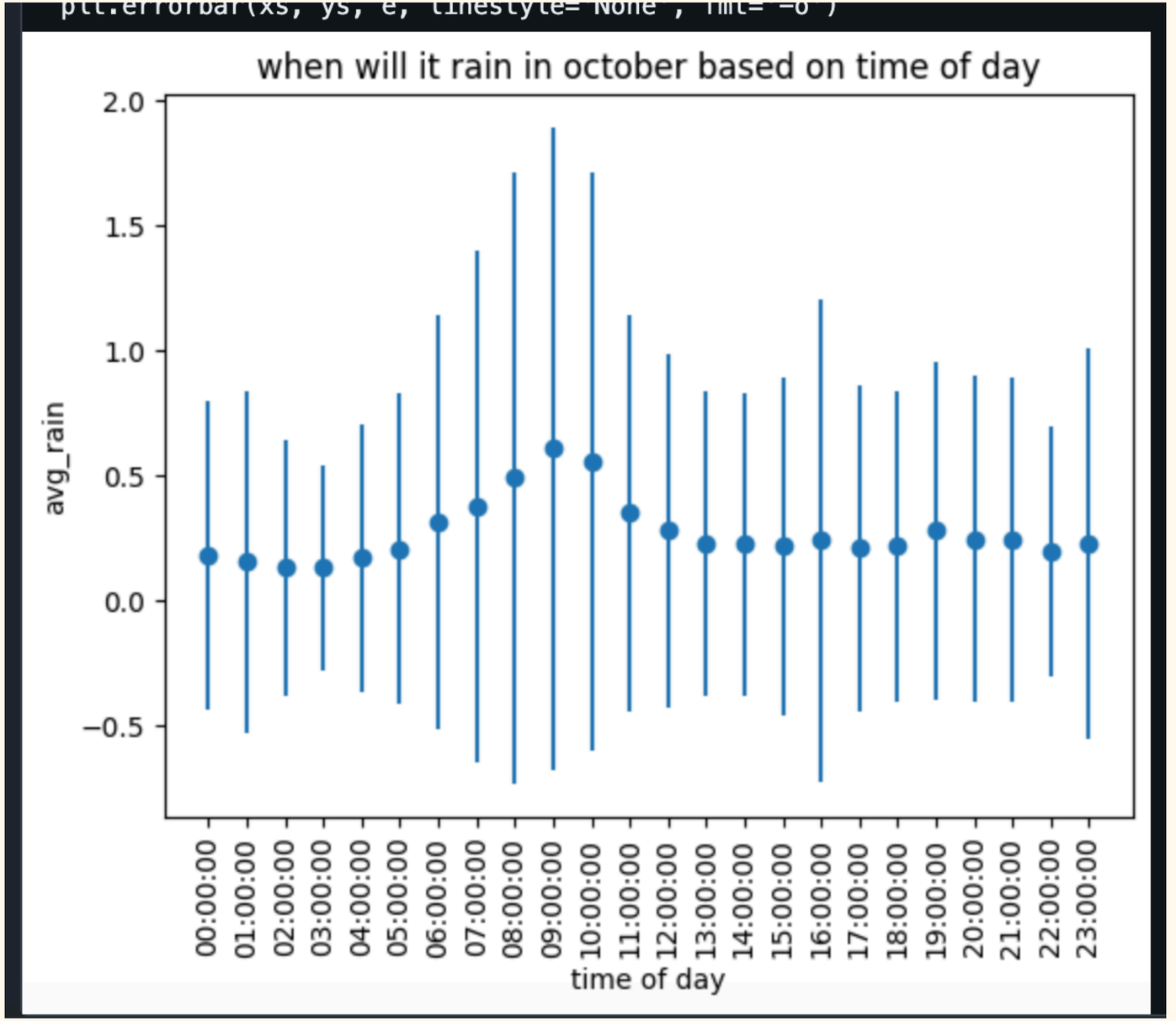
```
[[ 1.         -0.00738699]
 [-0.00738699  1.        ]]
```

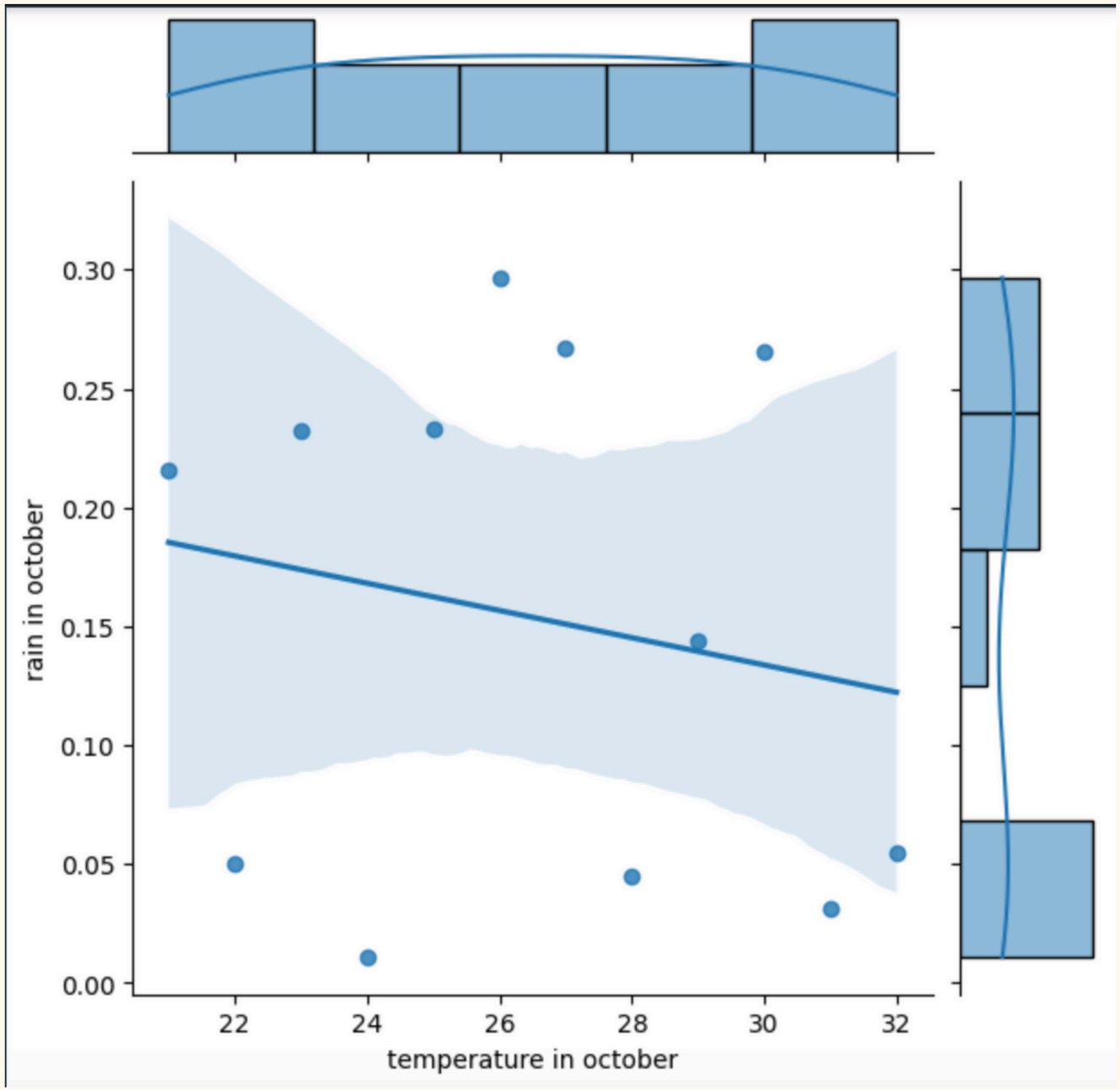


```
PearsonRResult(statistic=0.3757645619179635, pvalue=0.0)
```



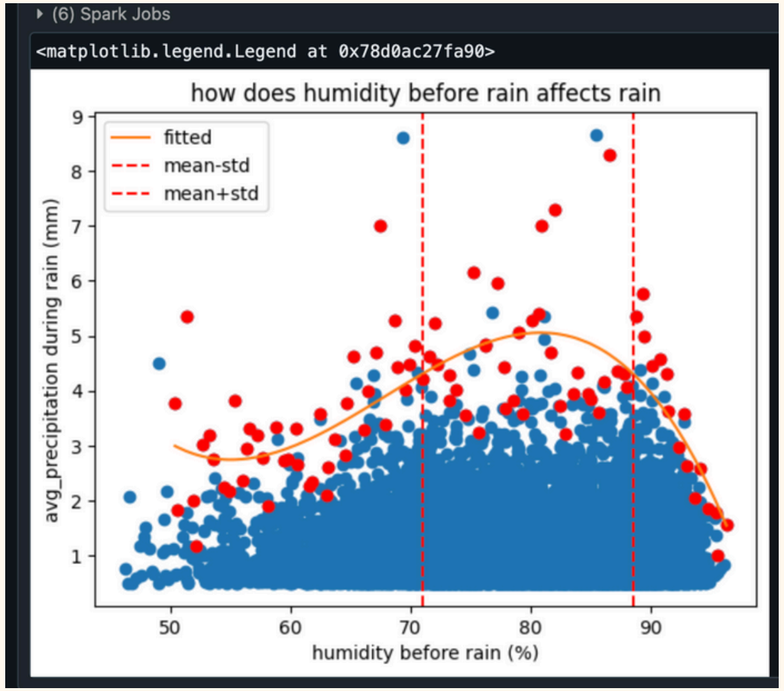
```
plt.errorbar(xs, ys, e, linestyle='None', fmt='-o')
```

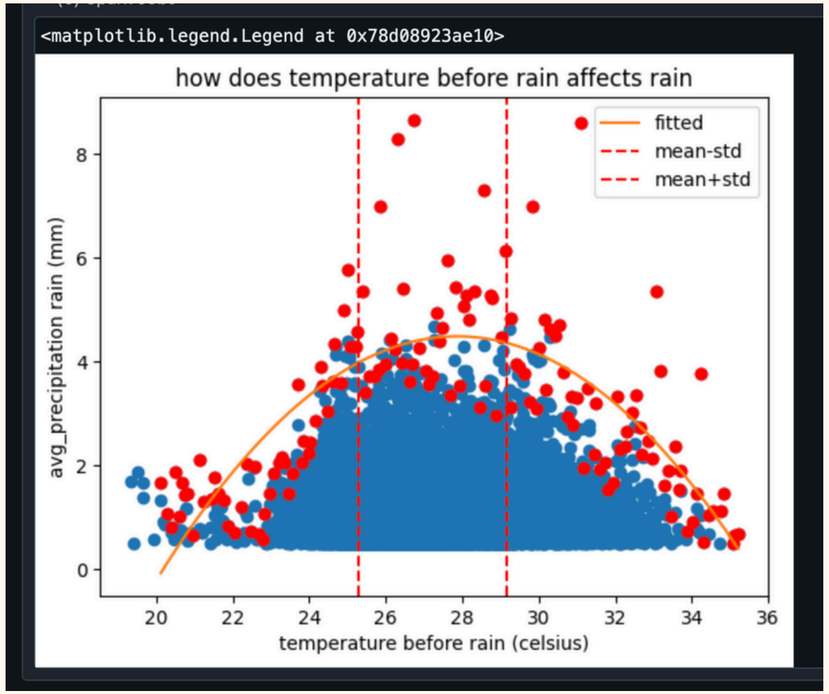


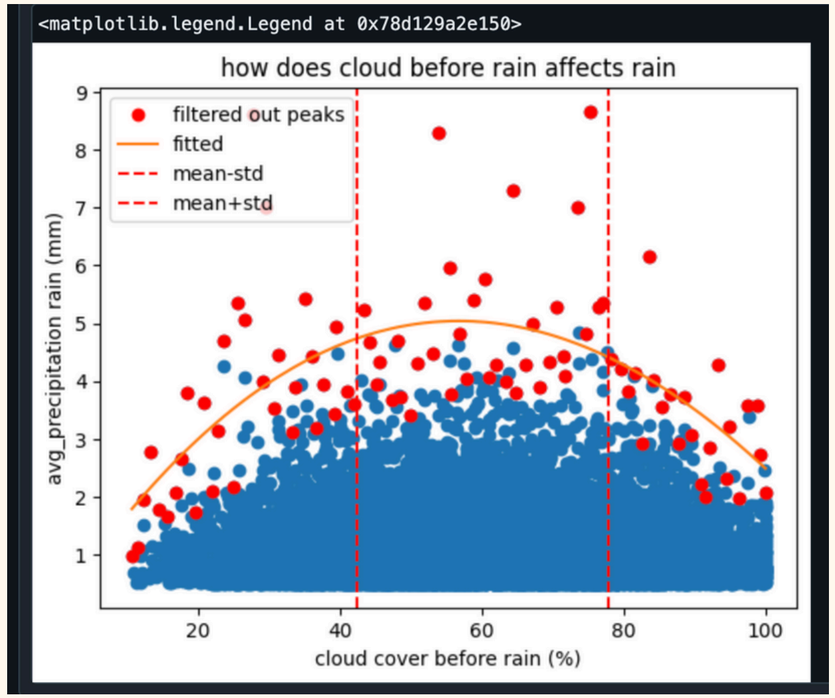


PearsonRResult(statistic=-0.1900510300578419, pvalue=0.5541008256515603)

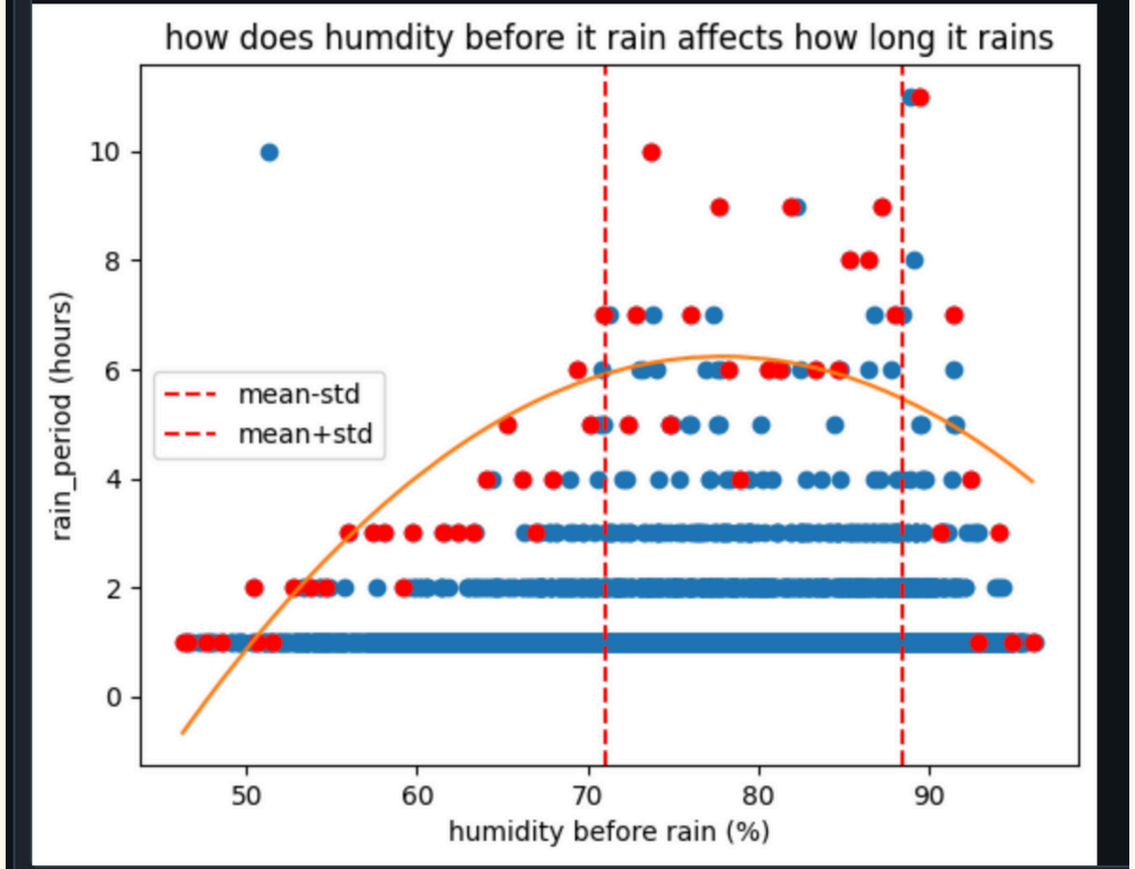
Trying to find a trend of causality of high rain by fitting peaks by guessing. Times series is a thing???



