# Traffic Management

## Eskwelabs Capstone Project

July 18, 2019

**Improve the service quality of** Grab **ride-hailing services**

**1** WHERE is the travel demand high?

**2** WHEN is the travel demand high?

**3** WHAT time-series model can predict travel demand?

## Traffic Management

| Field | Description |
|---|---|
| geohash6 | geohash level 6<br>Geohash is a public domain geocoding system which encodes a geographic location into a short string of letters and digits with arbitrary precision. You are free to use any geohash library to encode/decode the geohashes into latitude and longitude or vice versa. Some examples include **https://github.com/hkwi/python-geohash** (for Python), **https://github.com/kungfoo/geohash-java** (for Java). |
| day | day, where the value indicates the sequential order and not a particular day of the month |
| timestamp | start time of 15-minute intervals, in the following format: <hour>:<minute>, where hour ranges from 0 to 23 and minute is either one of (0, 15, 30, 45) |
| demand | aggregated demand normalised to be in the range [0,1] |

# KEY FINDINGS

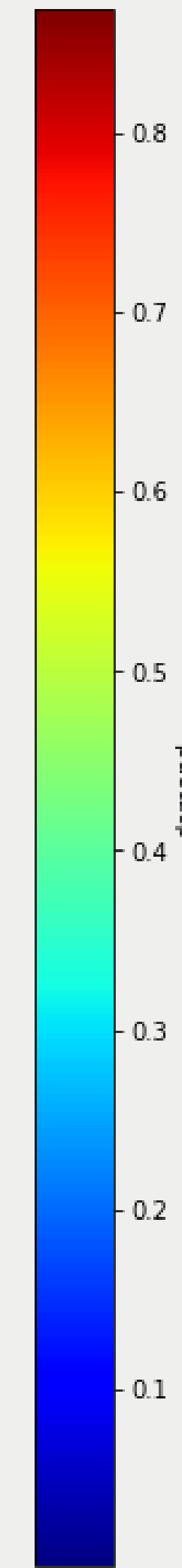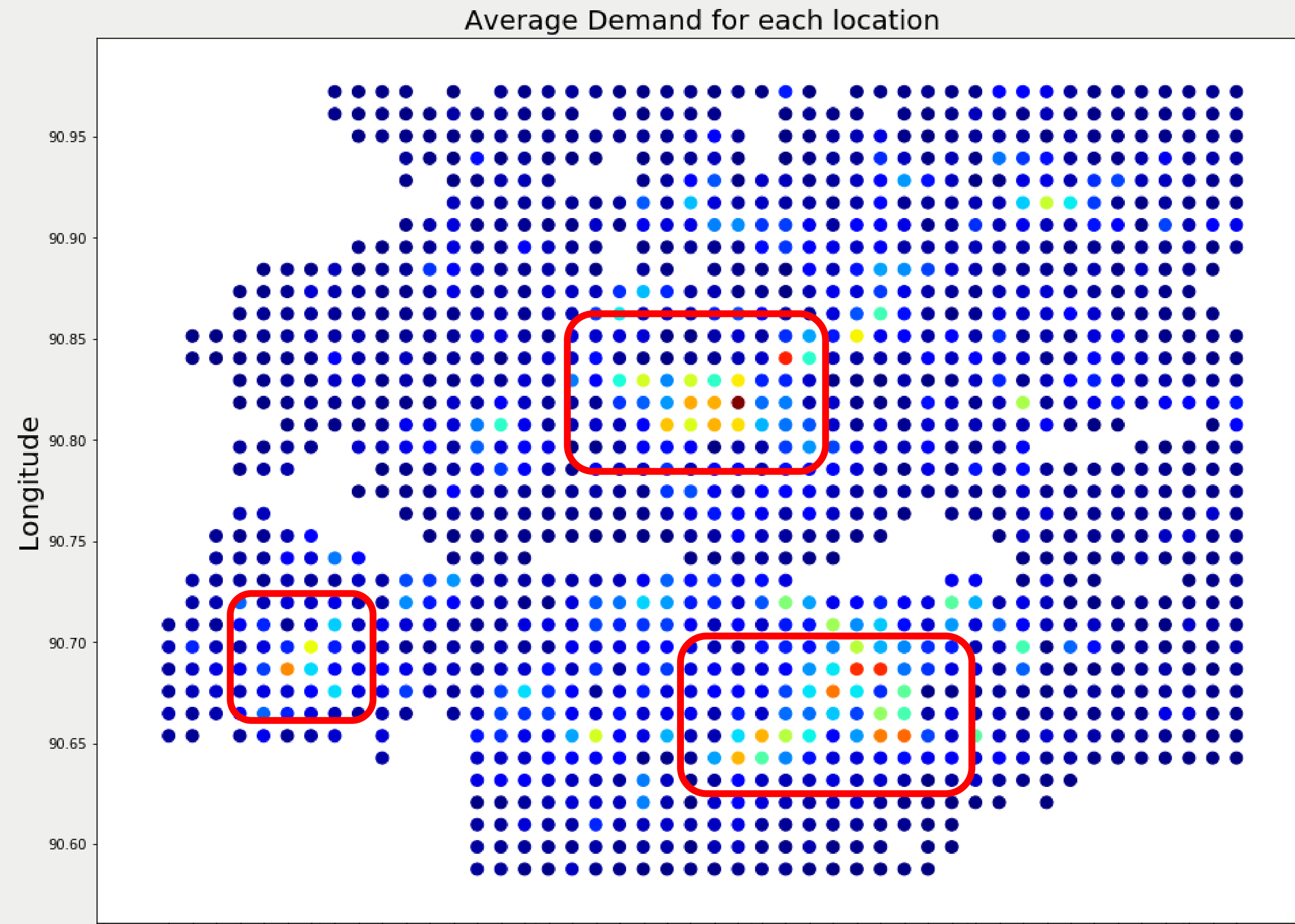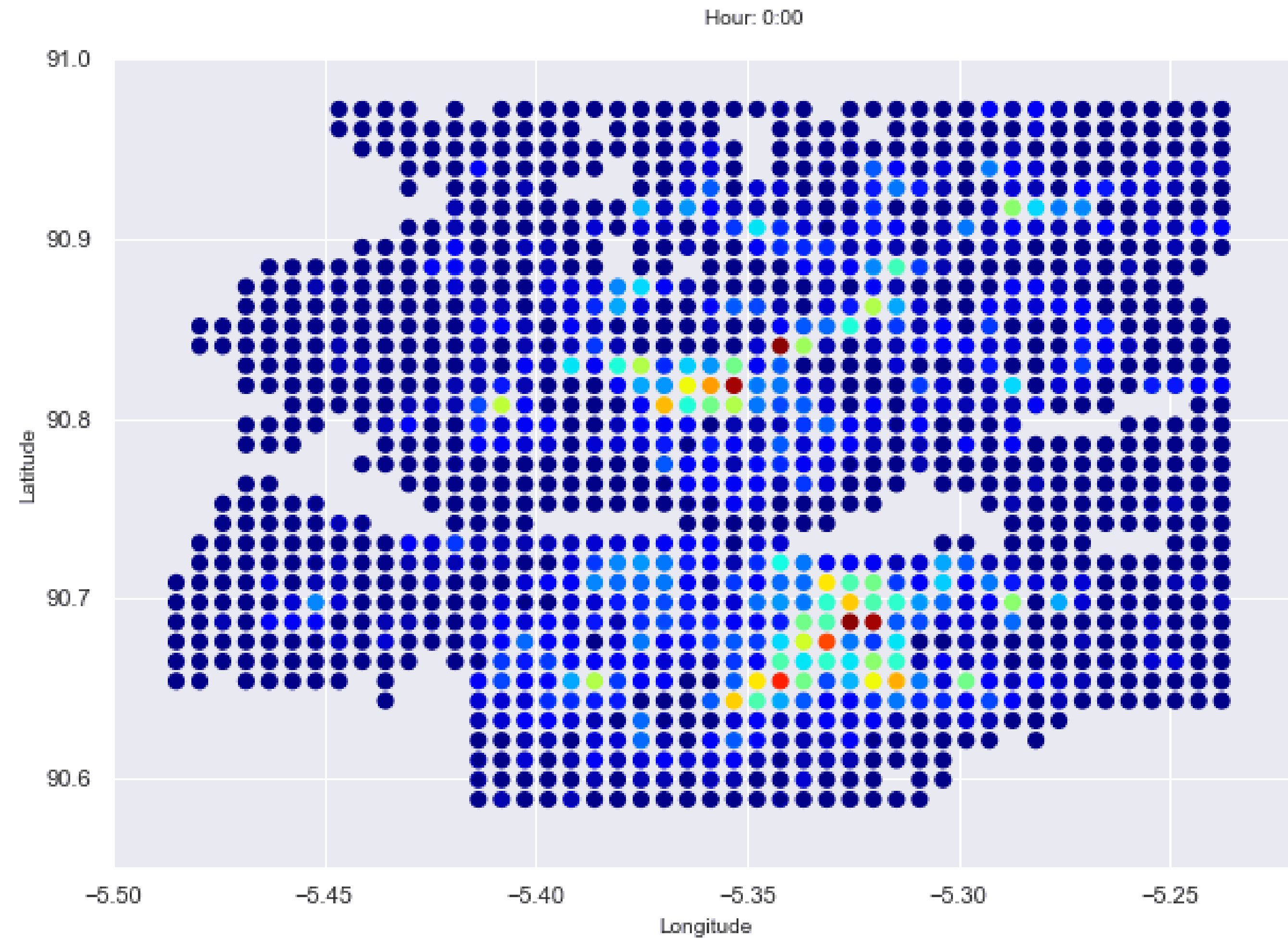| | |
|---|---|
| **WHERE** | Only certain areas have a consistently high demand. |
| **WHEN** | There is a minute increase in trend. Weekly seasonality is apparent. |
| **MODEL** | The Holt-Winters Method is the best out of the three time-series models |

