



MOBILITY SENSING AND DATA ANALYTICS FOR SMART CITIES

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BACKGROUND INFORMATION

- Smart Cities
- Mobility Sensing
- Economic Development
- Service Optimization

MobIntel

How it works

- Sensors
- MAC Address
- RSSI
- Privacy-First



Challenges

- Unchecked Data
- Loss of Power







PROJECT GOALS





Determine Sensor Power

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Verify Data

Compare with Google

Maps Popular Times and Sensor Correlation Trendline Forecasting

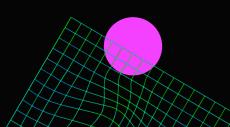
Describe Data

Seaborn and Matplotlib

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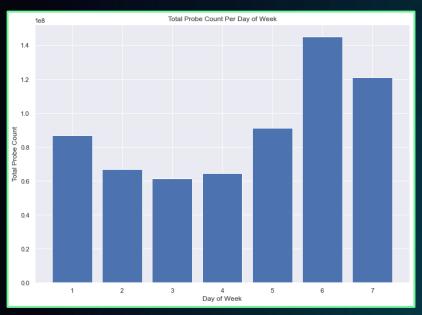


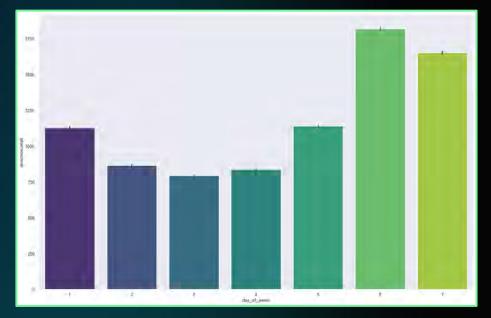


PROBE COUNTS PER DAY OF WEEK

Tot al

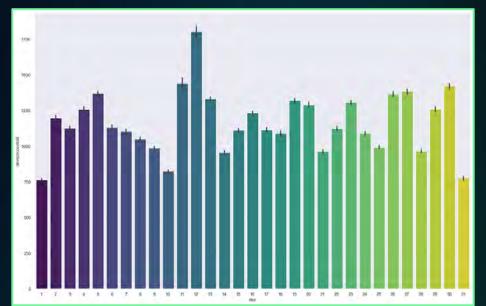
Average





PROBE COUNTS PER DAY

Average

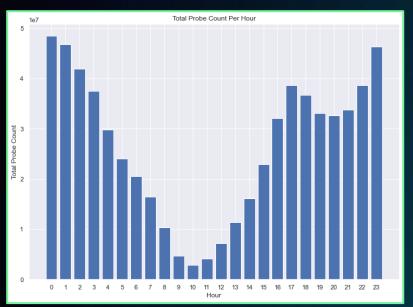


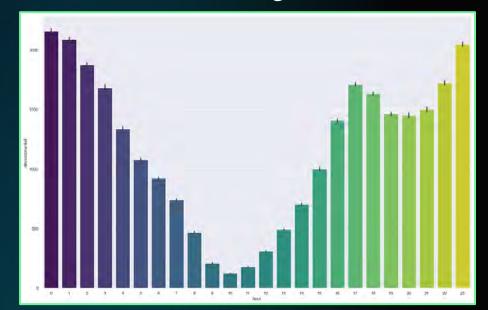


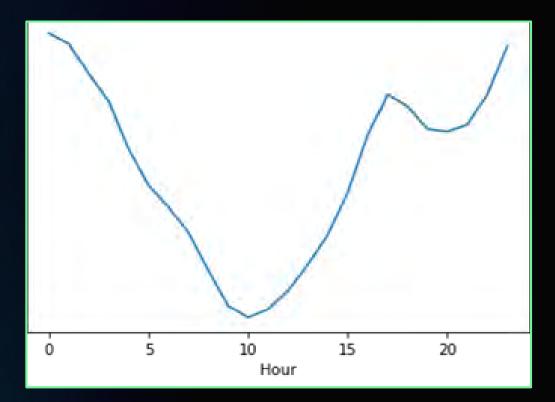
PROBE COUNTS PER HOUR

Tot al

Average









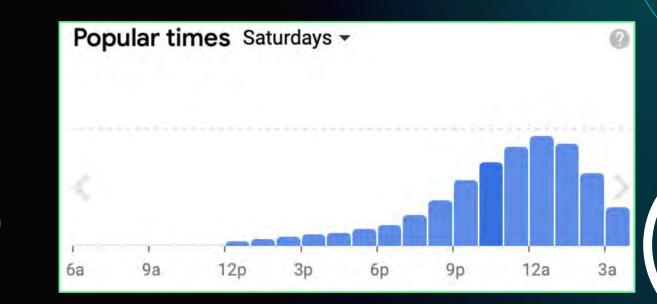


SENSOR CORRELATION

| | - | _ | _ | _ | - | | _ | _ | | | | _ | _ | | _ | _ | _ | | - 1.00 |
|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|--------|
| sensor_01 | 1 | 0.9.8 | 0.95 | 0.87 | | | 0.78 | 0.93 | 0.77 | | | | 0.94 | | | 0.69 | 0.76 | 0.87 | |
| sensor_02 | | -t | 0.96 | 0.83 | | | 0.77 | 0.87 | 0.77 | | | | 0.89 | 0.77 | 0.8 | 0.71 | 0.77 | | |
| sensor_05 | | | 1 | 0.84 | 0.79 | 0.78 | 0.82 | 0.88 | 0.81 | | | 0.78 | 0.9 | 0.86 | 0.87 | | 0.82 | 0.93 | - 0.95 |
| sensor_10 | 0.87 | 0.83 | 0.84 | 1 | 0.91 | 0.9 | 0.92 | 0.91 | 0.92 | 0.88 | 0.9 | 0.88 | | 0.81 | 0.81 | 0.81 | 0.86 | 0.8 | - 0.35 |
| sensor_12 | | | 0.79 | 0.91 | đ | 0.96 | | 0.77 | 0.96 | 0.93 | | 0.93 | 0.82 | 0.84 | 0.86 | 0.88 | 0.91 | | |