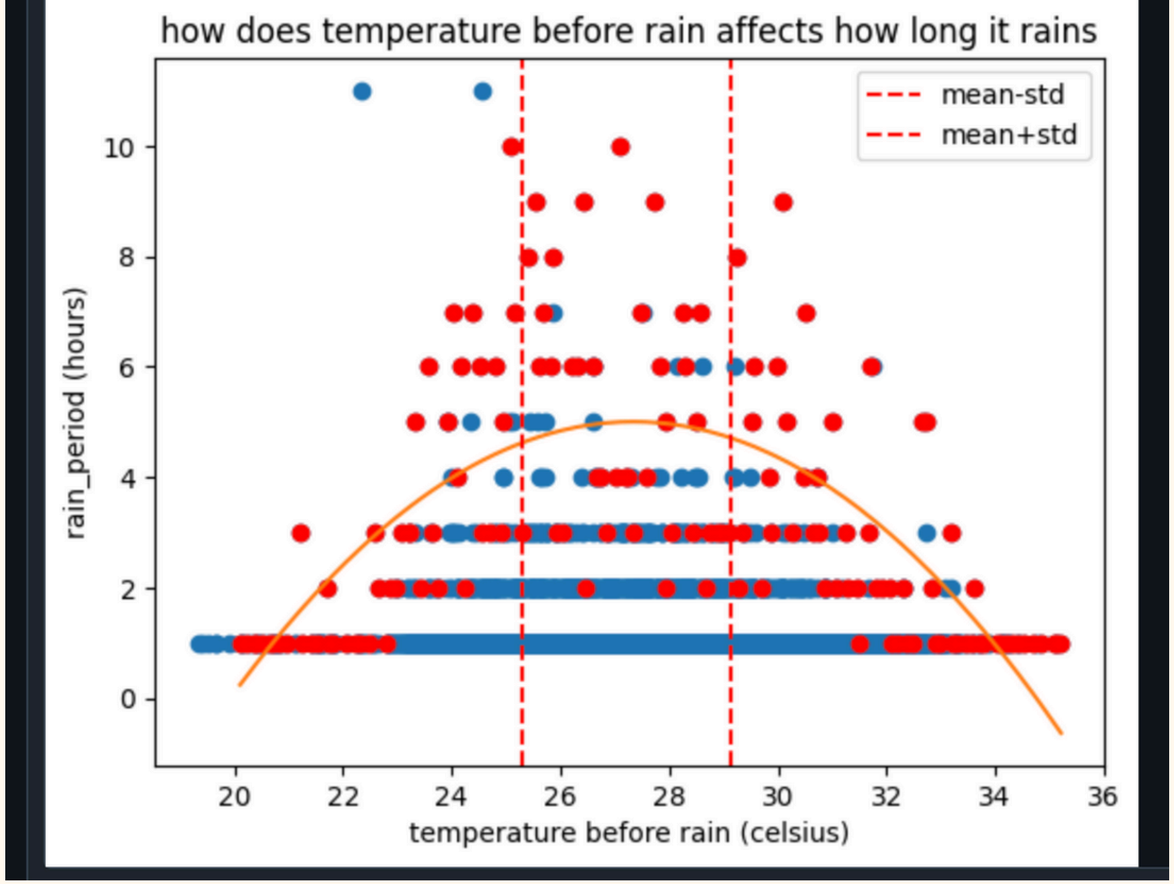




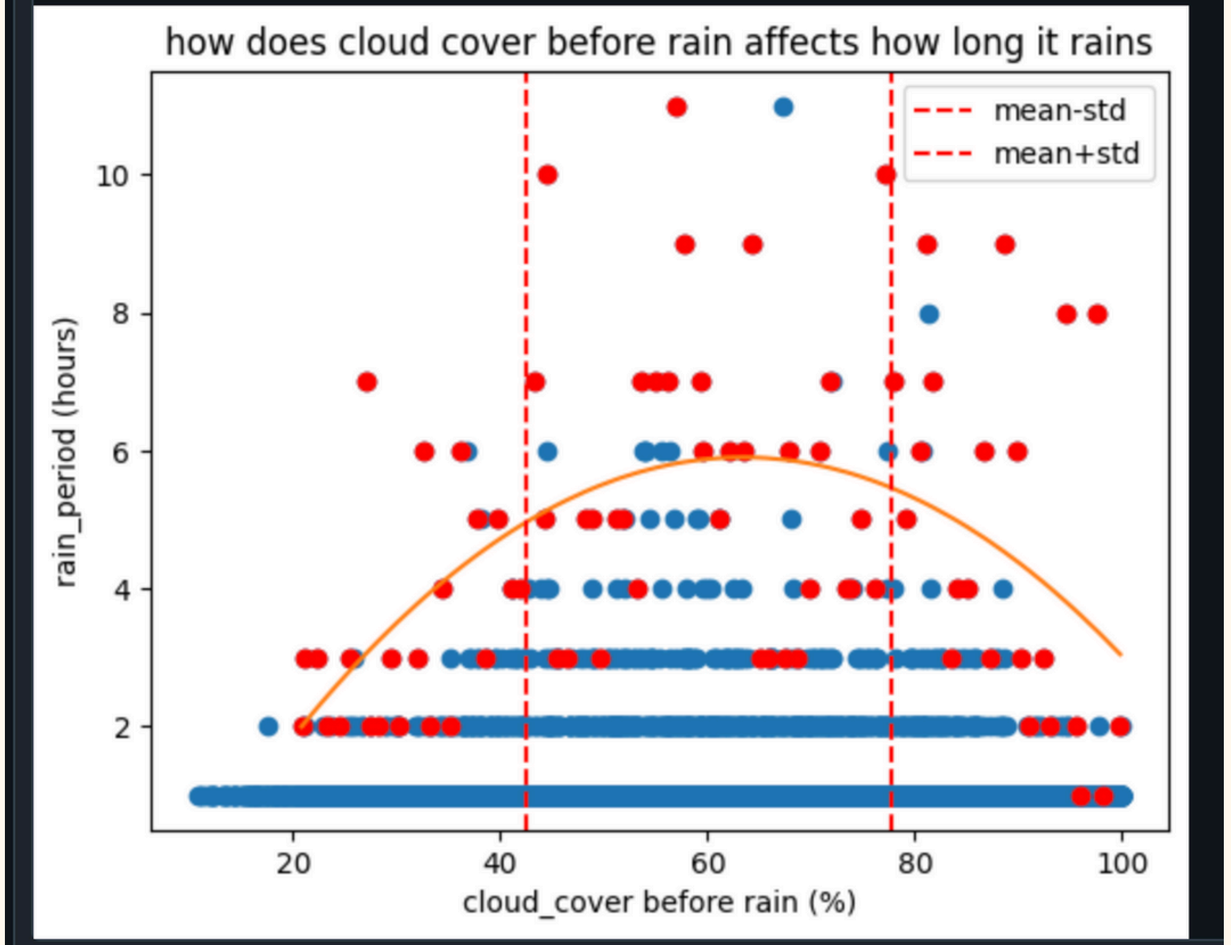
<matplotlib.legend.Legend at 0x78d086812e10>



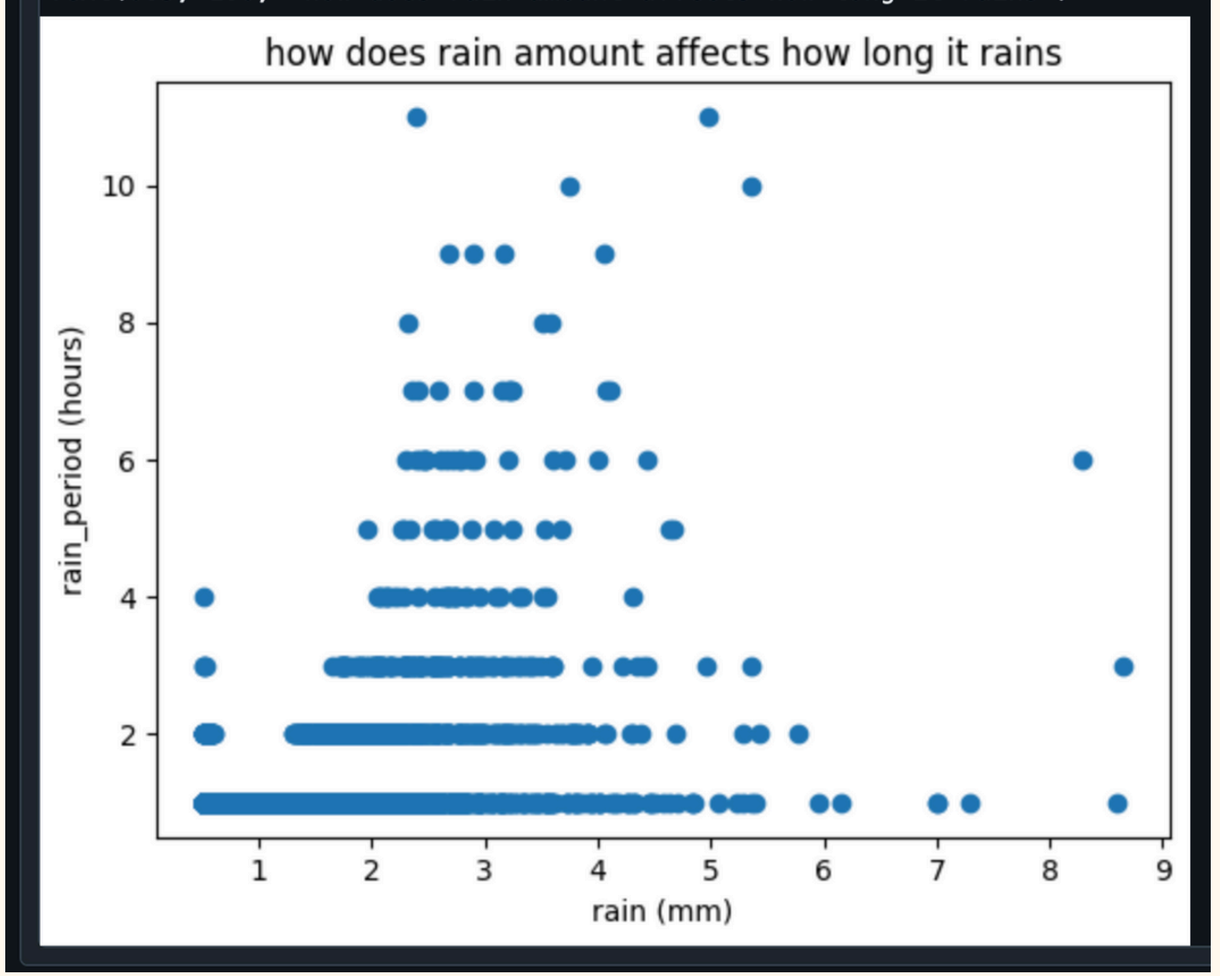
<matplotlib.legend.Legend at 0x78d086a57dd0>



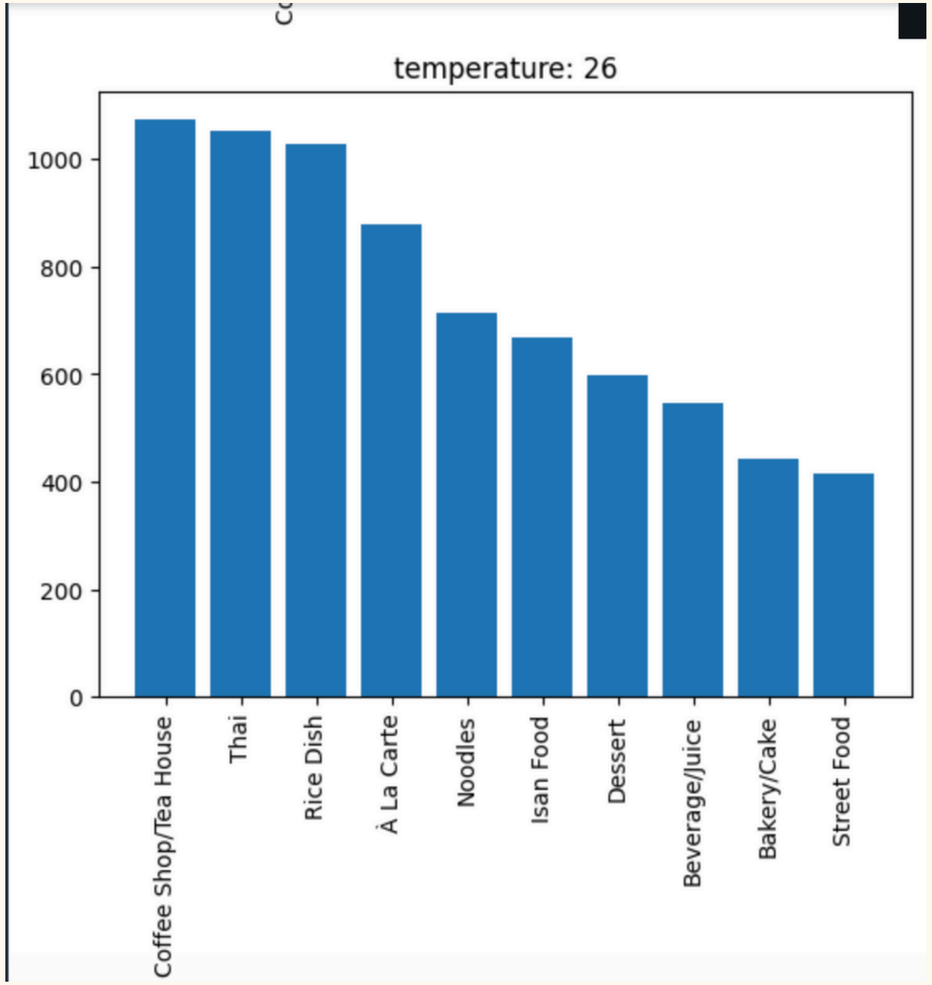
```
<matplotlib.legend.Legend at 0x78d086902e10>
```

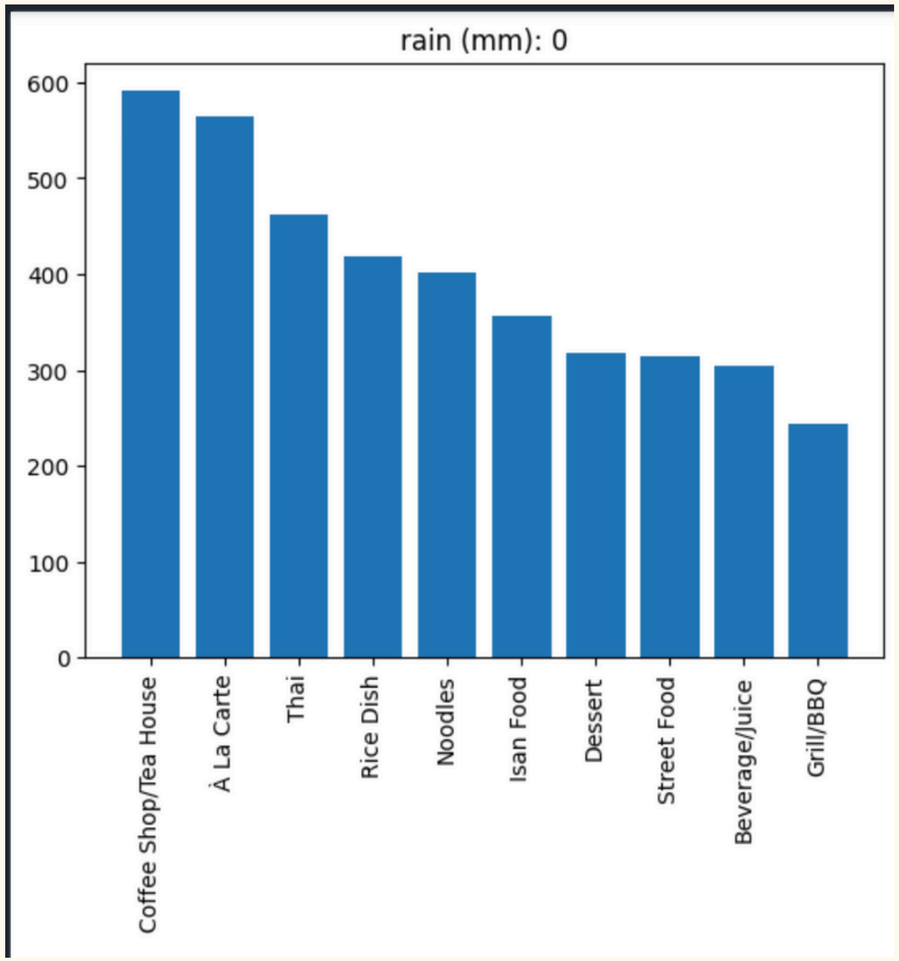


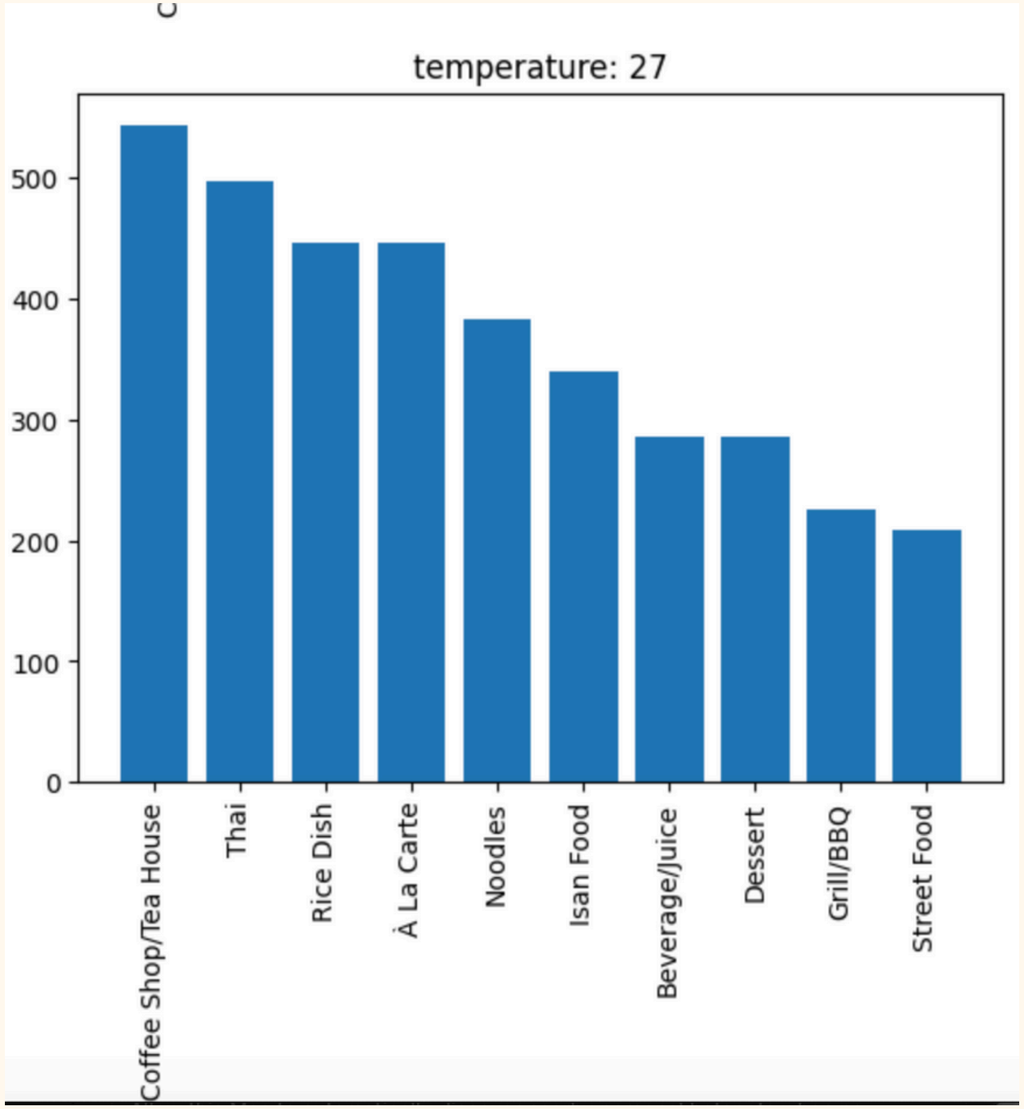

```
Text(0.5, 1.0, 'how does rain amount affects how long it rains')
```