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Average Demand for each location

Hotspots are most likely commercial & residential areas

# Average Hourly Demand

# KEY FINDINGS

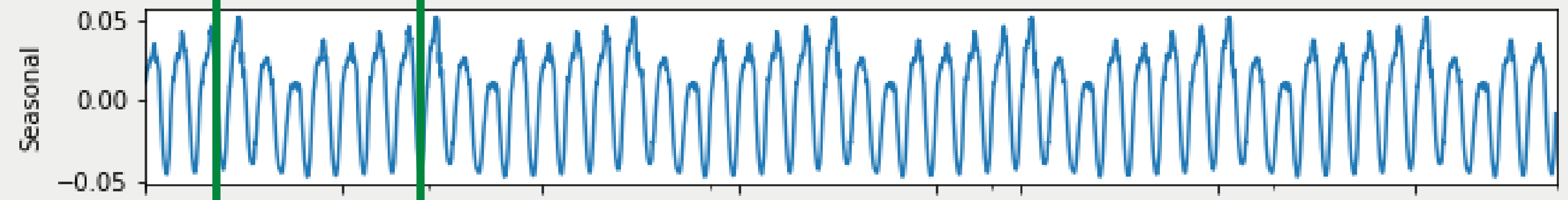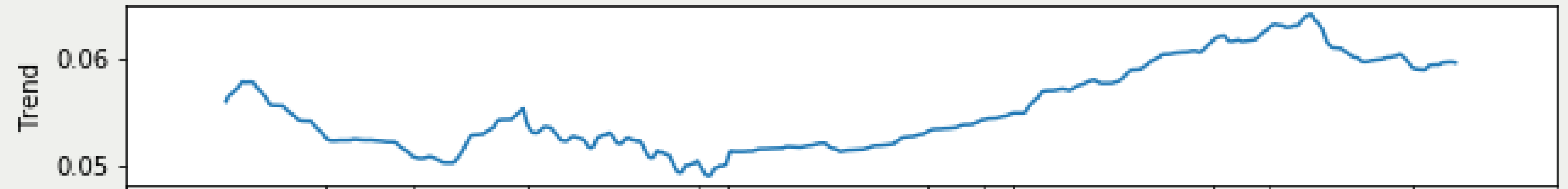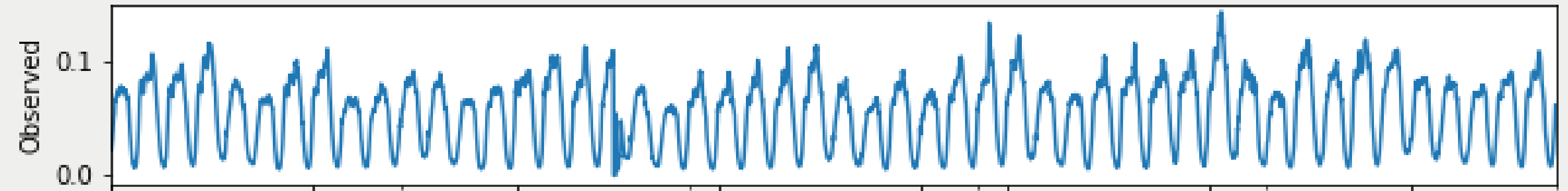**WHERE**

Only certain areas have a consistently high demand.

