

Climate Change

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Problem Statement

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- The impact on visibility given the hourly sky condition and hourly present weather type
- Variables Used: date, time, HourlyVisibility, HourlyPresentWeatherType, HourlySkyCondition

Variables Explanation

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- **Date**: year, month, and day
- **Time**: hour, minute, and second
- **Hourly Present Weather Type**

SN:03 |SN:71 |
snow|snow slight

SN:03 |SN:72 s |
snow| snow moderate

SN:03 BR:1 |SN:71 |
snow, mist| snow slight

HZ:7 |FU:05 |HZ:05
haze|smoke|haze

RA:02 |RA:61 |
rain| rain not freezing- moderate

RA:02 SN:03 |RA:61 RA:67 SN:71 |
rain, snow|rain not freezing-moderate, rain or drizzle and snow- slight

RA:02 BR:1 |RA:61 |
rain, mist| rain not freezing- moderate

HZ:7 ||HZ:05
haze||haze

Variable Explanation (Cont'd)

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Hourly Visibility

- 0 = objects not visible at 50 yards.
- 1 = objects not visible at 1 cable (203 yards).
- 2 = objects not visible at 3 cables (405 yards).
- 3 = objects not visible at 0.5 mile (nautical).
- 4 = objects not visible at 1 mile (nautical).
- 5 = visibility poor, objects not visible at 2 miles (nautical).
- 6 = visibility moderate, objects not visible at 5 miles (nautical).
- 7 = visibility good, objects not visible at 10 miles (nautical).
- 8 = visibility very good, objects not visible at 30 miles (nautical).
- 9 = visibility excellent, objects visible more than 30 miles (nautical).

Variable Explanation (Cont'd)

Hourly Sky Condition

CLR: clear sky

FEW: few clouds

SCT: scattered clouds

BKN: broken clouds

OVC: overcast

VV: obscured sky

10: partially obscured sky

*number at the end represents cloud base height at lowest point of layer (given in hundreds of feet)

Steps

1. Read the LCD Dataset in Python.
2. Select the important columns necessary for the data analysis.
3. Split the date column into date and time.
4. Create a new dataframe with these columns.
5. Export the new dataframe to a new csv file.
6. Analyze the new data using Tableau.

Visualization and Conclusion

Best Visibilities (Visibility 8-10)

Best visibility occurs when we have the best sky conditions and weather conditions

1. when we have FEW clouds and even though cloud base height are at 25 feet or even 17 feet from the ground, even with snowy weather conditions, it does not affect visibility as much.
on the contrary with overcast and snow/rain, if the cloud distance is higher than 38 feet, the visibility is the best
2. outlier: conditions with rain and overcast with cloud distance 23 feet and drizzle with overcast and 14 feet, visibility is still very clear.

Visibility Analysis - High 8-10.

Hourl..	Day of Date	Hourly Present Weather T..	Hourly Sky Conditions
10	1	-SN:03 SN:71	FEW:02 25 BKN:07 60 OVC:08 150
	3	-SN:03 SN:71	FEW:02 17 SCT:04 24
	5	-SN:03 SN:71	OVC:08 22
	11	-RA:02 RA:61	BKN:07 46 OVC:08 65
		-RA:02 SN:03 RA:61 RA:6..	SCT:04 12 OVC:08 39
	15	-SN:03 SN:71	BKN:07 15 OVC:08 42
			SCT:04 15 OVC:08 60
			SCT:04 18 BKN:07 37 OVC:08 110
	18	-RA:02 RA:61	BKN:07 25 BKN:07 30 OVC:08 39
	27	-RA:02 RA:61	BKN:07 20 BKN:07 25 OVC:08 32
			BKN:07 46 BKN:07 60 OVC:08 70
			OVC:08 23
			OVC:08 28
			SCT:04 24 BKN:07 33 OVC:08 39
9			SCT:04 28 OVC:08 38
	28	-DZ:01 DZ:51	OVC:08 14
		-RA:02 RA:61	OVC:08 8
			OVC:08 13
	31	-RA:02 RA:61	FEW:02 55 OVC:08 80
	2	-SN:03 SN:71	FEW:02 25 OVC:08 65
	3	-SN:03 SN:71	BKN:07 24
	5	-SN:03 SN:71	FEW:02 25 BKN:07 41 OVC:08 49
	15	-SN:03 SN:71	FEW:02 15 BKN:07 30 OVC:08 55
	16	-SN:03 SN:71	BKN:07 22 BKN:07 120
8	4	-SN:03 SN:71	SCT:04 37 OVC:08 55
	15	-SN:03 SN:71	BKN:07 22 OVC:08 50
	19	-RA:02 RA:61	OVC:08 14

Visualization and Conclusion (Cont'd)

Worst Visibilities

1. In general, snowy overcast below the height of 20 feet has low visibility and obscured sky with cloud distance 11 feet/ overcast with 8 feet has the worst visibility with snow weather conditions
2. Outlier: snow with overcast with distance 39 feet and snow and breeze with overcast at distance 60 feet,(should have been good visibility according to our previous interpretation) still gives a low visibility.
Another example: clear sky with haze/smoke also reduces visibility considerably. clear sky should have had a good visibility but the haze/smoke reduces it considerably.

Visibility Analysis - High 8-10.

Hourl..	Day of Date	Hourly Present Weather T..	Hourly Sky Conditions
3	27	-DZ:01 DZ:51	SCT:04 14 OVC:08 24
		-RA:02 RA:61	BKN:07 13 OVC:08 34
2.5	1	-SN:03 SN:71	OVC:08 34
	5	-SN:03 SN:71	FEW:02 12 BKN:07 17 OVC:08 33 OVC:08 25
	11	-SN:03 SN:71	OVC:08 6
	20	-SN:03 BR:1 SN:71	SCT:04 31 OVC:08 60
2	1	-SN:03 SN:71	BKN:07 20 OVC:08 31 OVC:08 25
	2	-SN:03 SN:71	SCT:04 23 OVC:08 39
	5	-SN:03 SN:71	FEW:02 13 BKN:07 24 OVC:08 34
	8	-SN:03 SN:71	OVC:08 15
1.75	12	-SN:03 SN:03 SN:71	SCT:04 9 BKN:07 14 OVC:08 19
1.5	1	-SN:03 SN:71	OVC:08 17
	2	-SN:03 SN:71	OVC:08 15
	5	-SN:03 SN:71	OVC:08 19
1.25	12	-SN:03 BR:1 SN:71	OVC:08 6
1	1	-SN:03 SN:71	VV:09 11
	5	-SN:03 SN:71	OVC:08 21
	12	-SN:03 BR:1 SN:71	OVC:08 8
0.75	1	-SN:03 SN:71	VV:09 9 VV:09 15
	5	-SN:03 SN:71	VV:09 17
	12	-SN:03 BR:1 SN:71	VV:09 6
		-SN:03 SN:03 SN:71	VV:09 11
0.5	1	SN:03 SN:72 s	VV:09 10
	20	SN:03 FG:2 FG:35 SN:72	VV:09 13