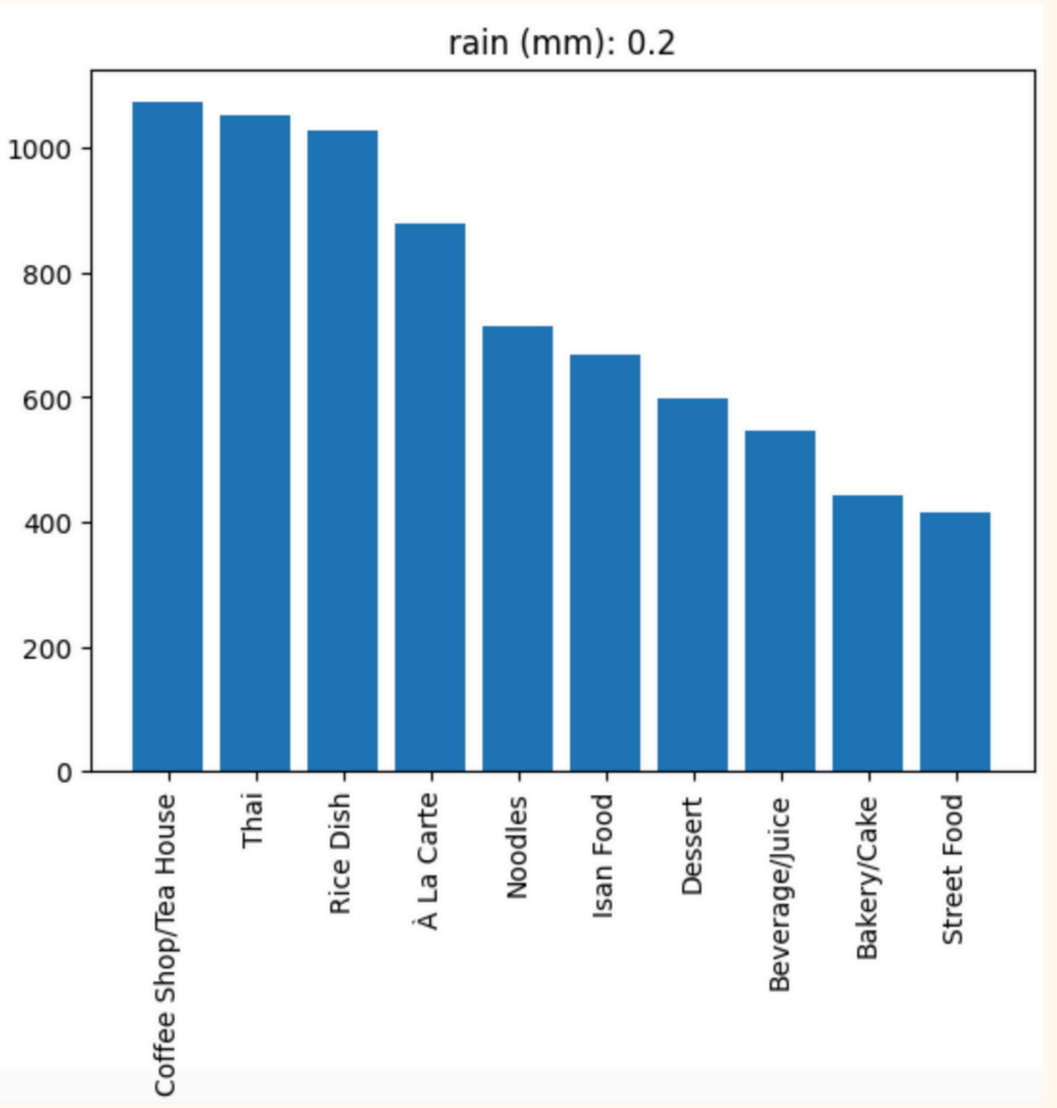


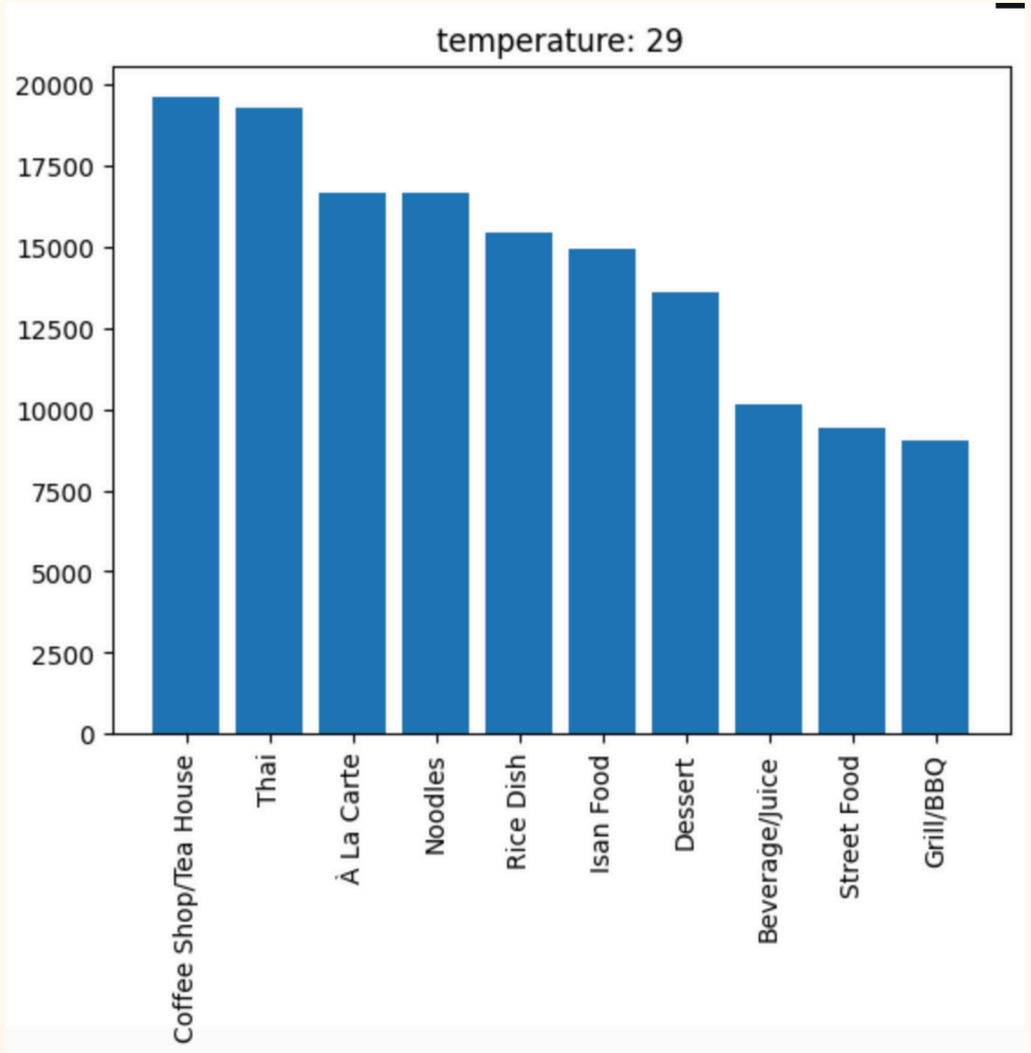
How does weather affect line man order (we order a lot of coffee/tea via line man)

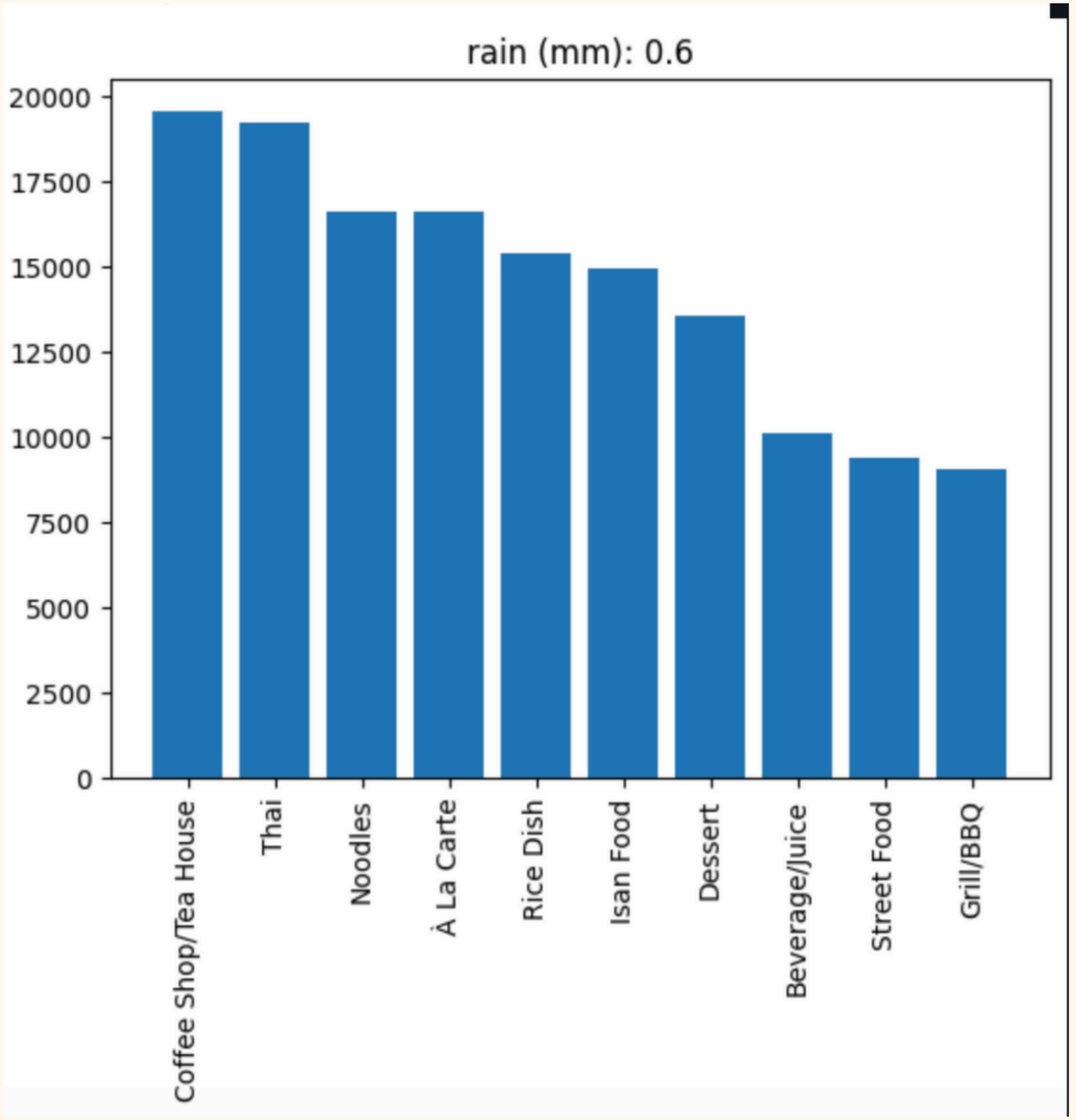


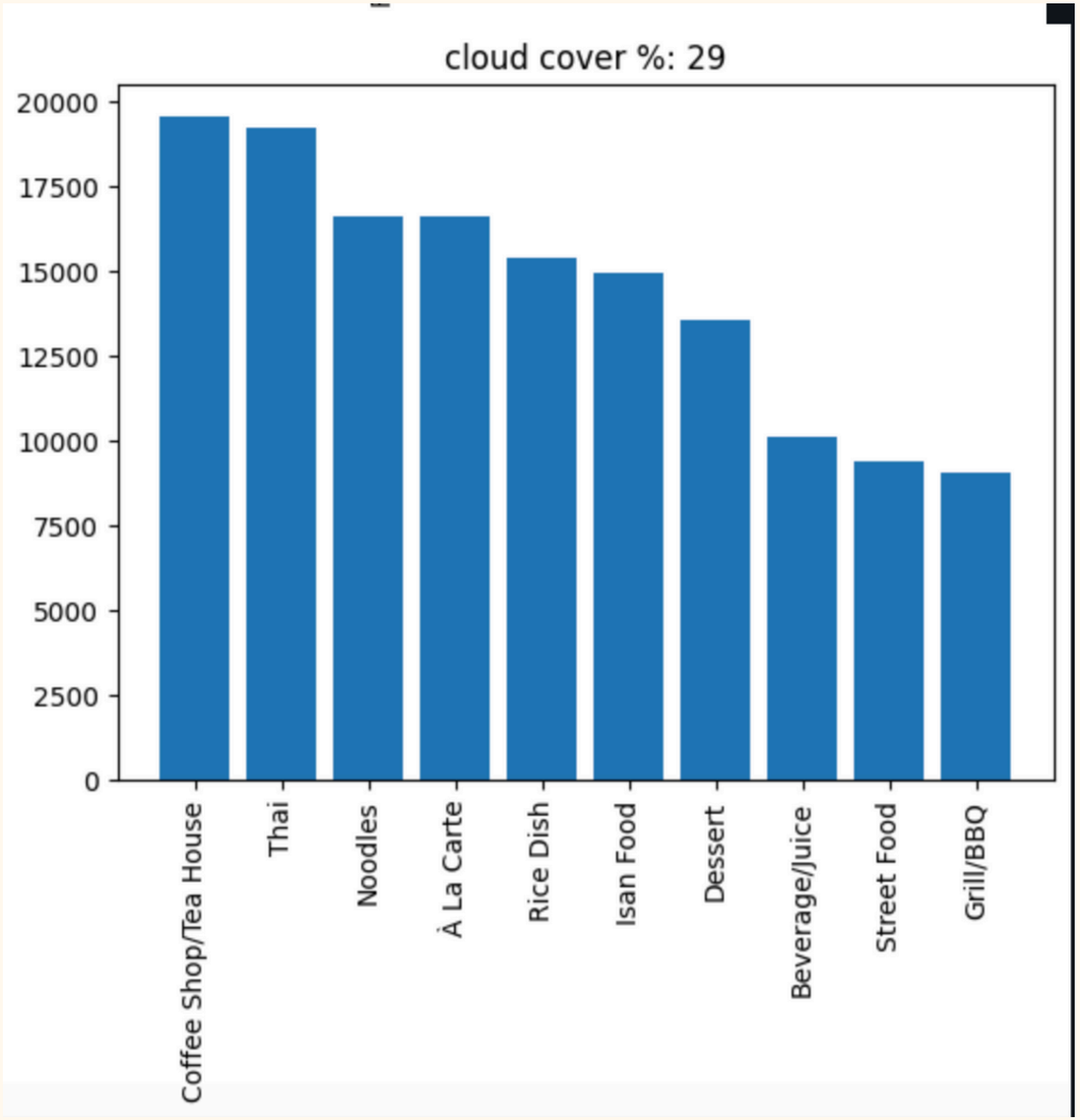


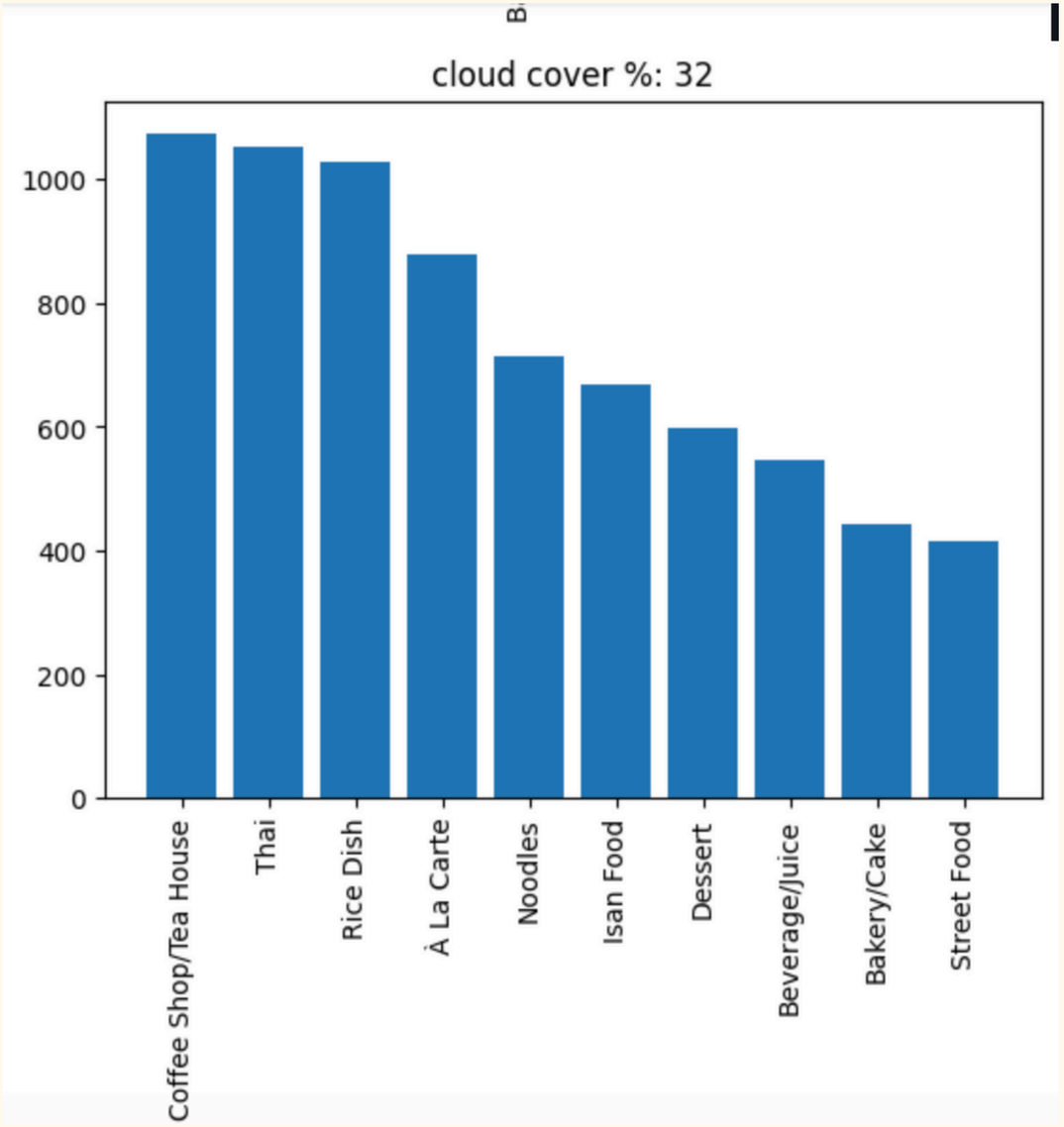

temperature: 27
0
100
200
300
400
500
Coffee Shop/Tea House
Thai
Rice Dish
À La Carte
Noodles
Isan Food
Beverage/Juice
Dessert
Grill/BBQ
Street Food


rain (mm): 0.2
0
200
400
600
800
1000
Coffee Shop/Tea House
Thai
Rice Dish
À La Carte
Noodles
Isan Food
Dessert
Beverage/Juice
Bakery/Cake
Street Food