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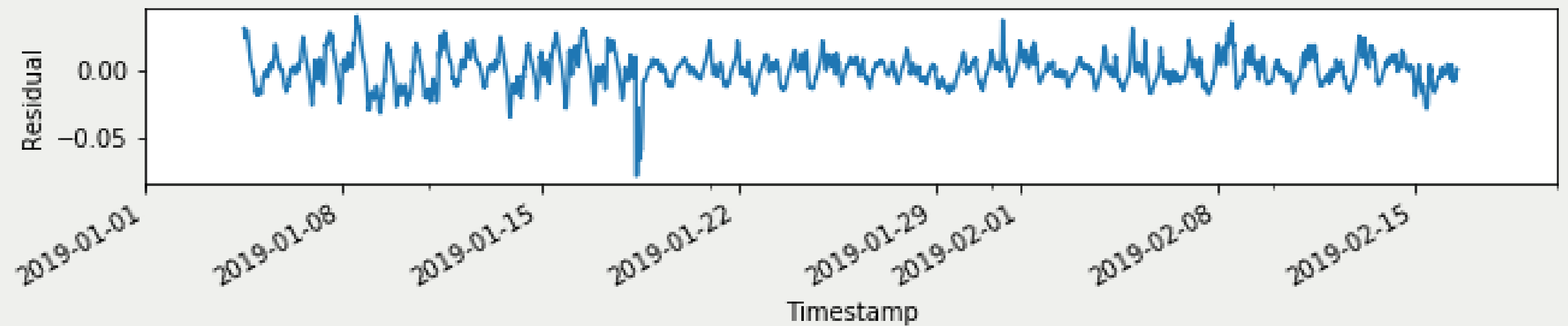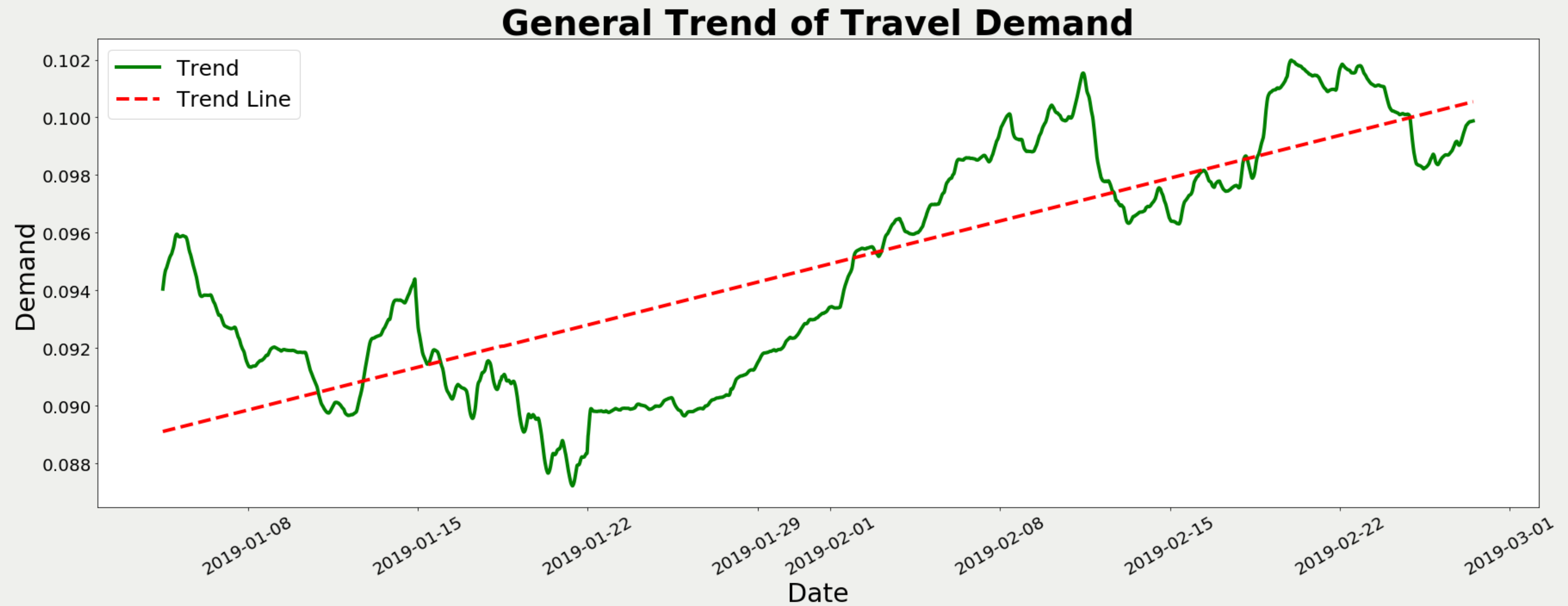There is a minute increase in trend. Weekly seasonality is apparent.

**MODEL**

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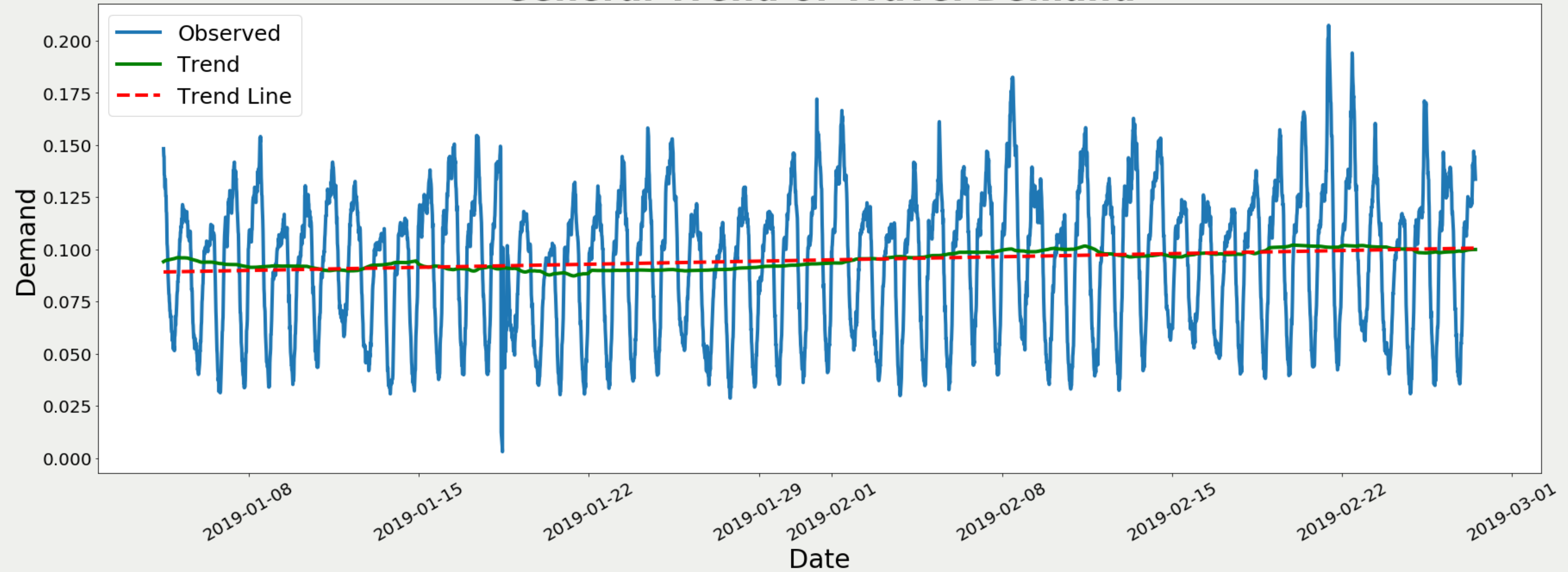
**trend**
general direction
in which demand
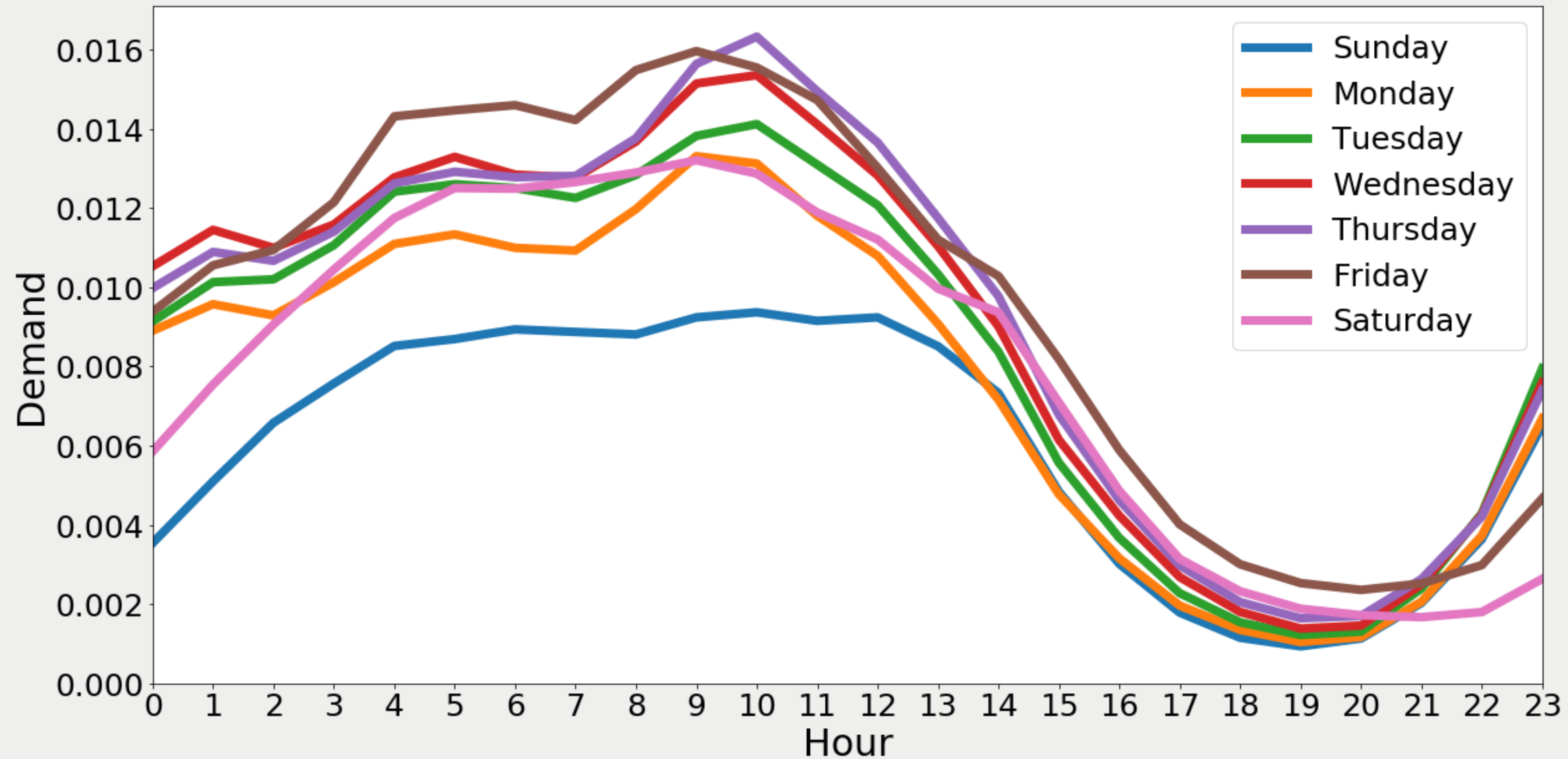changes