| sensor_13 | | | 0.78 | 0.9 | 0.96 | 1 | 0.96 | 0.77 | 0.95 | | | | 0.81 | 0.85 | 0.86 | 0.88 | 0.92 | 0.77 | - 0.90 |
| sensor_14 | 0.78 | 0.77 | 0.82 | 0.92 | | 0,96 | 4 | 0.81 | 0.97 | 0.92 | | | 0.84 | 0.85 | 0.86 | 0.88 | 0.91 | 0.78 | 0.50 |
| sensor_15 | 0,93 | 0.87 | 0.88 | 0.91 | 0.77 | 0.77 | 0.81 | 1 | 0.8 | 0,77 | 0.77 | | 0.97 | 0.72 | 0,72 | 0.7 | 0.76 | 0.8 | |
| sensor_16 | 0.77 | 0.77 | 0.81 | 0.92 | 0.96 | | 0.97 | 0.8 | 1 | 0.93 | | | 0.83 | 0.85 | 0.86 | 0.88 | 0.91 | 0.78 | - 0.85 |
| sensor_17 | | | 0.75 | 0.88 | 0.93 | | 0.92 | 0.77 | 0.93 | 1 | | | 0.8 | 0.87 | 0.87 | 0.92 | | | 0.00 |
| sensor_18 | | | | 0.9 | | 0.97 | | 0.77 | | 0.95 | 1 | | 0.82 | 0.84 | 0.85 | 0.88 | 0.92 | | |
| sensor_19 | | | 0.78 | 0.88 | 0.93 | | | | | | 0.95 | 1 | 0.8 | 0.89 | 0.89 | 0.93 | 0.95 | 0.77 | - 0.80 |
| sensor_26 | | 0.89 | 0.9 | 0.94 | 0.82 | 0.81 | 0.84 | 0.97 | 0.83 | 0.8 | 0.82 | 0.8 | 1 | 0.75 | | 0.73 | 0.78 | 0.83 | |
| sensor_43 | | 0.77 | 0.86 | 0.81 | 0.84 | 0.85 | 0.85 | | 0.85 | 0.87 | 0.84 | 0.89 | 0.75 | 1 | 0.92 | 0.88 | 0.91 | 0.79 | |
| sensor_46 | | 0.8 | 0.87 | 0.81 | 0.86 | 0.86 | 0.86 | | 0.86 | 0.87 | 0.85 | 0.89 | | 0.92 | 1 | 0.88 | | 0.83 | - 0.75 |
| sensor_47 | 0.69 | 0.71 | 0.76 | 0.81 | 0.88 | 0.88 | 0.88 | 0.7 | 0.88 | 0.92 | 0.88 | 0.93 | | 0.88 | 0.88 | 1 | 0.54 | 0.73 | |
| sensor_48 | 0.76 | 0.77 | 0.82 | 0.86 | 0.91 | 0.92 | 0.91 | 0.76 | 0.91 | | 0.92 | | 0.78 | 0.91 | 0.94 | 0.94 | 1 | 0.79 | |
| sensor_51 | 0.87 | | 0.93 | 0.8 | | 0.77 | 0.78 | 0.8 | 0.78 | | | 0.77 | 0.83 | 0.79 | 0.83 | | 0.79 | 1 | - 0.70 |
| | sensor_01 | sensor_02 | sensor_05 | sensor_10 | sensor_12 | sensor_13 | sensor_14 | sensor_15 | sensor_16 | sensor_17 | sensor_18 | sensor_19 | sensor_26 | sensor_43 | sensor_46 | sensor_47 | sensor_48 | sensor_51 | |