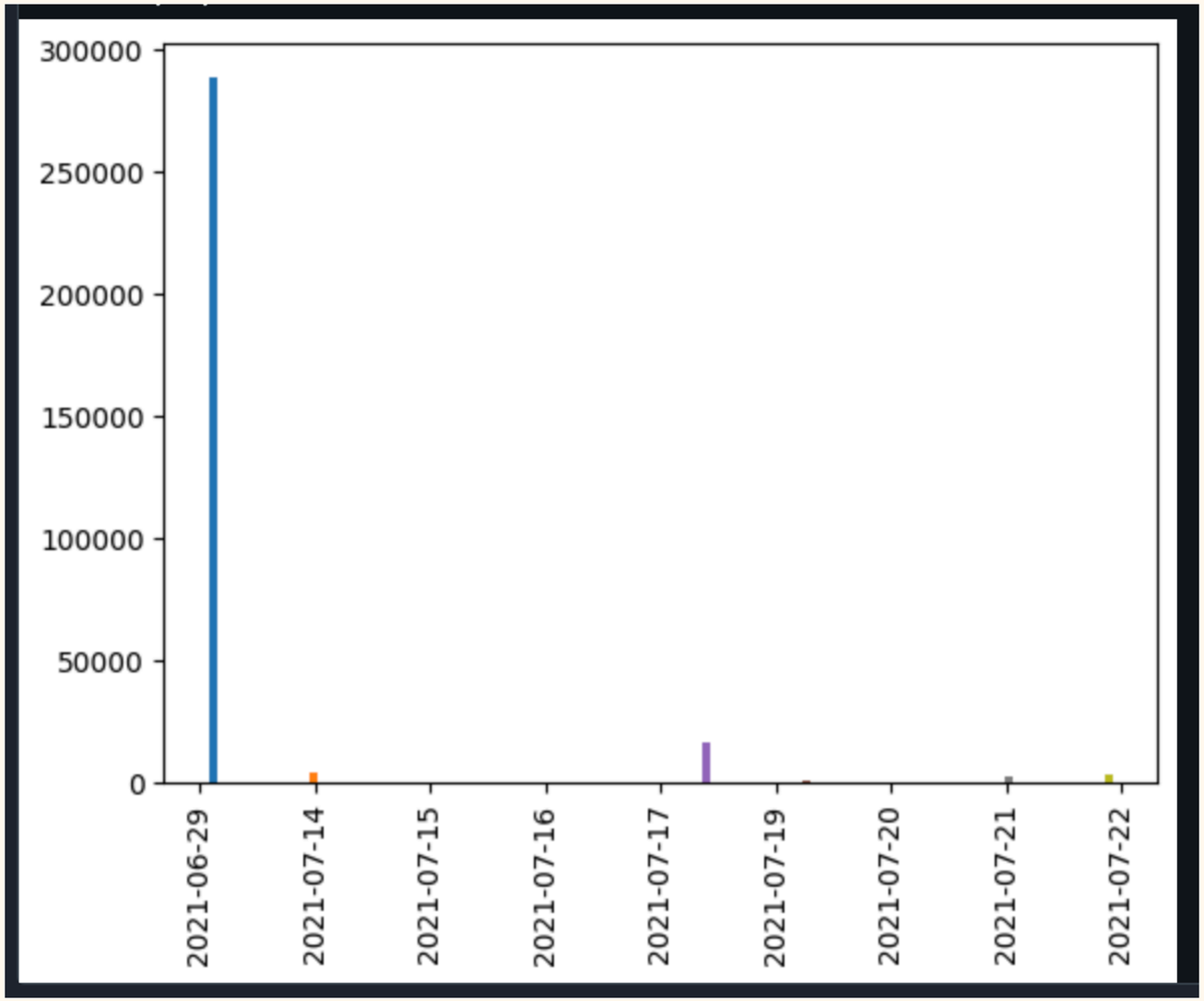

temperature: 29
20000
17500
15000
12500
10000
7500
5000
2500
0
Coffee Shop/Tea House
Thai
À La Carte
Noodles
Rice Dish
Isan Food
Dessert
Beverage/Juice
Street Food
Grill/BBQ


rain (mm): 0.6
20000
17500
15000
12500
10000
7500
5000
2500
0
Coffee Shop/Tea House
Thai
Noodles
À La Carte
Rice Dish
Isan Food
Dessert
Beverage/Juice
Street Food
Grill/BBQ

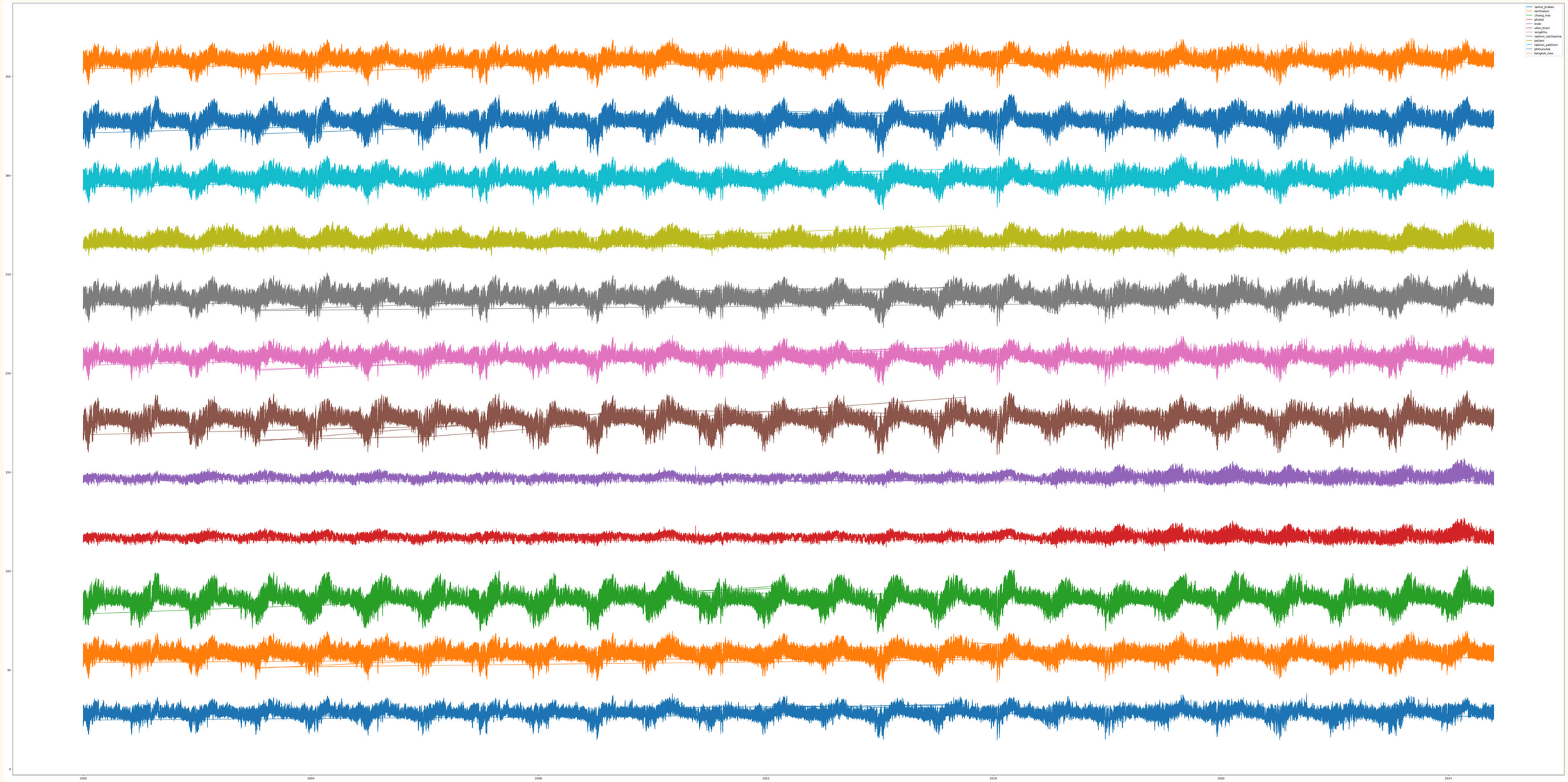

cloud cover %: 29
20000
17500
15000
12500
10000
7500
5000
2500
0
Coffee Shop/Tea House
Thai
Noodles
À La Carte
Rice Dish
Isan Food
Dessert
Beverage/Juice
Street Food
Grill/BBQ


cloud cover %: 32
1000
800
600
400
200
0
Coffee Shop/Tea House
Thai
Rice Dish
À La Carte
Noodles
Isan Food
Dessert
Beverage/Juice
Bakery/Cake
Street Food

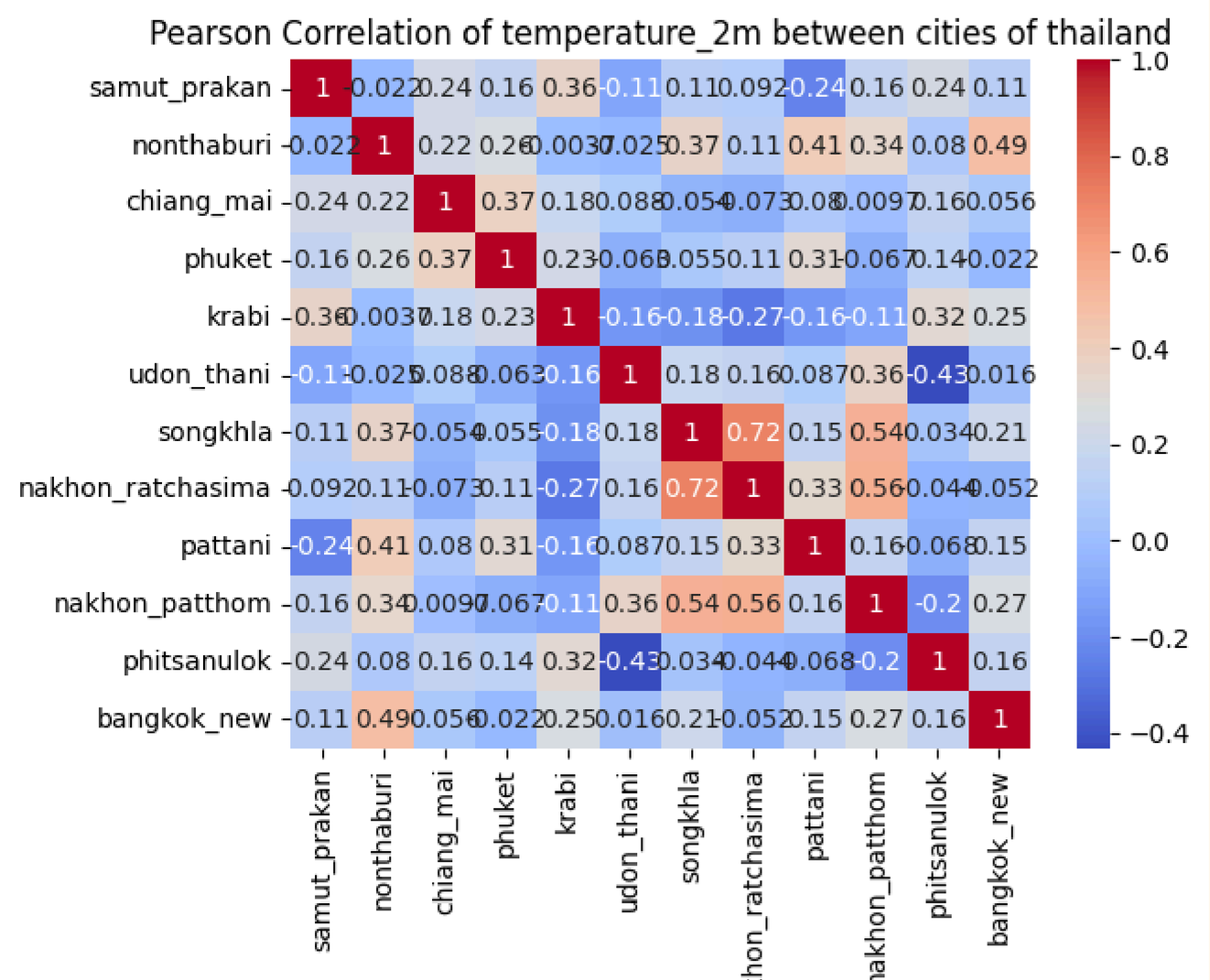
Knowing your data is important



Is there any correlation between weather behaviour of different location



Can we predict weather pattern base on another location

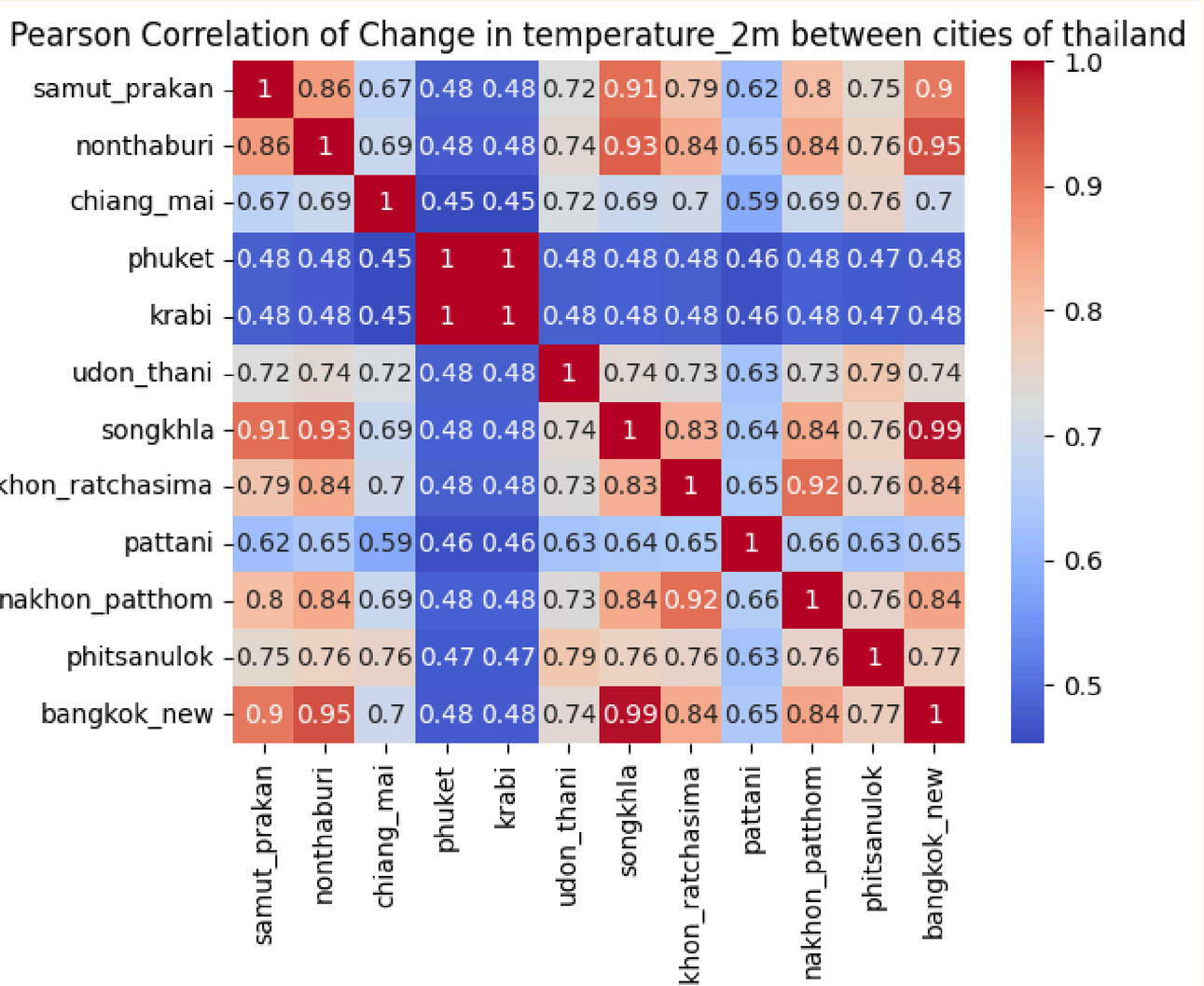


Case Example: Thailand

Pearson correlation
within hour time span

notable correlation
Bangkok + Nonthaburi
songkhla + Nakhon Ratchasima

Can we predict weather pattern base on another location



Case Example: Thailand

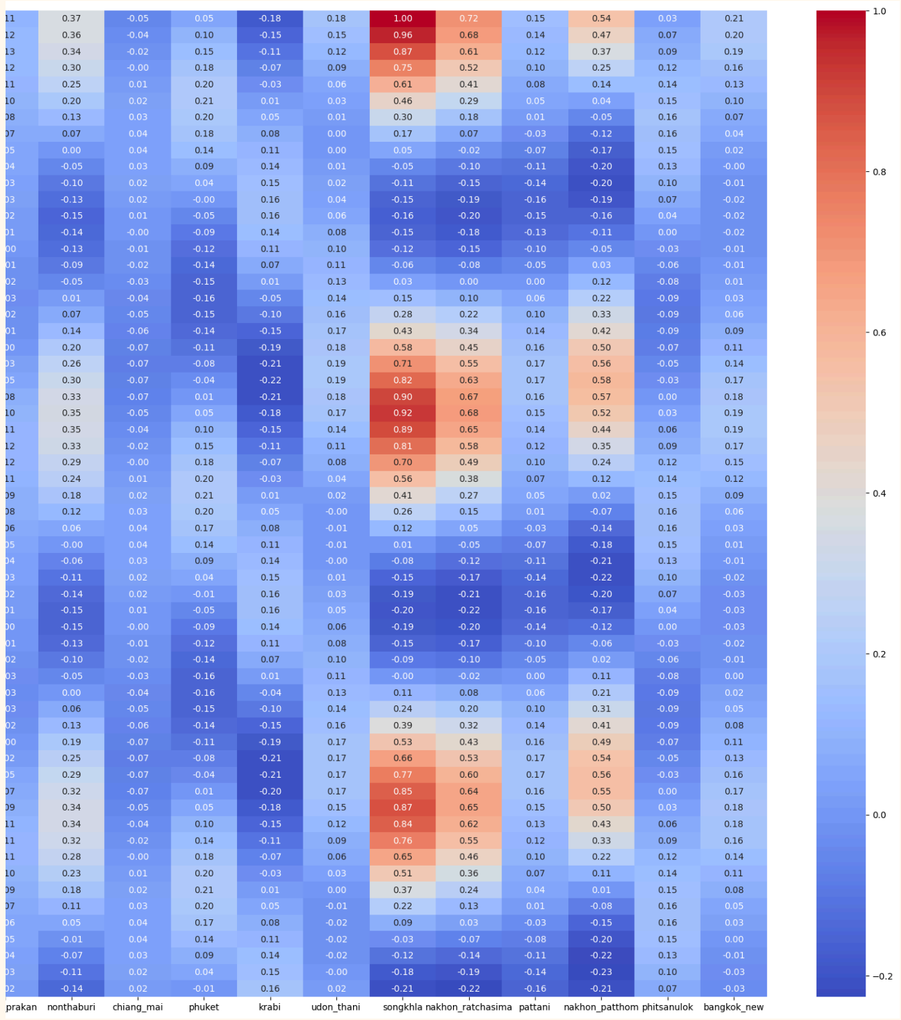
Pearson correlation
within hour time span