**seasonality**
recurring changes
in travel demand

General Trend of Travel Demand

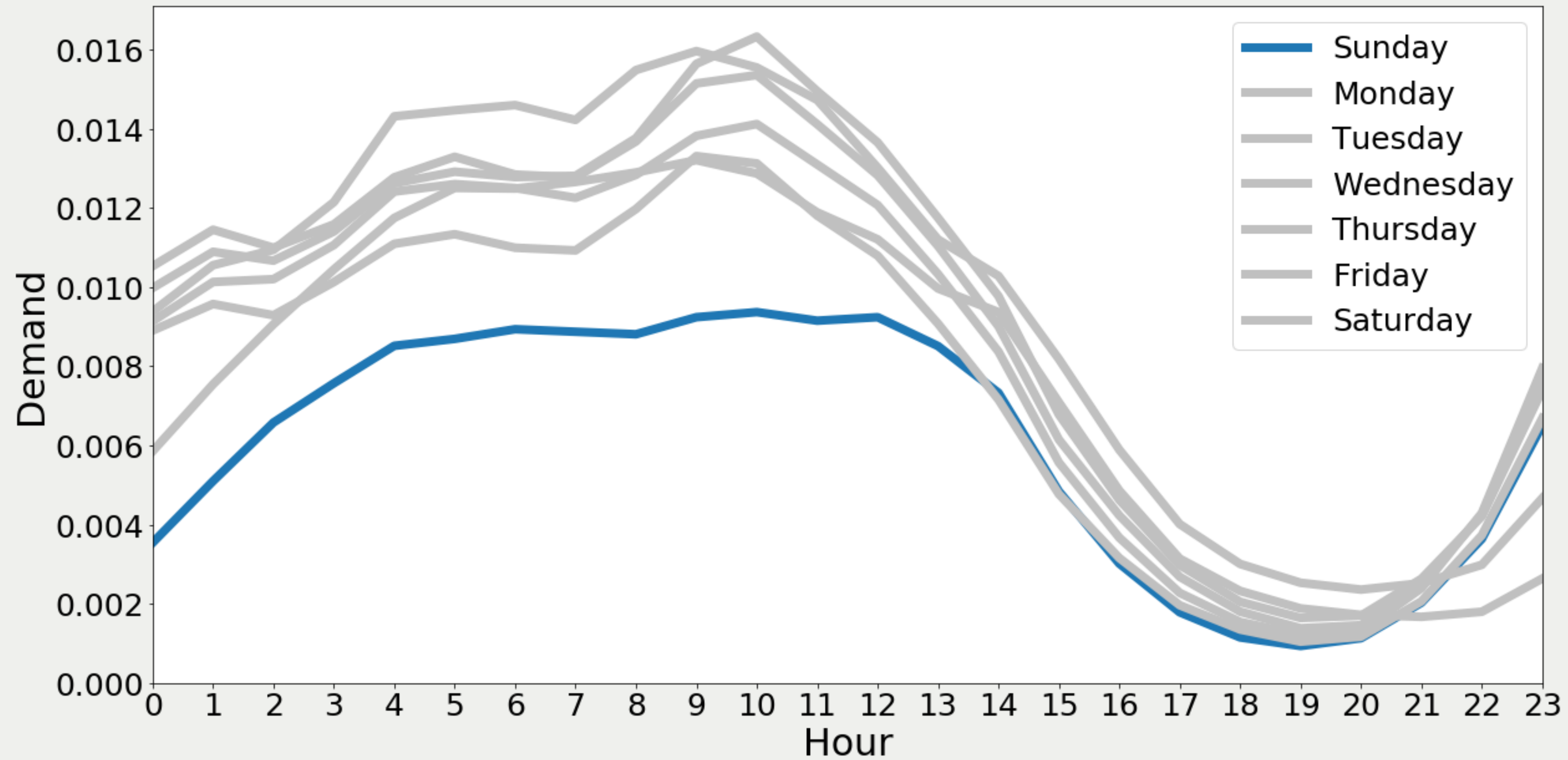**Although there is an increasing trend,**