GOOGLE MAPS POPULAR TIMES



TRENDLINE FORECASTING

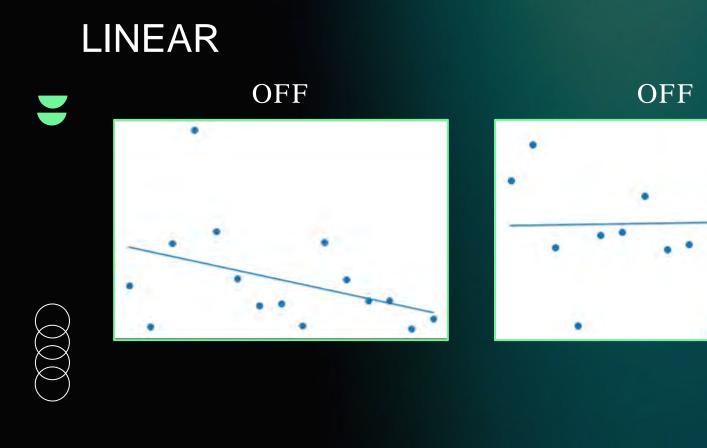
 Calculating next value from trendline of previous data points



LINEAR

• First-Order

• Second-Order

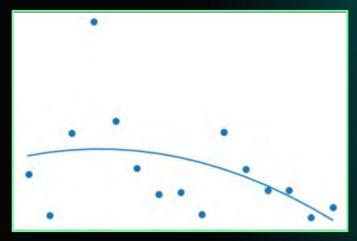


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QUADRATIC

ON





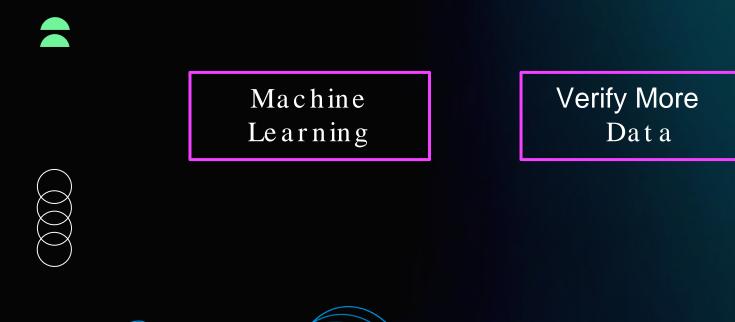


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FUTURE PROJECT GOALS



Thanks

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