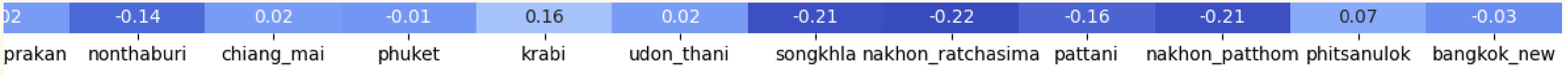
notable correlation
Bangkok + Songkhla
songkhla + Nonthaburi
Phuket + Krabi

Time Lag: Songkhla

y axis: time lag

Observation:
there seems to be a periodic raise in correlation



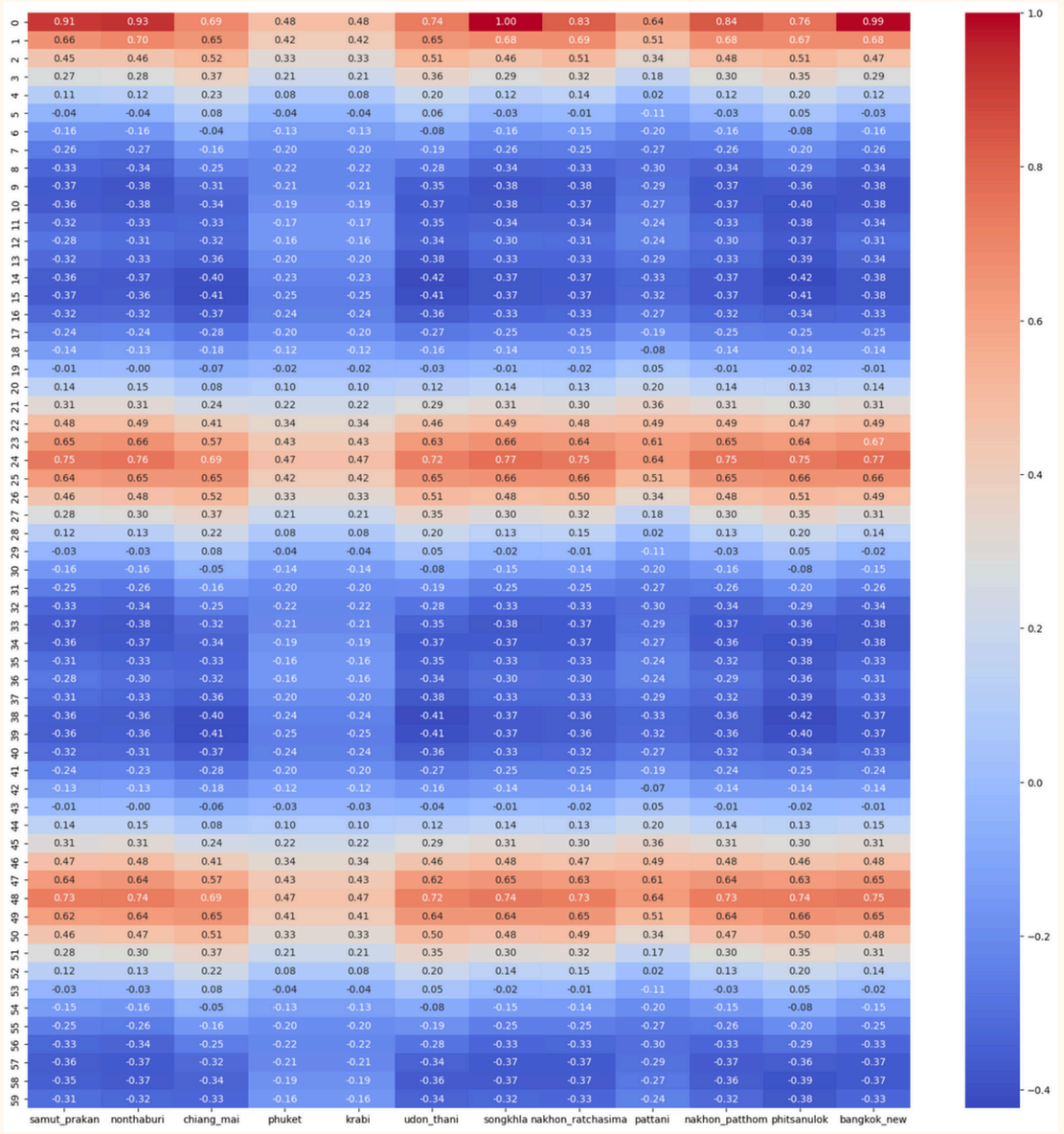


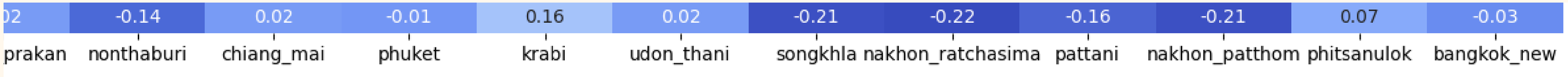
Time Lag: Songkhla

y axis: time lag

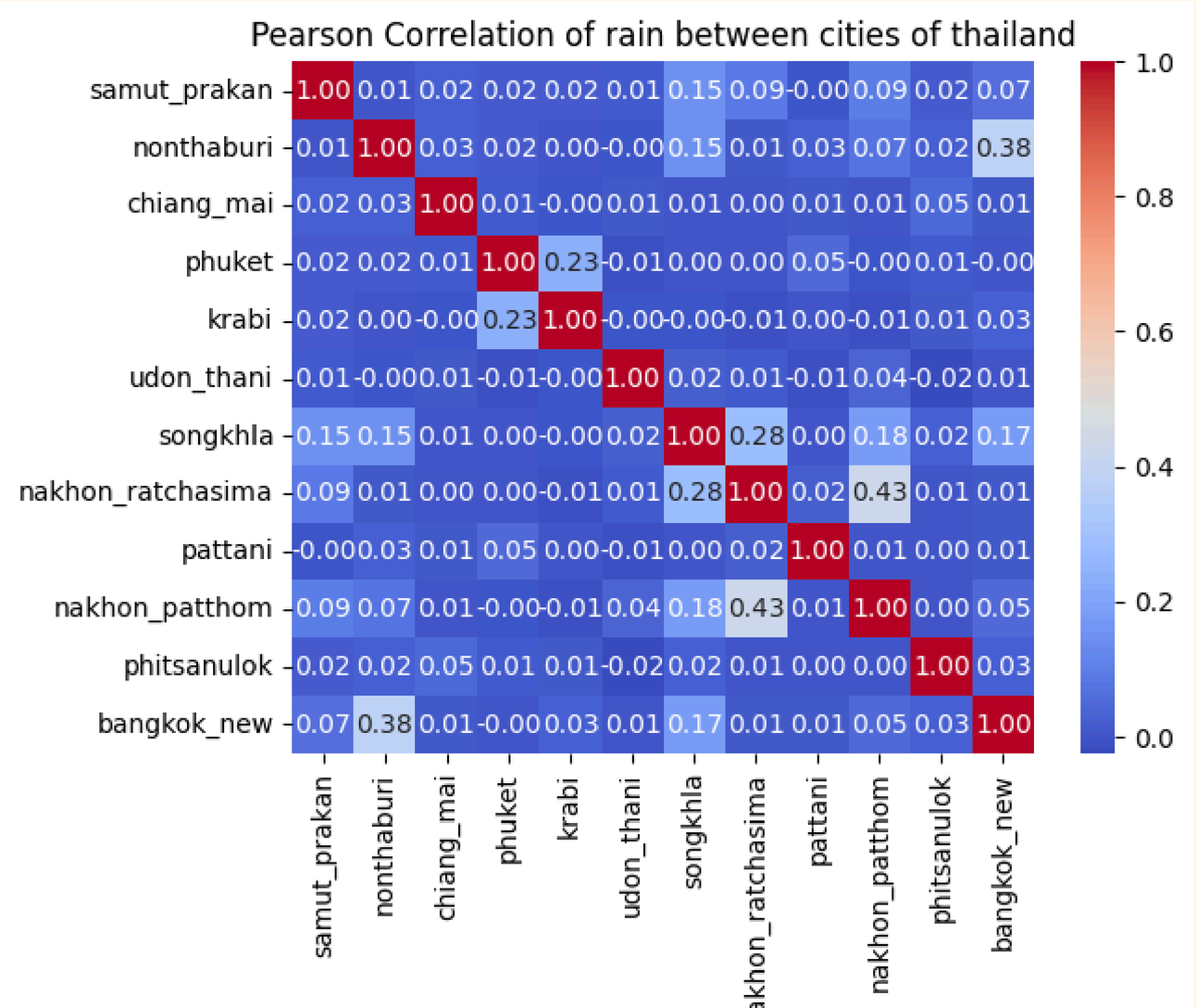
Observation:
there seems to be a periodic raise in correlation as well (24 hours)