General Trend of Travel Demand

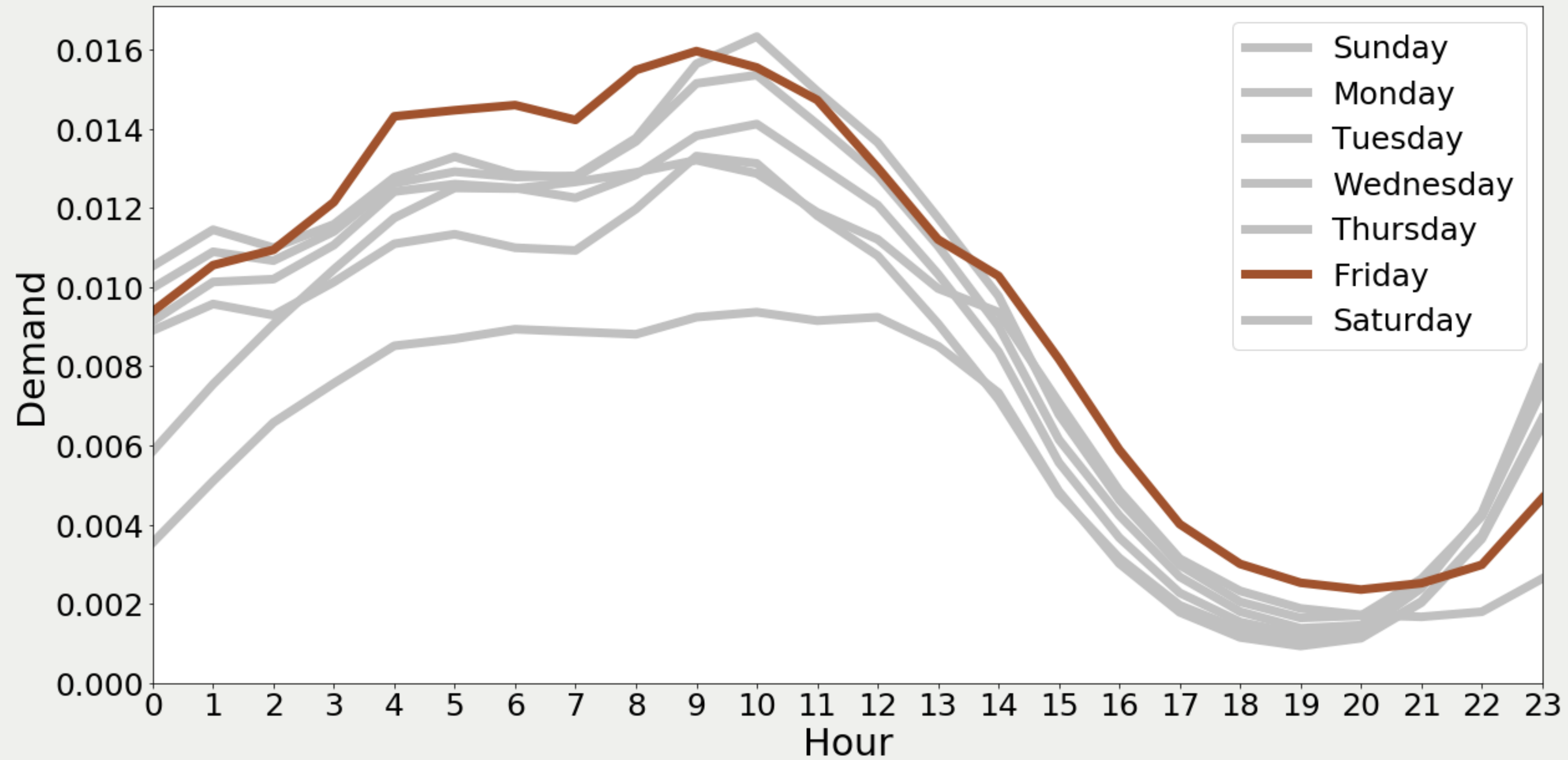Although there is an increasing trend,
the slope is extremely small

Average Hourly Demand for each Day of the Week
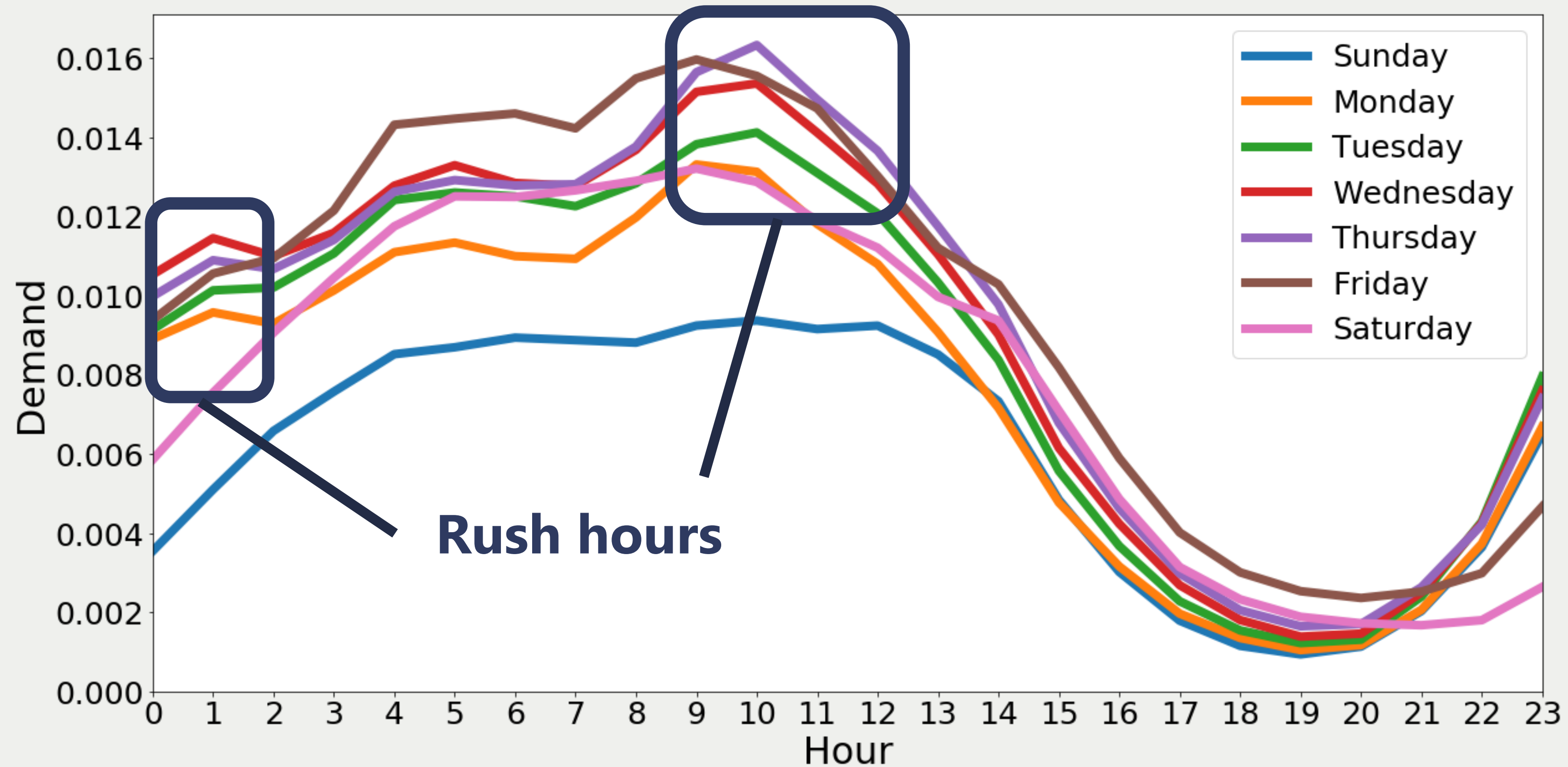
There is a **weekly seasonality**

**Average Hourly Demand for each Day of the Week**

**There is a weekly seasonality**

Average Hourly Demand for each Day of the Week

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Average Hourly Demand for each Day of the Week

There is a **weekly seasonality**

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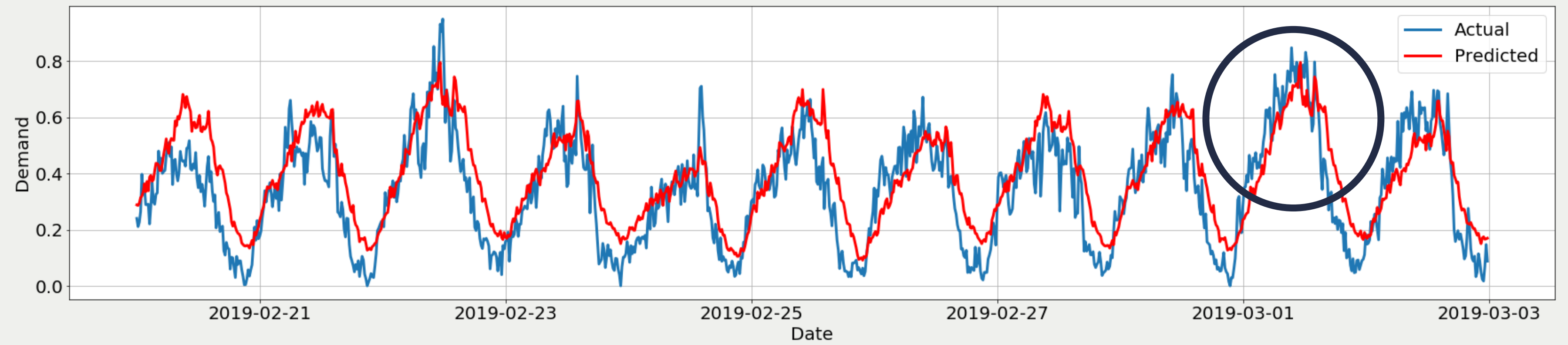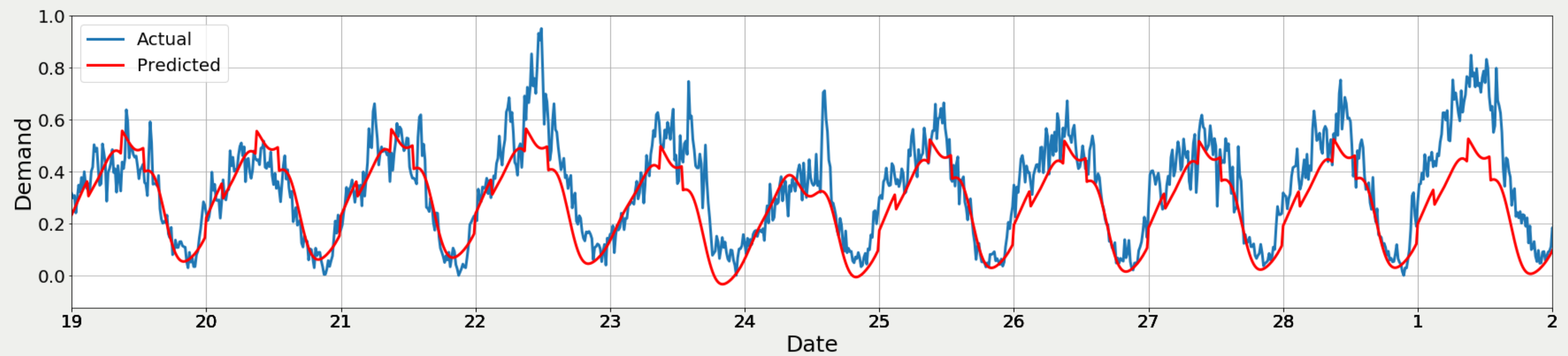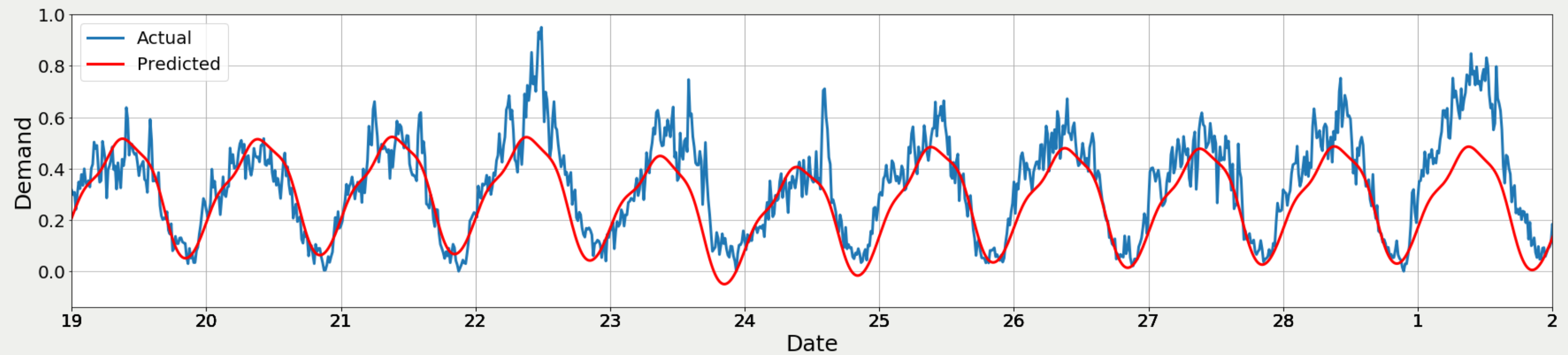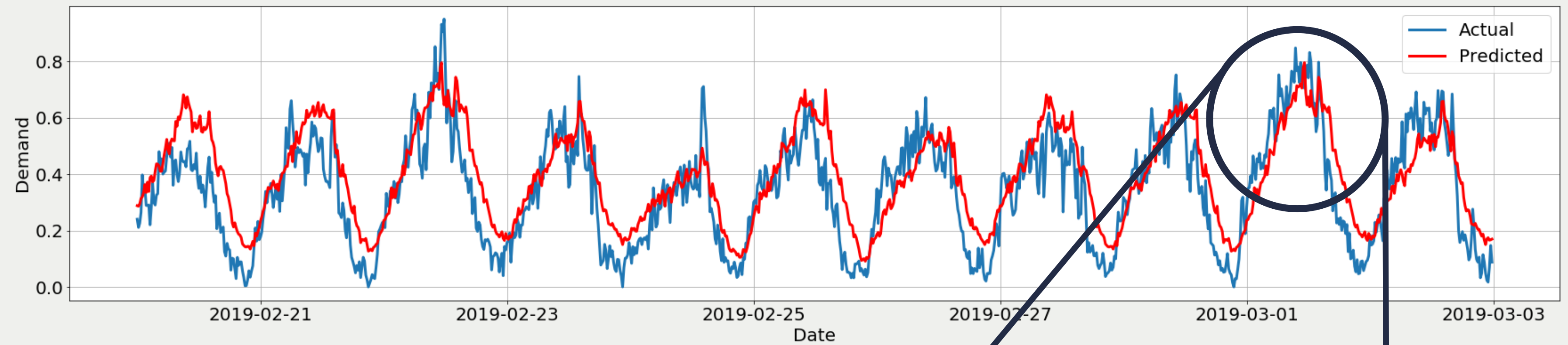| WHERE | Only certain areas have a consistently high demand. |
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**Holt-Winters**