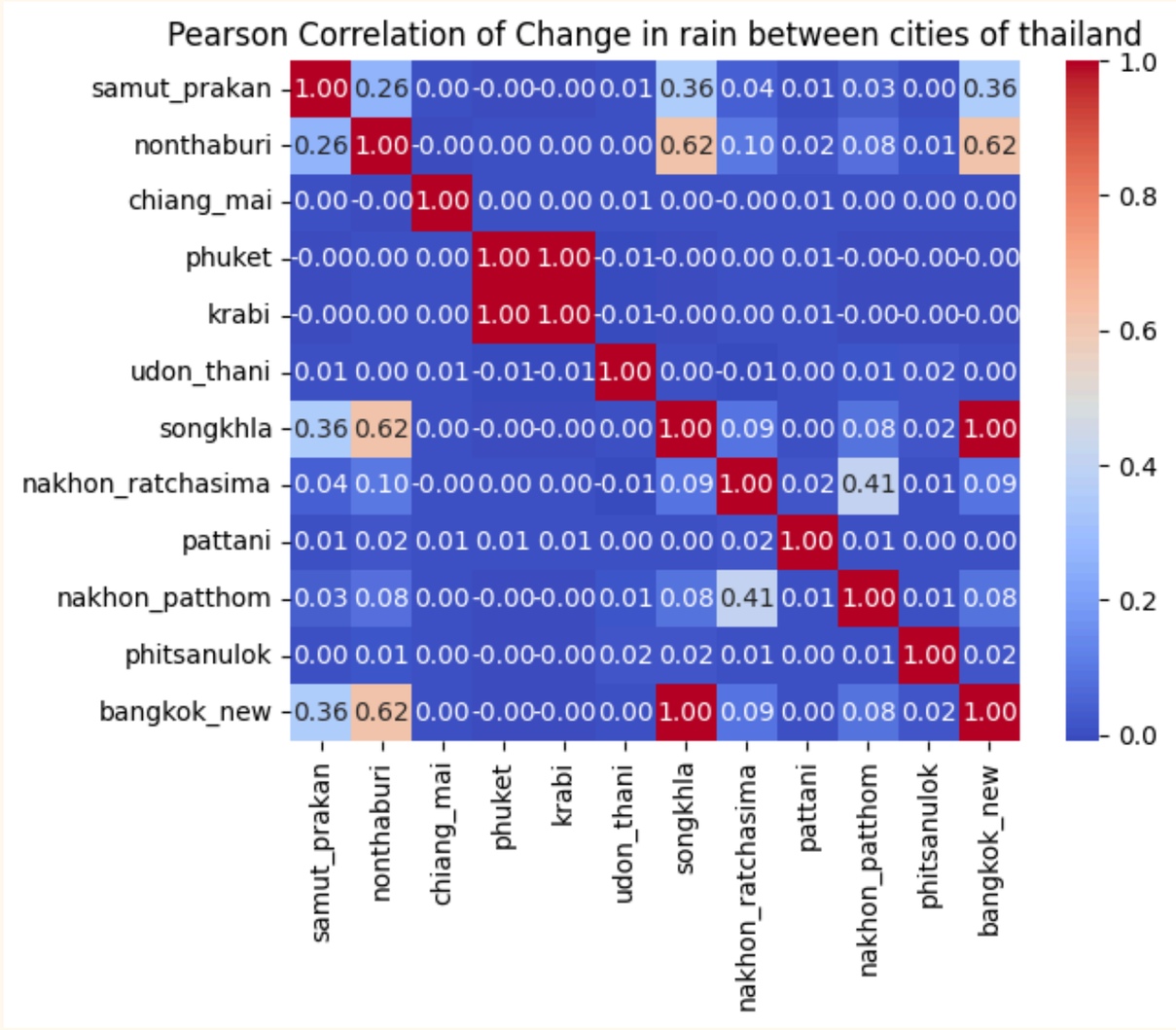
> 0.77



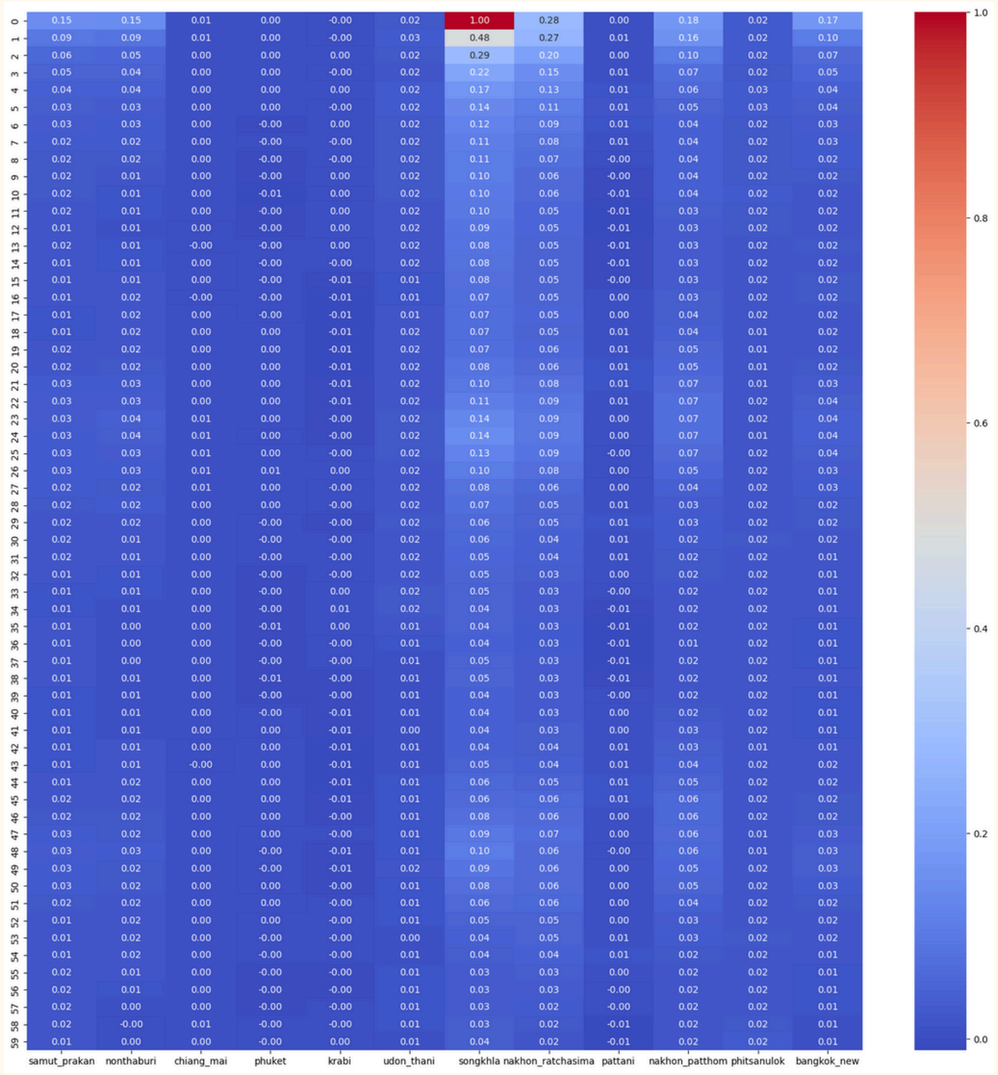


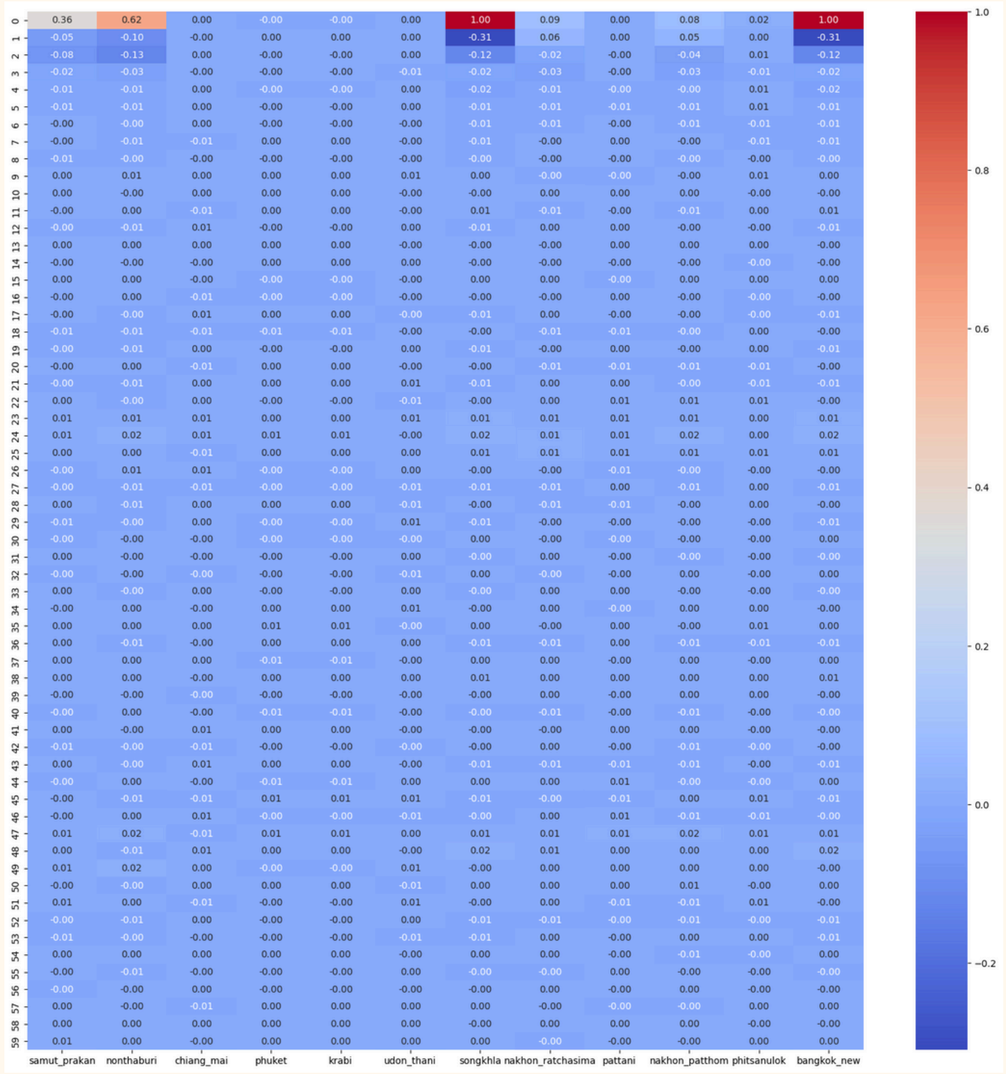
Rainfall

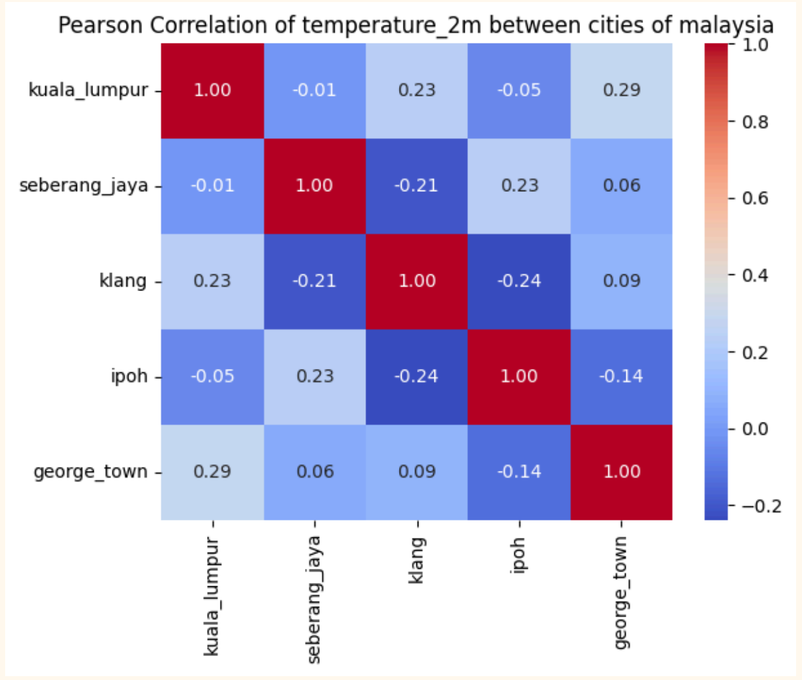

Pearson Correlation of rain between cities of thailand
samut_prakan 1.00 0.01 0.02 0.02 0.02 0.01 0.15 0.09 -0.00 0.09 0.02 0.07
nonthaburi 0.01 1.00 0.03 0.02 0.00 -0.00 0.15 0.01 0.03 0.07 0.02 0.38
chiang_mai 0.02 0.03 1.00 0.01 -0.00 0.01 0.01 0.00 0.01 0.01 0.05 0.01
phuket 0.02 0.02 0.01 1.00 0.23 -0.01 0.00 0.00 0.05 -0.00 0.01 -0.00
krabi 0.02 0.00 -0.00 0.23 1.00 -0.00 -0.00 -0.01 0.00 -0.01 0.01 0.03
udon_thani 0.01 -0.00 0.01 -0.01 -0.00 1.00 0.02 0.01 -0.01 0.04 -0.02 0.01
songkhla 0.15 0.15 0.01 0.00 -0.00 0.02 1.00 0.28 0.00 0.18 0.02 0.17
nakhon_ratchasima 0.09 0.01 0.00 0.00 -0.01 0.01 0.28 1.00 0.02 0.43 0.01 0.01
pattani -0.00 0.03 0.01 0.05 0.00 -0.01 0.00 0.02 1.00 0.01 0.00 0.01
nakhon_patthom 0.09 0.07 0.01 -0.00 -0.01 0.04 0.18 0.43 0.01 1.00 0.00 0.05
phitsanulok 0.02 0.02 0.05 0.01 0.01 -0.02 0.02 0.01 0.00 0.00 1.00 0.03
bangkok_new 0.07 0.38 0.01 -0.00 0.03 0.01 0.17 0.01 0.01 0.05 0.03 1.00
samut_prakan
nonthaburi
chiang_mai
phuket
krabi
udon_thani
songkhla
nakhon_ratchasima
pattani
nakhon_patthom
phitsanulok
bangkok_new
1.0
0.8
0.6
0.4
0.2
0.0

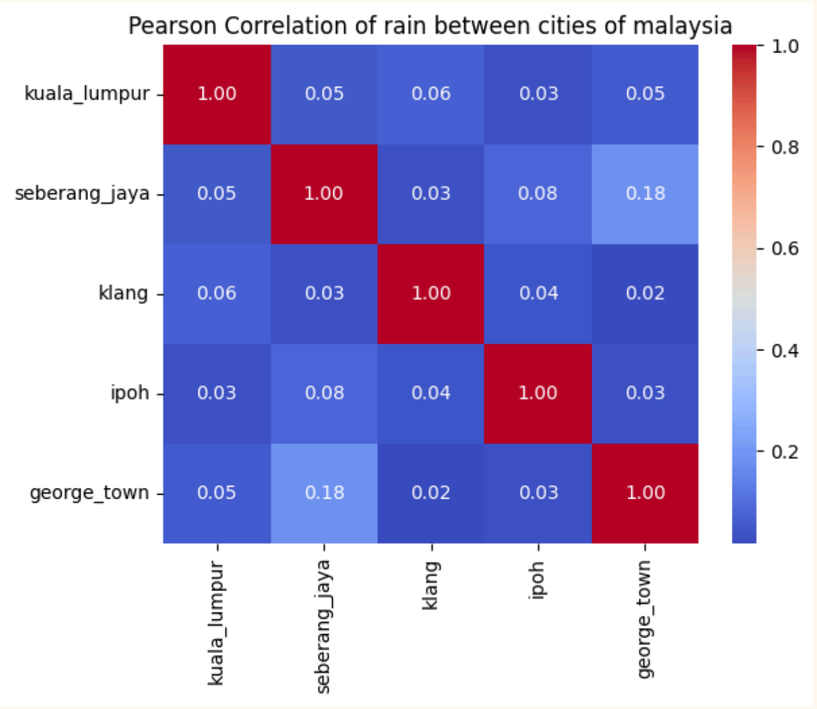

Pearson Correlation of Change in rain between cities of thailand
samut_prakan 1.00 0.26 0.00 -0.00 -0.00 0.01 0.36 0.04 0.01 0.03 0.00 0.36
nonthaburi 0.26 1.00 -0.00 0.00 0.00 0.00 0.62 0.10 0.02 0.08 0.01 0.62
chiang_mai 0.00 -0.00 1.00 0.00 0.00 0.01 0.00 -0.00 0.01 0.00 0.00 0.00
phuket -0.00 0.00 0.00 1.00 1.00 -0.01 -0.00 0.00 0.01 -0.00 -0.00 -0.00
krabi -0.00 0.00 0.00 1.00 1.00 -0.01 -0.00 0.00 0.01 -0.00 -0.00 -0.00
udon_thani 0.01 0.00 0.01 -0.01 -0.01 1.00 0.00 -0.01 0.00 0.01 0.02 0.00
songkhla 0.36 0.62 0.00 -0.00 -0.00 0.00 1.00 0.09 0.00 0.08 0.02 1.00
nakhon_ratchasima 0.04 0.10 -0.00 0.00 0.00 -0.01 0.09 1.00 0.02 0.41 0.01 0.09
pattani 0.01 0.02 0.01 0.01 0.01 0.00 0.00 0.02 1.00 0.01 0.00 0.00
nakhon_patthom 0.03 0.08 0.00 -0.00 -0.00 0.01 0.08 0.41 0.01 1.00 0.01 0.08
phitsanulok 0.00 0.01 0.00 -0.00 -0.00 0.02 0.02 0.01 0.00 0.01 1.00 0.02
bangkok_new 0.36 0.62 0.00 -0.00 -0.00 0.00 1.00 0.09 0.00 0.08 0.02 1.00
samut_prakan
nonthaburi
chiang_mai
phuket
krabi
udon_thani
songkhla
nakhon_ratchasima
pattani
nakhon_patthom
phitsanulok
bangkok_new
1.0
0.8
0.6
0.4
0.2
0.0

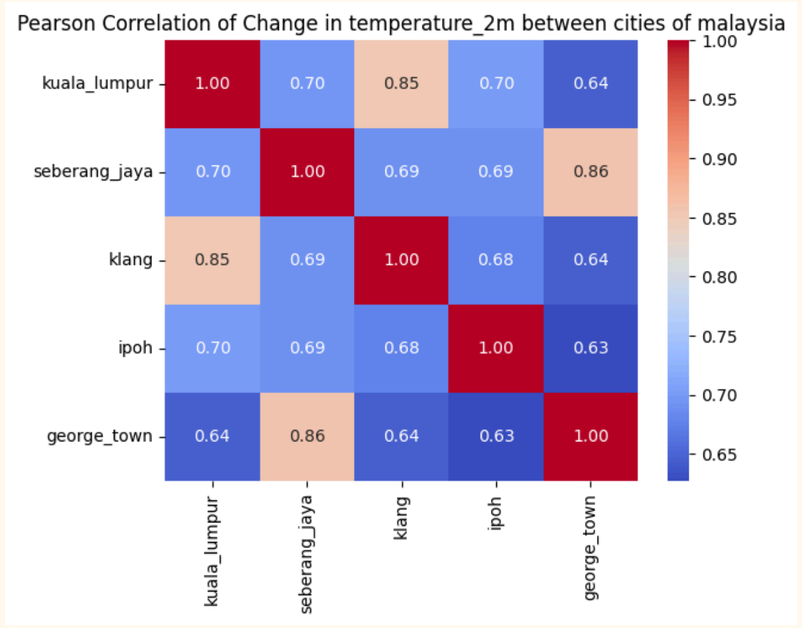
Rainfall lag time

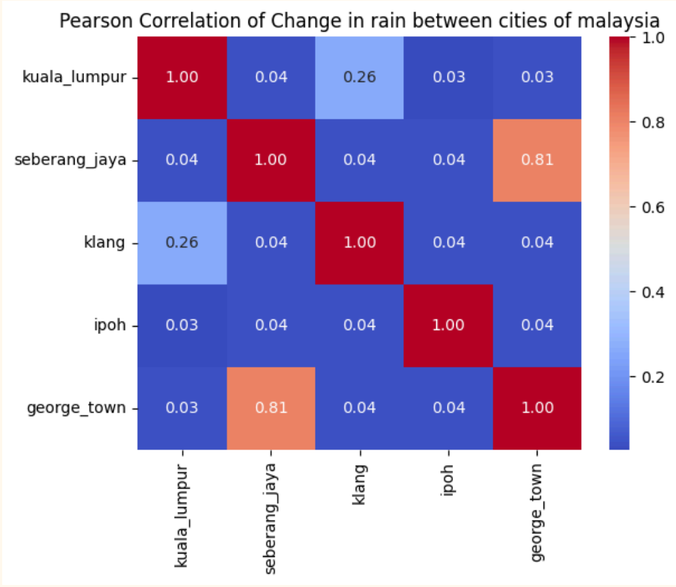


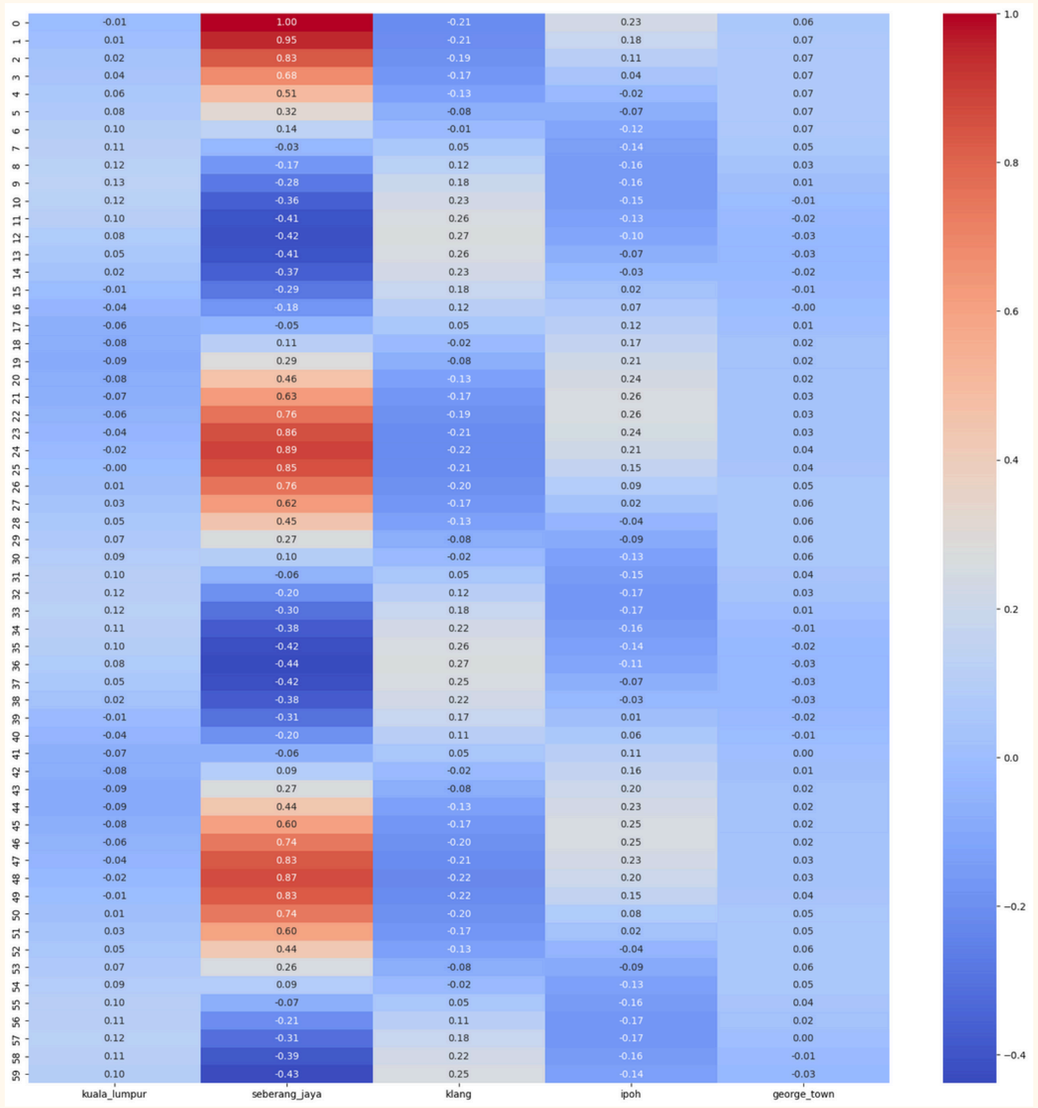


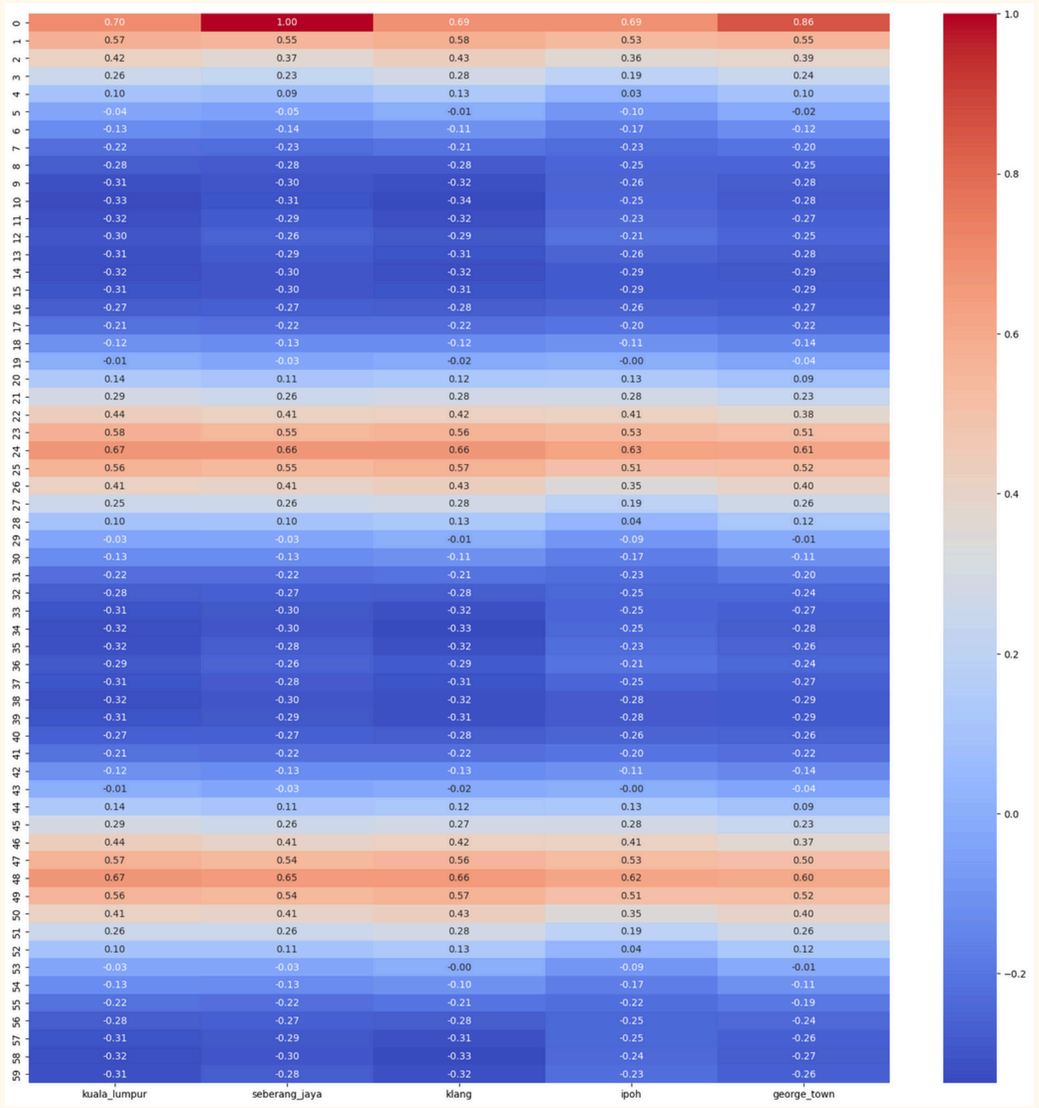

Pearson Correlation of temperature_2m between cities of malaysia
kuala_lumpur
seberang_jaya
klang
ipoh
george_town
1.00 -0.01 0.23 -0.05 0.29
-0.01 1.00 -0.21 0.23 0.06
0.23 -0.21 1.00 -0.24 0.09
-0.05 0.23 -0.24 1.00 -0.14
0.29 0.06 0.09 -0.14 1.00
1.0
0.8
0.6
0.4
0.2
0.0
−0.2