**FBProphet with regressors**

**FBProphet**
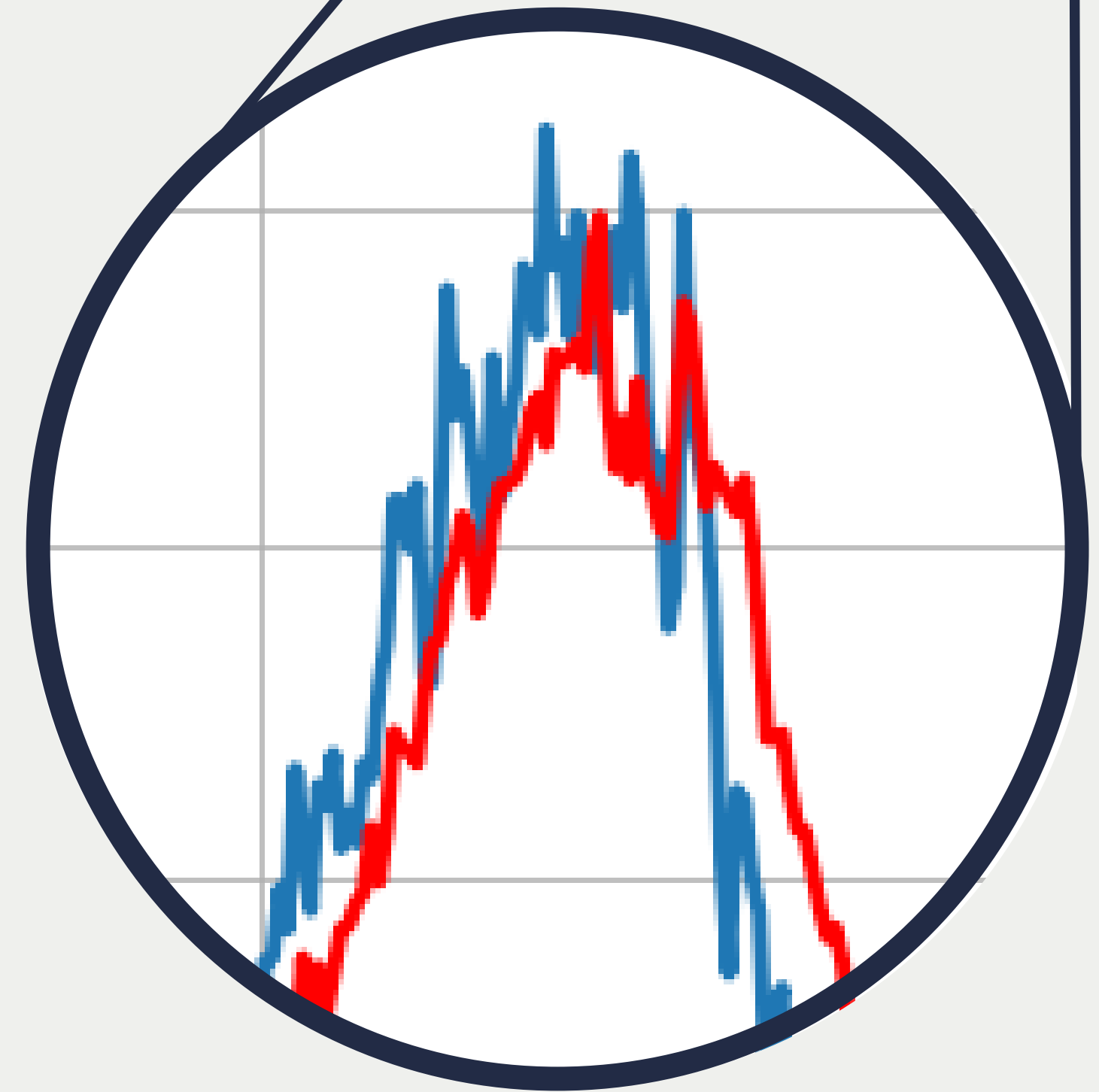
**Holt-Winters**

This model can capture the **spikes in demand** within the day

# KEY FINDINGS

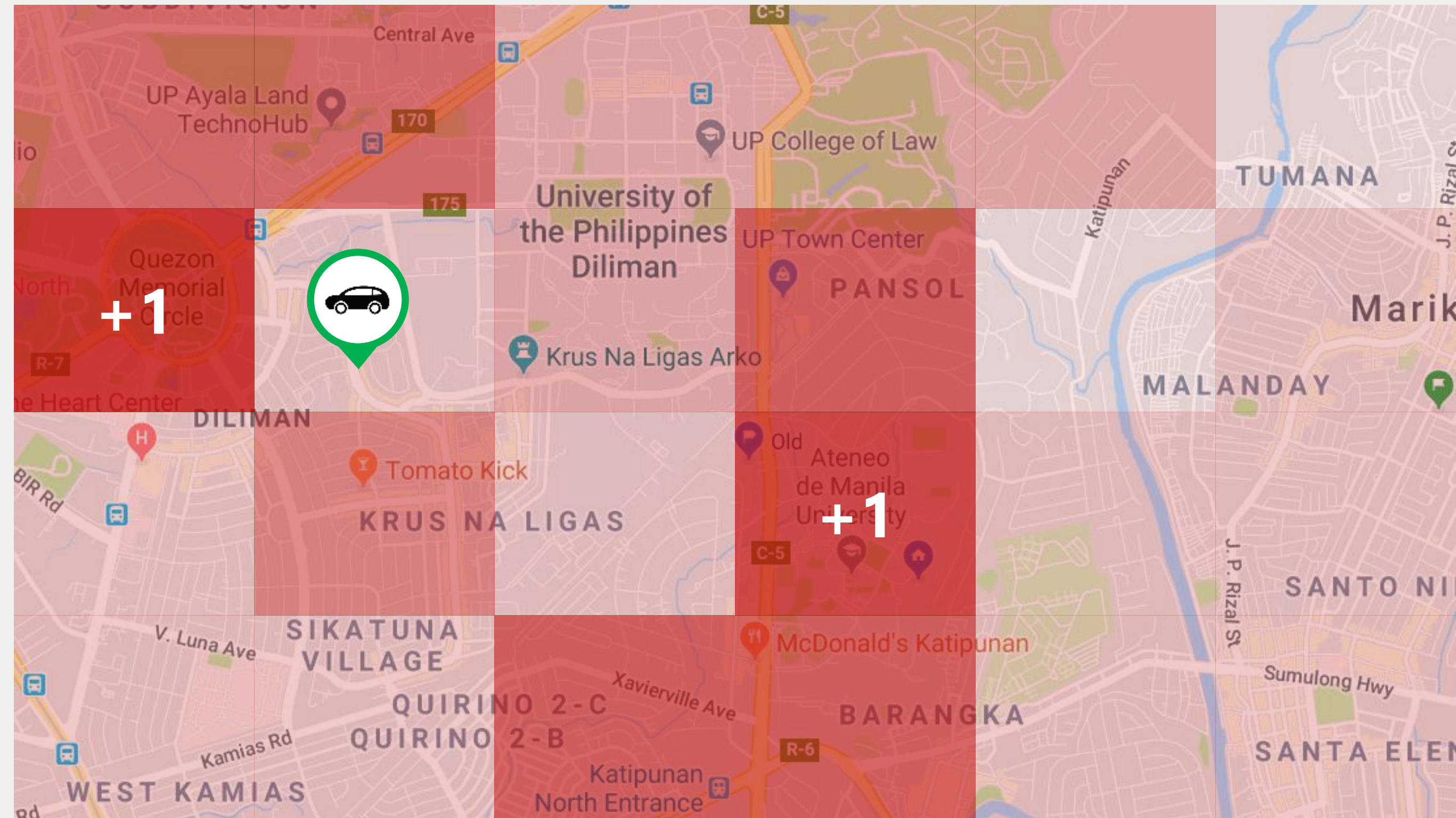| | |
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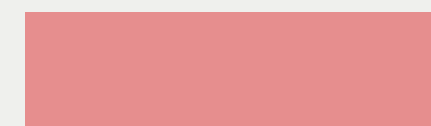# How do we improve Grab service quality?

# On the Driver's end

**Rerouting through incentives**

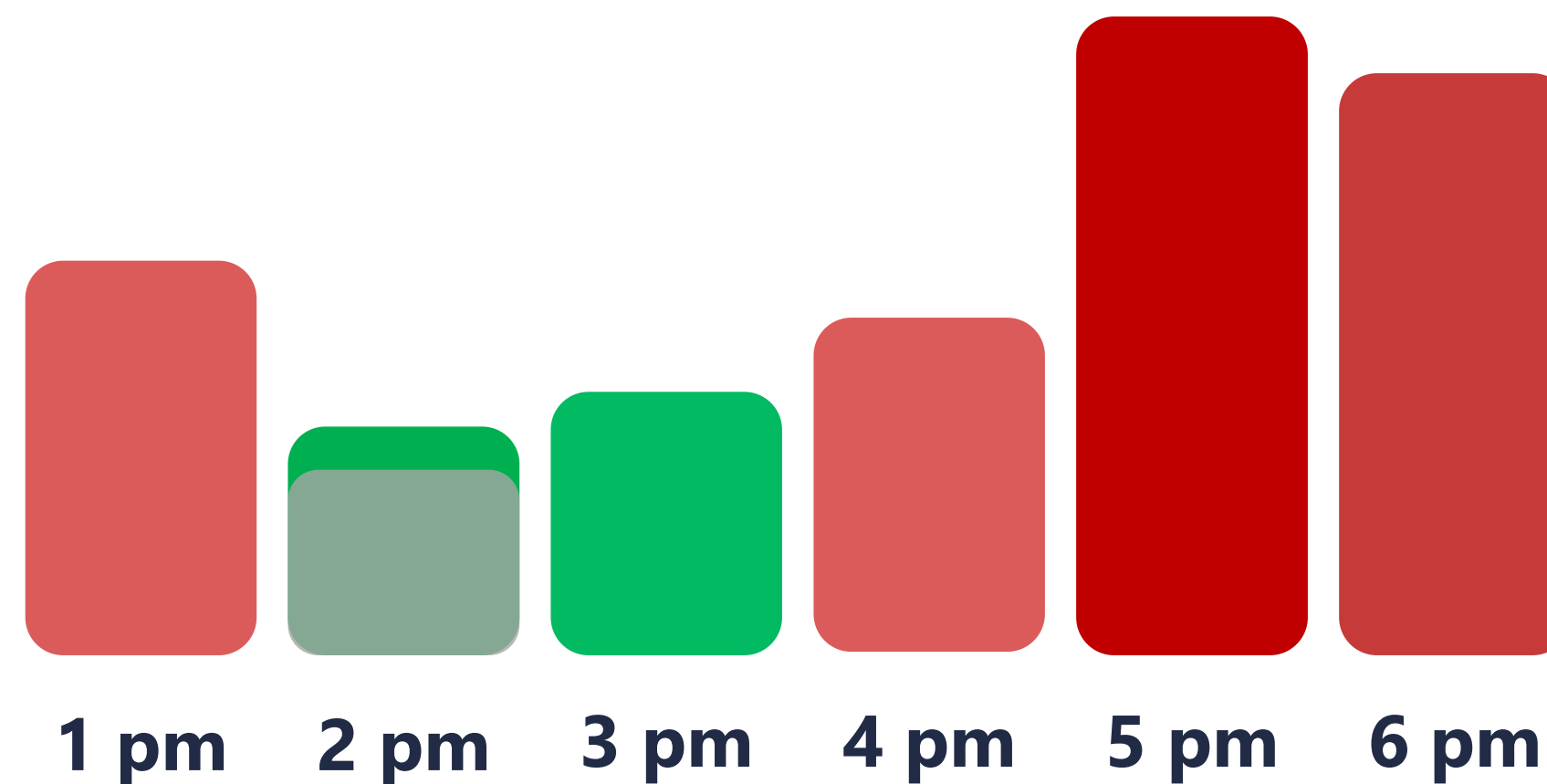Provide drivers with heatmap to show areas with high demand

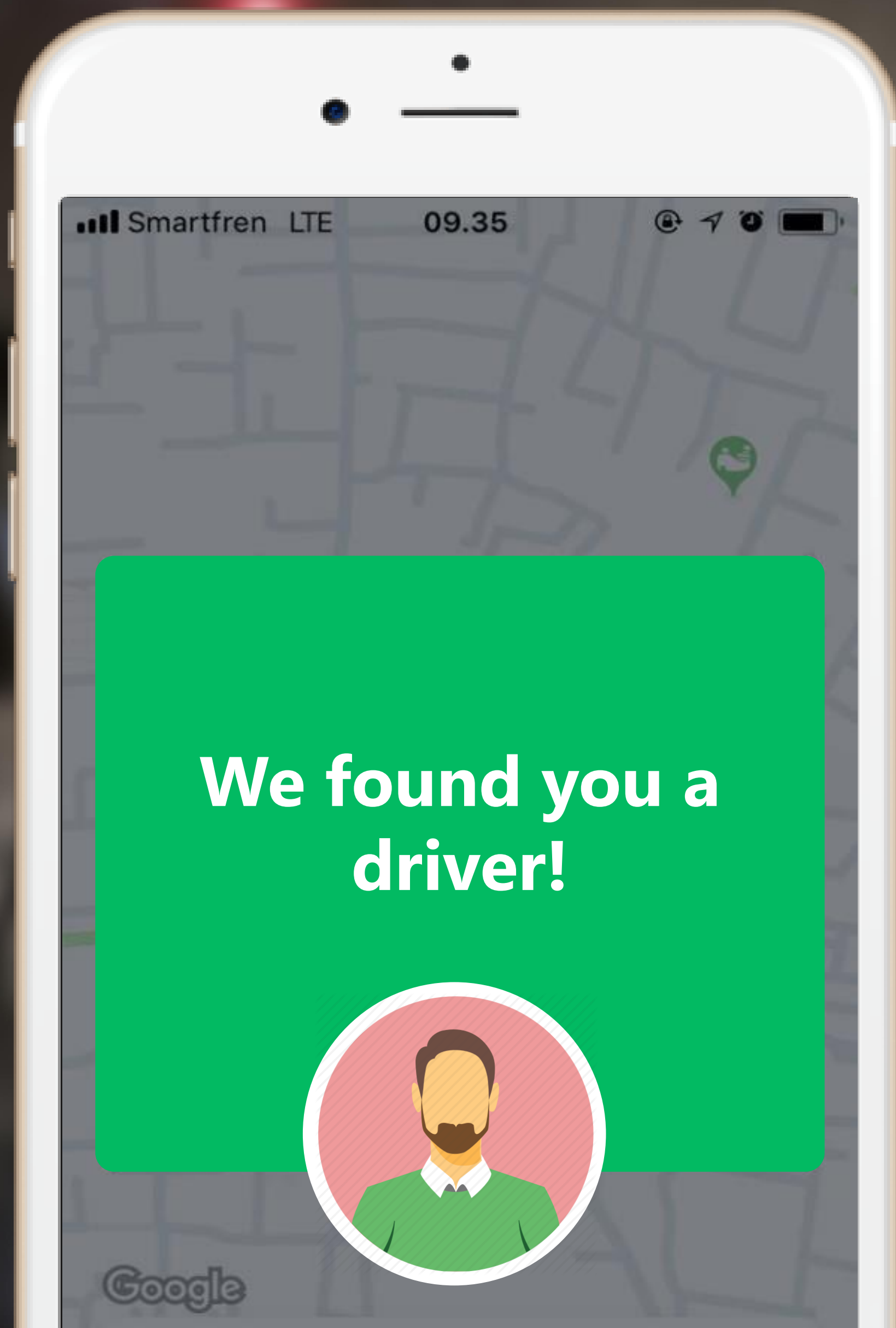Low

High

# On the User's end

**Travel Demand Notification**

Alert users when traffic is about to increase or drop

We found you a
driver!