Pearson Correlation of rain between cities of malaysia
kuala_lumpur
seberang_jaya
klang
ipoh
george_town
1.00 0.05 0.06 0.03 0.05
0.05 1.00 0.03 0.08 0.18
0.06 0.03 1.00 0.04 0.02
0.03 0.08 0.04 1.00 0.03
0.05 0.18 0.02 0.03 1.00
1.0
0.8
0.6
0.4
0.2


Pearson Correlation of Change in temperature_2m between cities of malaysia
kuala_lumpur
seberang_jaya
klang
ipoh
george_town
1.00 0.70 0.85 0.70 0.64
0.70 1.00 0.69 0.69 0.86
0.85 0.69 1.00 0.68 0.64
0.70 0.69 0.68 1.00 0.63
0.64 0.86 0.64 0.63 1.00
1.00
0.95
0.90
0.85
0.80
0.75
0.70
0.65


Pearson Correlation of Change in rain between cities of malaysia
kuala_lumpur
seberang_jaya
klang
ipoh
george_town
1.00 0.04 0.26 0.03 0.03
0.04 1.00 0.04 0.04 0.81
0.26 0.04 1.00 0.04 0.04
0.03 0.04 0.04 1.00 0.04
0.03 0.81 0.04 0.04 1.00
1.0
0.8
0.6
0.4
0.2

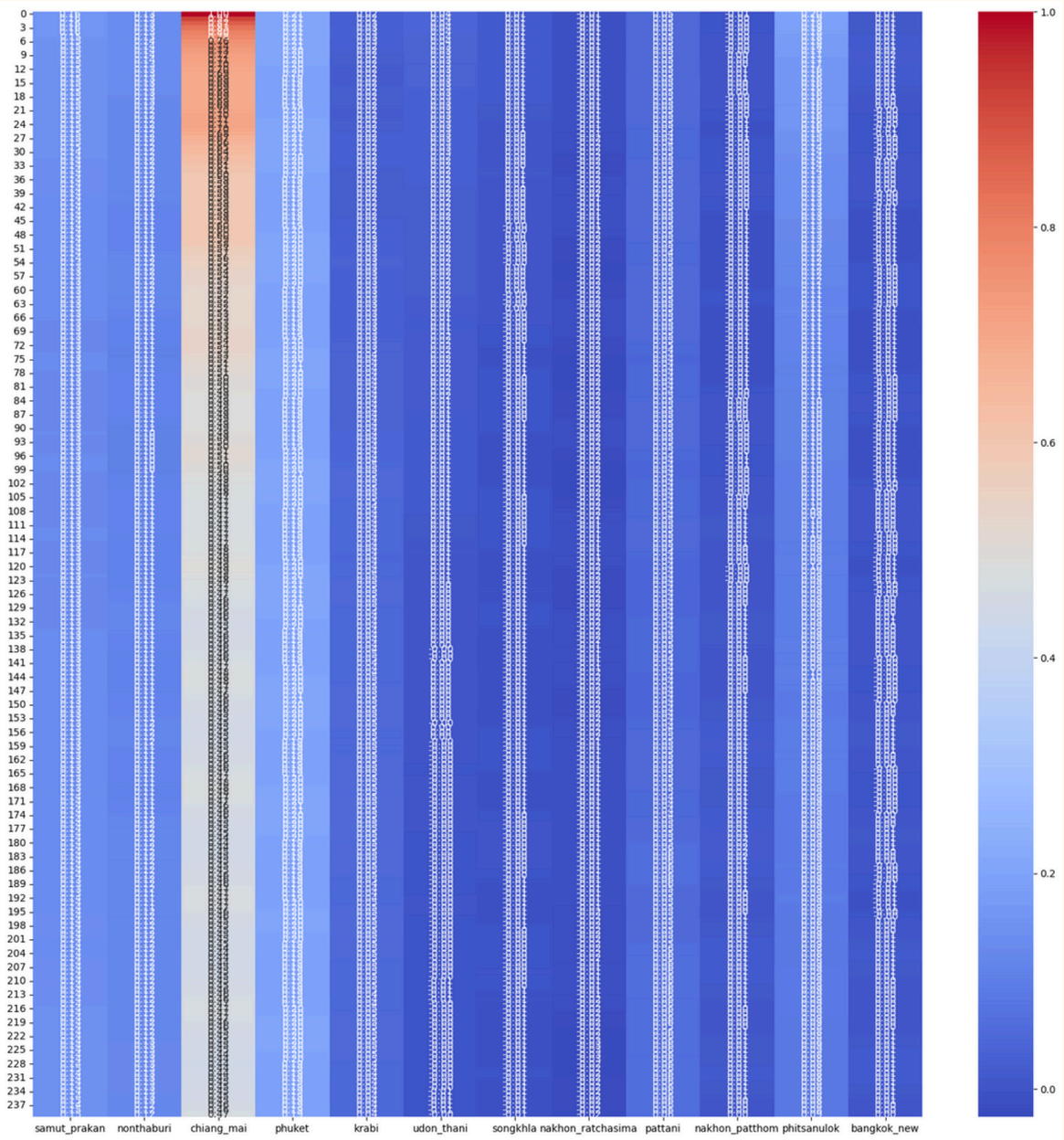

kuala_lumpur
seberang_jaya
klang
ipoh
george_town
1.0
0.8
0.6
0.4
0.2
0.0
−0.2
−0.4


kuala_lumpur
seberang_jaya
klang
ipoh
george_town
1.0
0.8
0.6
0.4
0.2
0.0
−0.2

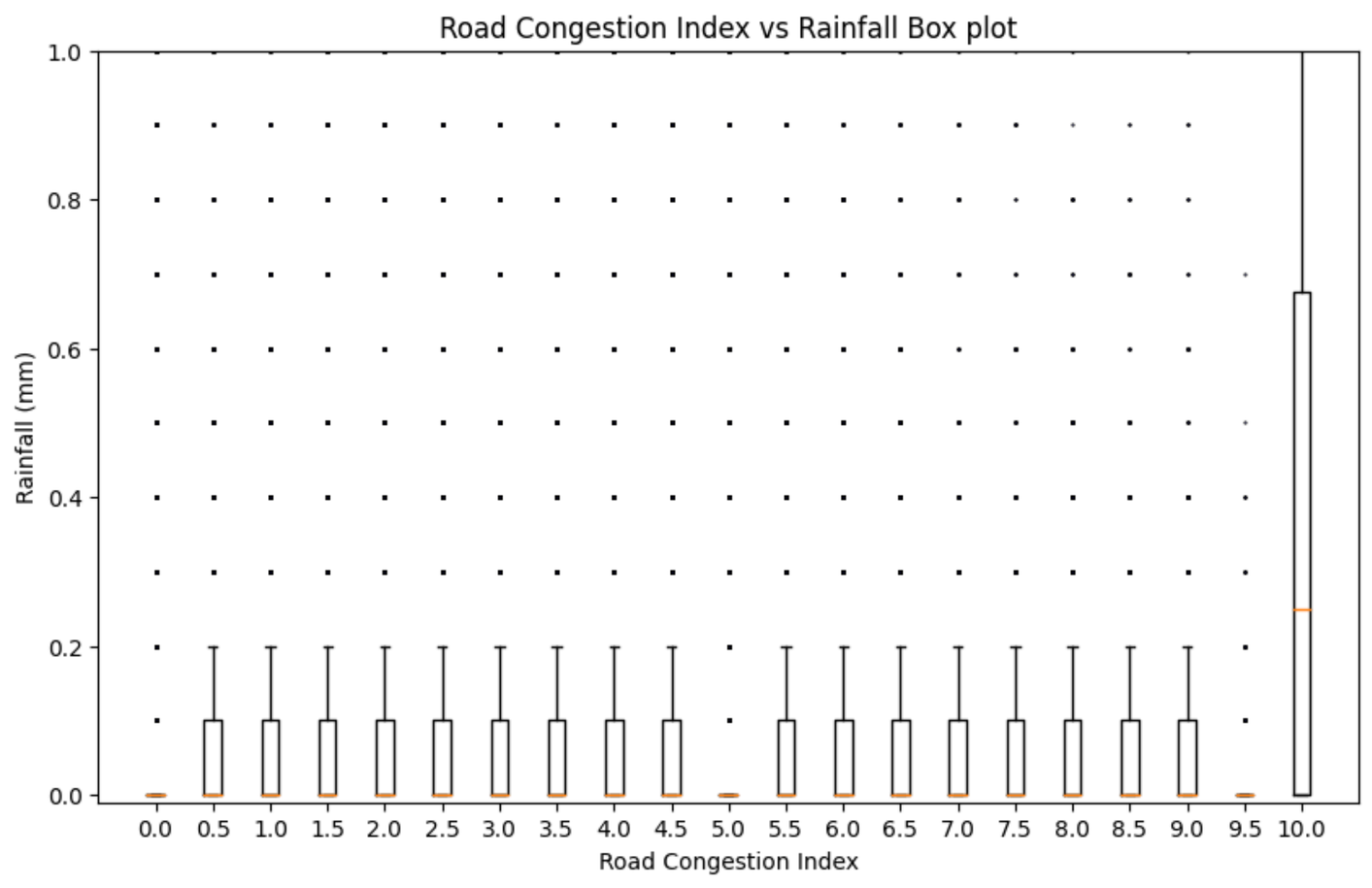
Interesting Observation

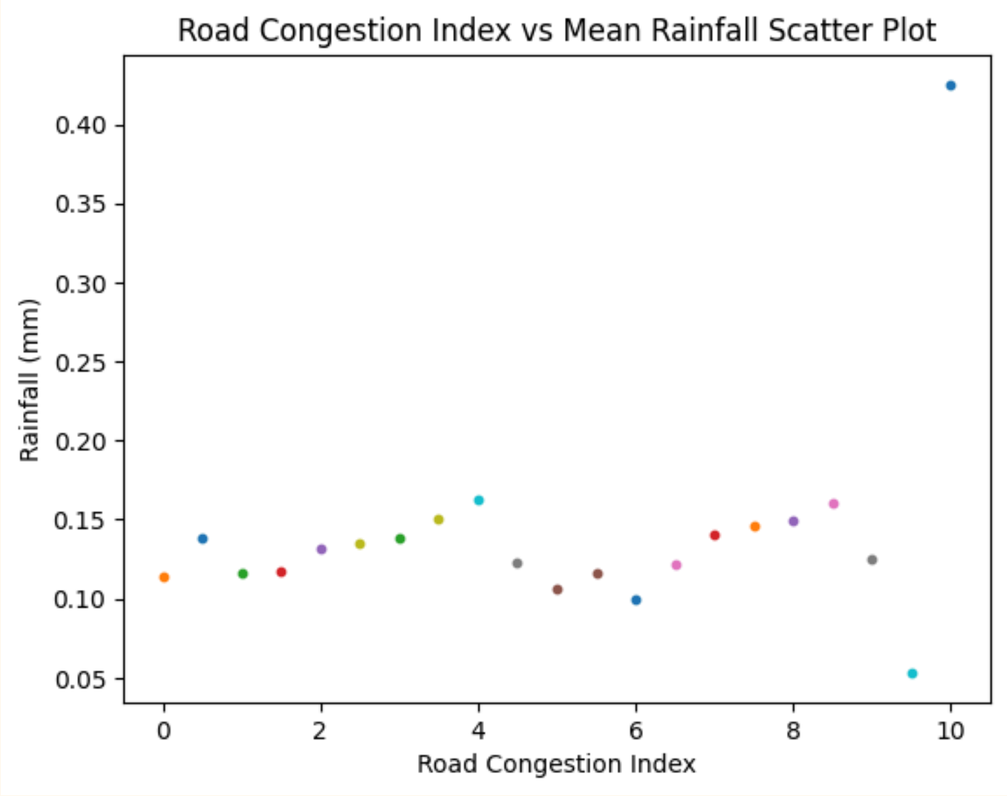
Cloud cover

gradually not
correlated over
time



Is there any correlation between traffic pattern and weather behaviour

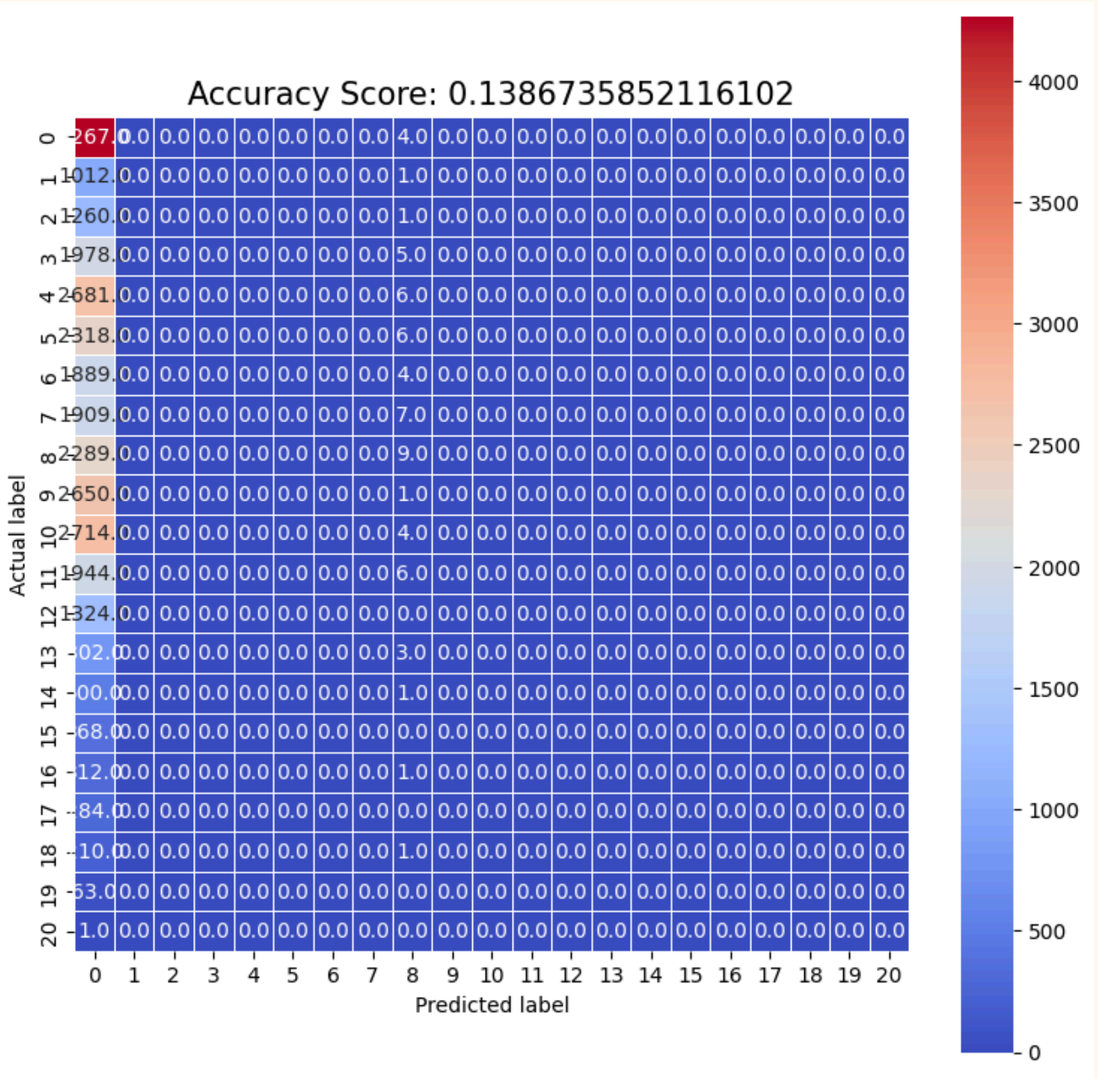




Kruskal Median Testing between each traffic index

Dataset: Bangkok traffic 2017-2024

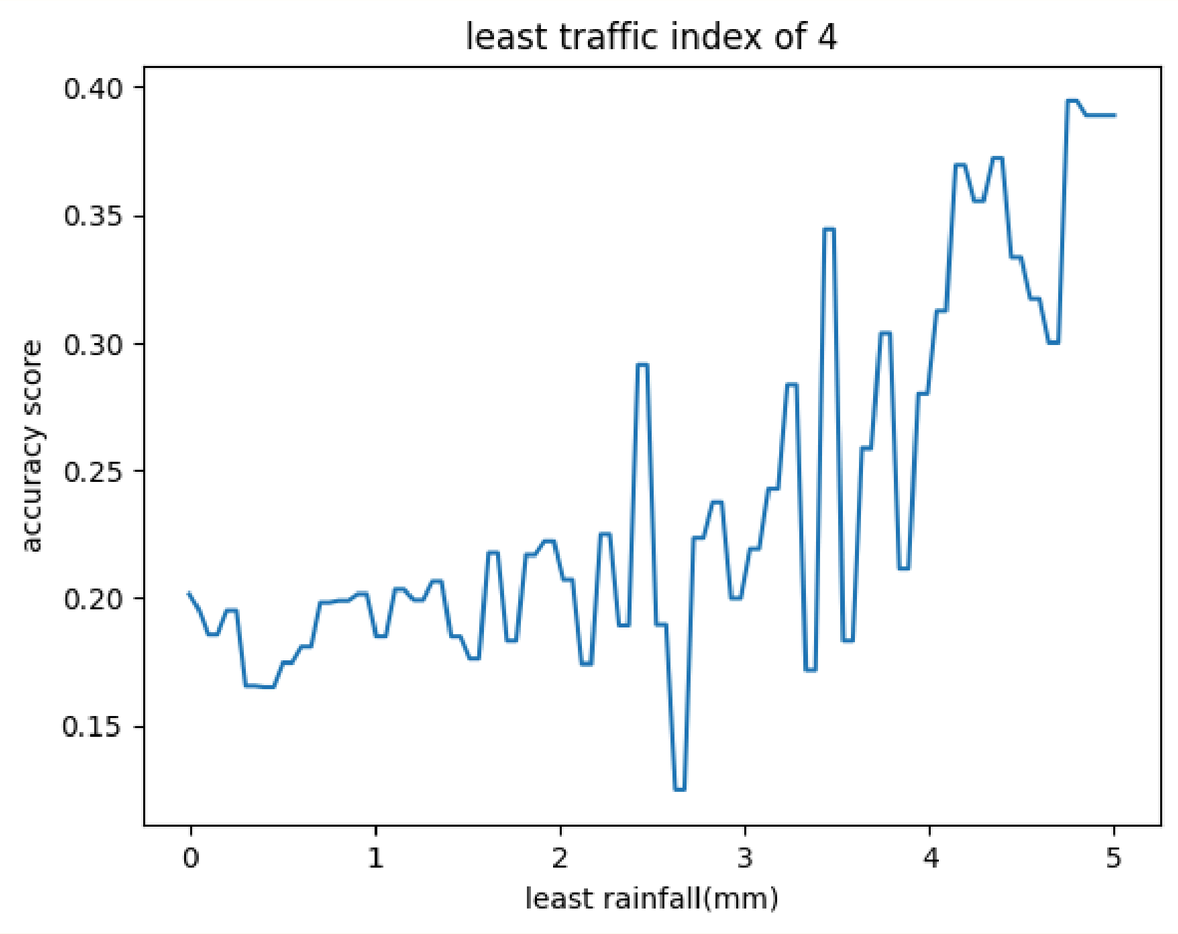
p - value ~ 0

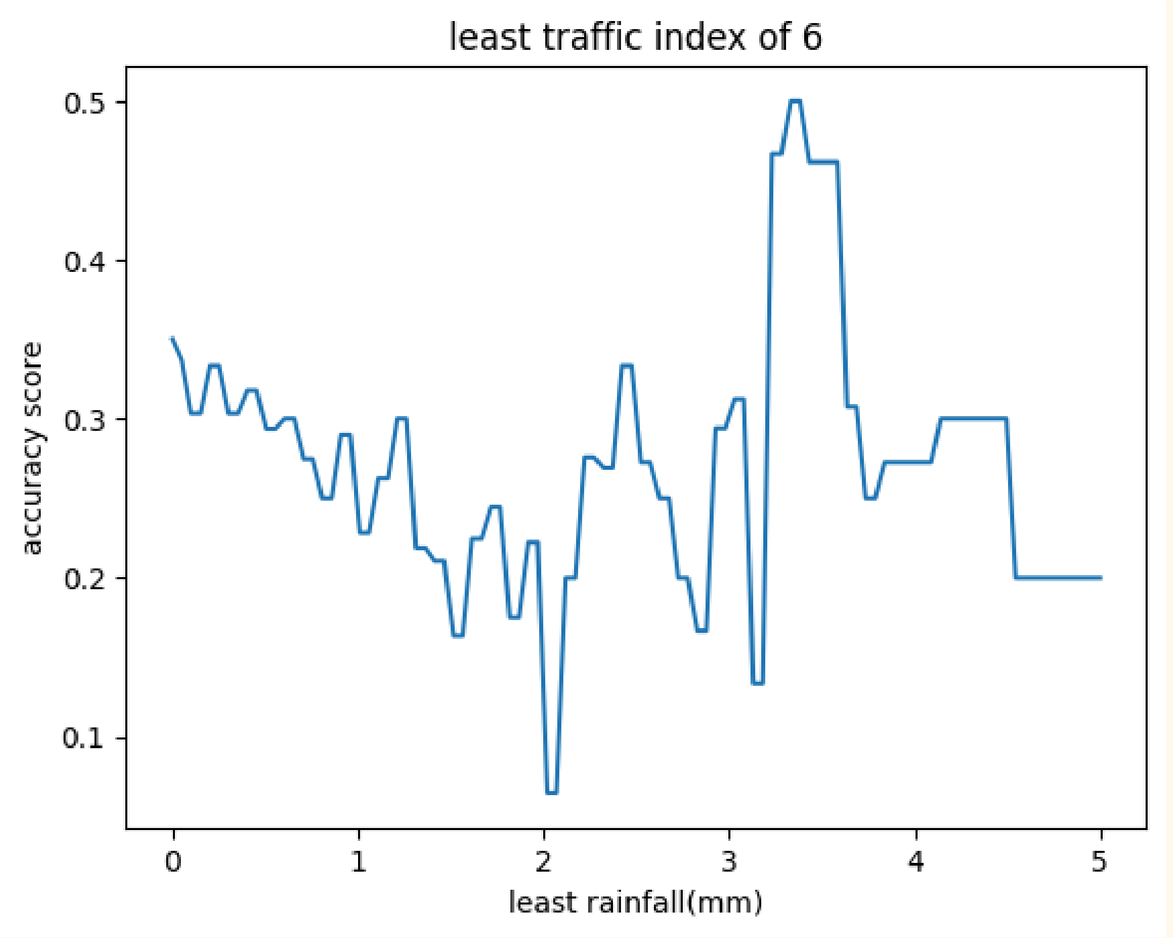


Logistical Regression

- rainfall
- temperature
- cloud cover
- wind speed

fine tuning: tight claim, big dataset





How does weather pattern affect traffic incident

> 0.2 mm rainfall

> 0.4 mm rainfall

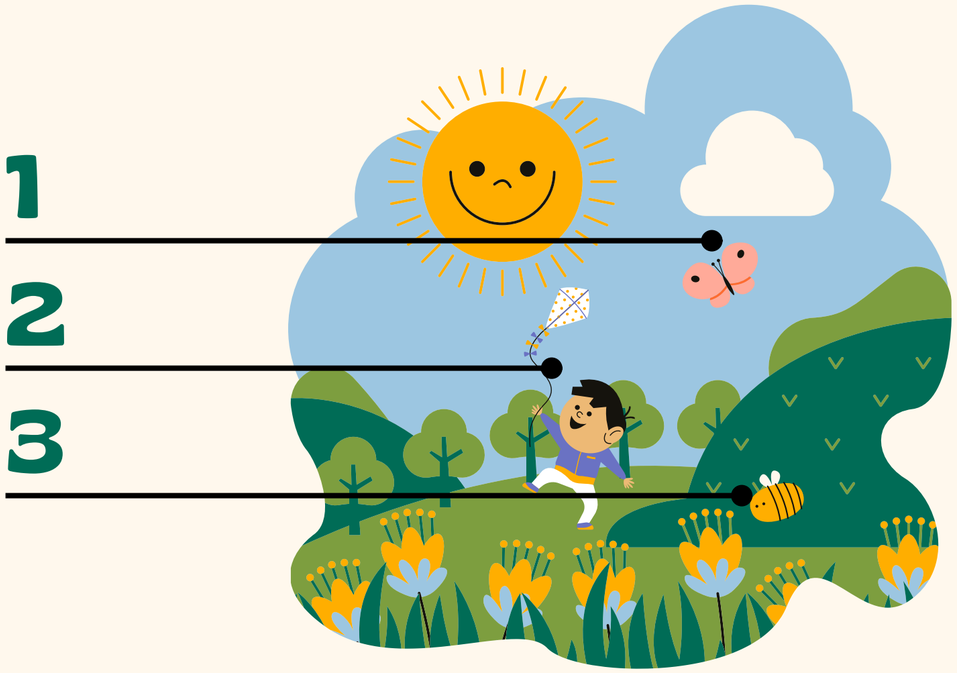
Spot the Difference!

Can you spot six differences between these two images?

ANSWER KEY

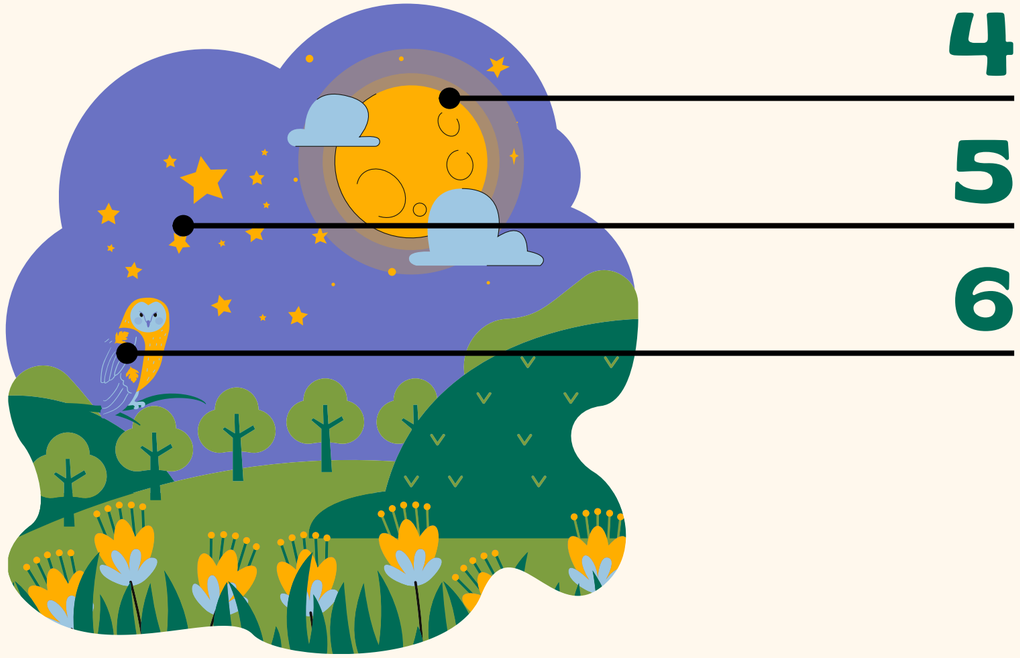
Spot the Difference!

Can you spot six differences between these two images?



Daytime

The Sun is visible in the sky, giving off heat and light.



Nighttime

The Sun has gone down and the sky becomes dark.

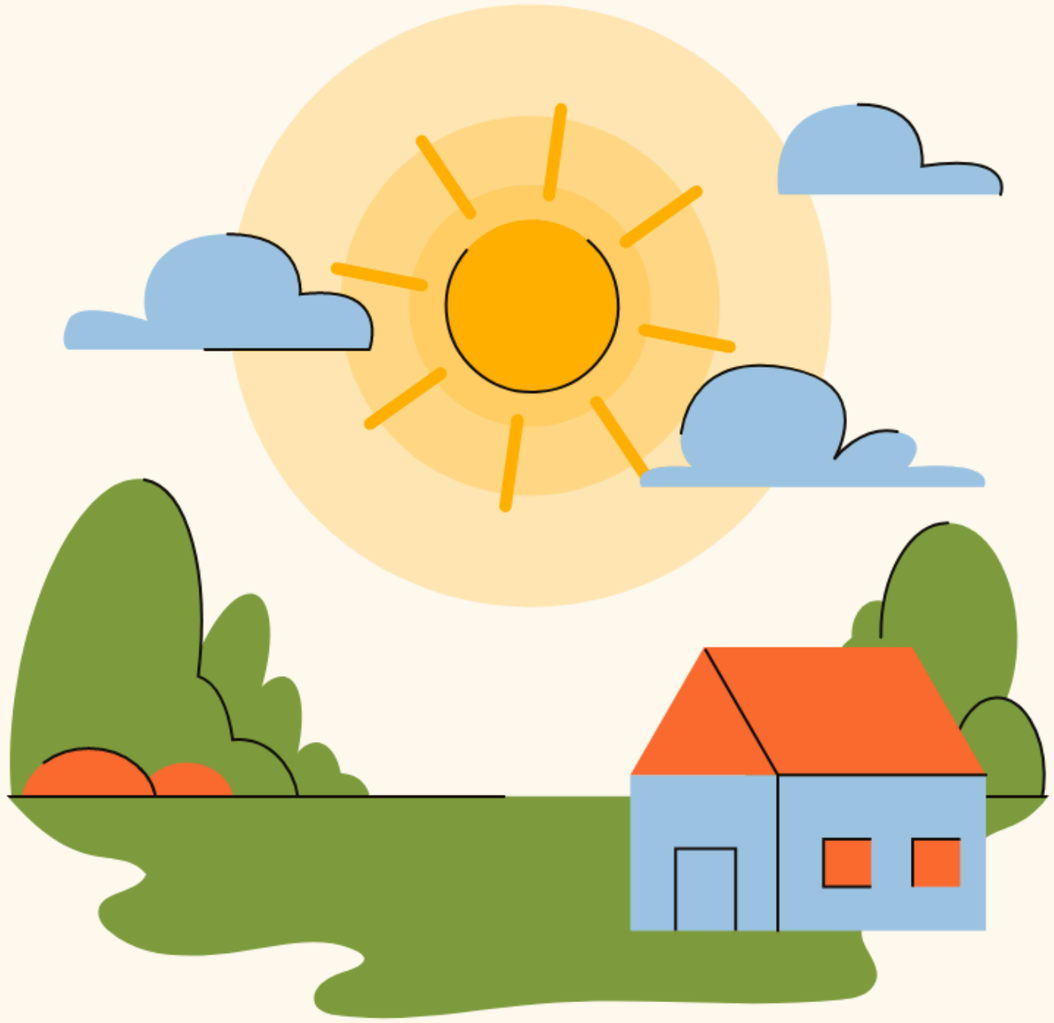
At the end of the lesson, you'll learn to...

1. investigate the effects of sunlight on Earth.
2. observe how the Sun warms the Earth's materials.
3. explain how shade is produced.

FUN FACT!

The Sun is the closest star to Earth.

What is the Sun?



It's a big ball of hot gas in space.

The Sun is a star made up mostly of hydrogen and helium.

It gives us light and heat.

The Sun is very far away, but its light and heat reach us daily.

How Does the Sun Warm the Earth?

The Sun's rays carry heat to the Earth's surface.

The light coming from the Sun carries energy. It becomes heat when it hits a surface.

Thinking Hats On!

Why are some areas in the playground warmer while others cooler?

On a sunny day, which is warmer to touch: the pavement or the soil?

Sun's Effect on Earth's Materials

Sand

Soil

Water

Rocks

The Sun affects different materials in different ways.

These materials on Earth’s surface will warm up from sunlight in different amounts and at different rates.

Sun's Effect on Earth's Materials

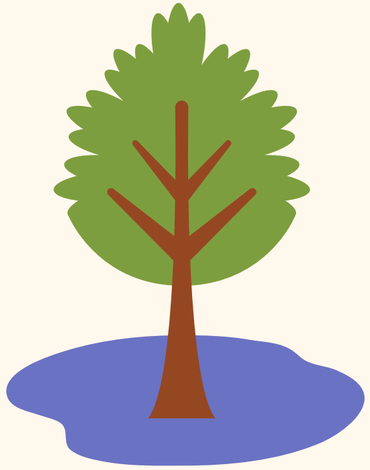
Different colored materials under the sun will warm at different rates.

Darker-colored materials absorb more light and get warm faster than light-colored materials.

Shade and How It's Produced

Shade forms when a structure blocks the Sun's rays. It protects us and provides relief from the Sun's heat.

There are different ways to produce shades and block the sunlight.



Planting trees

Using tents and umbrellas

Constructing buildings or shelters

Try to Remember!

The Sun provides us with light and heat.

When the Sun's rays reach Earth, the light energy changes to heat.

Sun's heat has different effects on Earth's materials.

The darker the material, the more heat it absorbs, hence the faster it gets warm.

Shade provides relief and protection from the Sun's heat.

Shade provides relief and protection from the Sun's heat.

REFERENCE

Mitchell D. Chester, Ed.D., Commissioner. "Sunlight Warms Earth's Surface." Model Curriculum. Revised July 2018. Accessed from http://millriverschools.org/documents/drivesync/Curriculum%20Website/Science/GL%20K/mcu-SCIgK-SunlightWarms.pdf

Resource Page

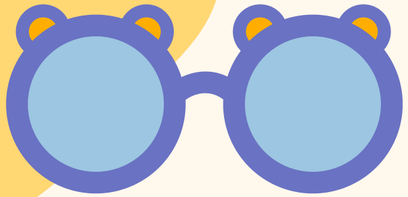
Use these illustrations in your Canva Presentation. To find even more elements about the weather, use these collection codes in the elements search bar:

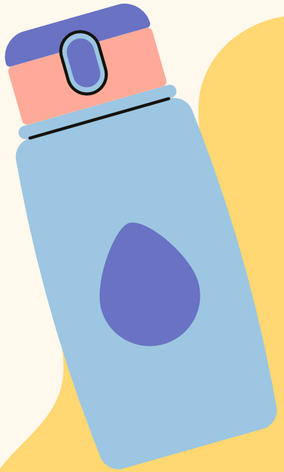
canvaeducationscienceobjectsinthesky

canvaeducationscienceweather

canvaeducationweather

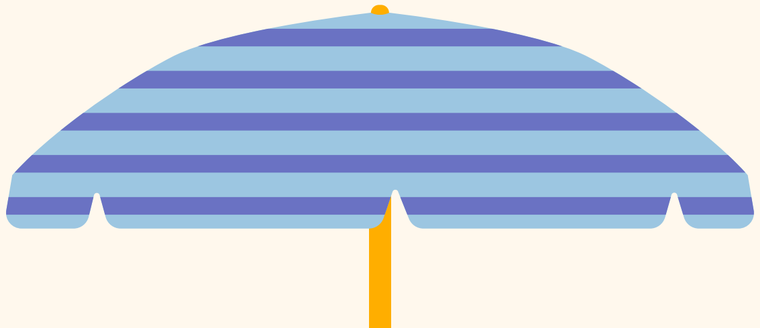
Don't forget to delete this page before presenting. Happy designing!





Try this background for online class.

*Please delete this section before downloading.



Press these keys while on Present mode!

B for blur

C for confetti

D for a drumroll

M for mic drop

O for bubbles

Q for quiet

U for unveil

0-9 Any number from 0-9 for a timer