Tamil Nadu Covid-19 Mobility Analysis

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May 22, 2020

RBCDSAI IITM

Data

All figures in this report are generated using movement data generated by Facebook and infected cases data from covid19india.org. Facebook data represent people who use Facebook in this region and have location services enabled. Data are aggregated at a 1200m x 1200m sized tiles and vectors (lines) are drawn connecting all areas to each other. These lines provide data in both directions (going from area A to B and from area B to A).

covid19india.org is a volunteer driven database for COVID-19 stats & patient tracing in India. This group of volunteers are using state bulletins and official handles to update daily COVID data. The data is validated by a group of volunteers and published into a Google sheet and an API. API is available for all at api.covid19india.org.

Figure Description

Interdistrict and intradistrict mobility between districts

The percent change in movement corresponding to the baseline in Tamil Nadu (TN) district-wise. As people stop moving, and especially if they don't leave their homes, they no longer contribute to FB movement data so we are unable to capture any information from them. The darker areas show high mobility and lighter areas show less mobility between districts.

The time is converted from UTC to IST. Hence the 0000 hrs, 0800 hrs and 1600 hrs are adjusted to 0530 hrs, 1330 hrs and 2130 hrs respectively.
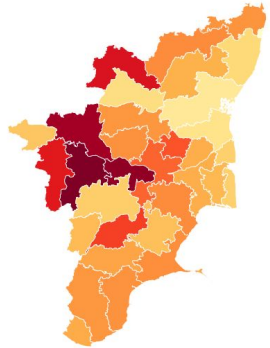
Number of cases in each district or zone

This data comes from covid19india.org and Greater Chennai Corporation (@chennaicorp). We extract datapoints belonging to Tamil Nadu from covid19india data and plot the number of cases district-wise. @chennaicorp twitter handle publishes zone wise case breakup for Chennai.
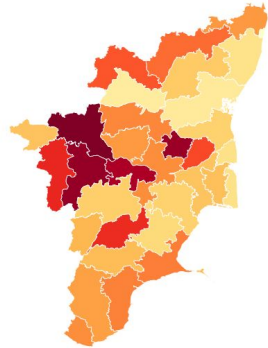
Visualizations (Intra-district Mobility -- Recent)
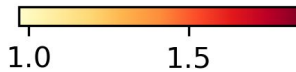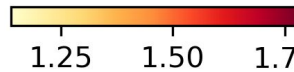

Intra district Mobility, TN, 20-05-2020

05:30 Hours   13:30 Hours   21:30 Hours

1.25   1.50   1.75   1.25   1.50   1.75   1.0   1.5
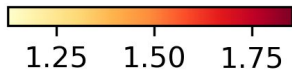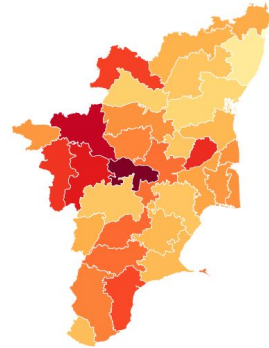
Ratio = Crisis: People Moving / Baseline: People Moving

On May 19, 2020, lockdown restrictions were relaxed in 25 districts in Tamil nadu and public transport was resumed with reduced capacity.

We can see the direct impact of reopening of transportation in the intra-district mobility here. The heat in the map indicates around twice the amount of movement compared to baseline movement (pre-lockdown).

Western districts like Tiruppur, Erode, Coimbatore and Karur are showing huge spikes in mobility. Perambalur is the only red-zone district that show high mobility.

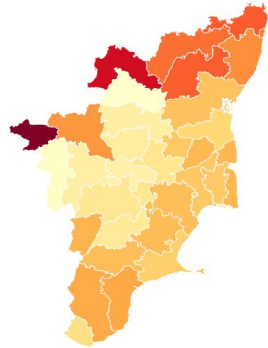# Visualizations (Inter-district Mobility -- Recent)
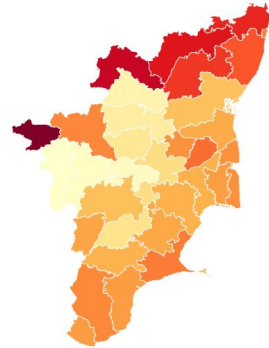

Inter district mobility, TN, 20-05-2020
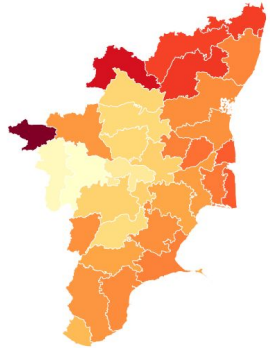
05:30 Hours   13:30 Hours   21:30 Hours

Ratio = Crisis: People Moving / Baseline: People Moving

Despite the map indicating high mobility, the scale shows that most of the movement comes from The Nilgiris district and other districts are still operating below the baseline.

The northern districts, which are currently classified as red zones, are showing considerable amount of movement. One possible reason might be that people are moving back into Chennai.
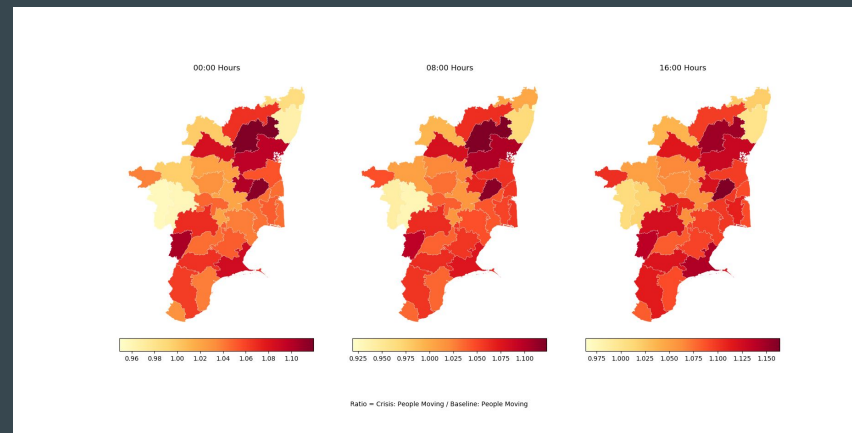
Since private buses are now allowed to operate at reduced capacity, people use this chance to get back to the capital to resume with their jobs.

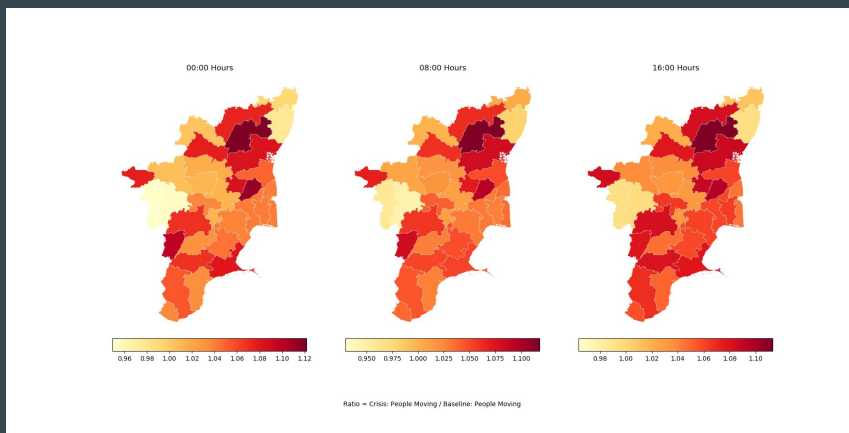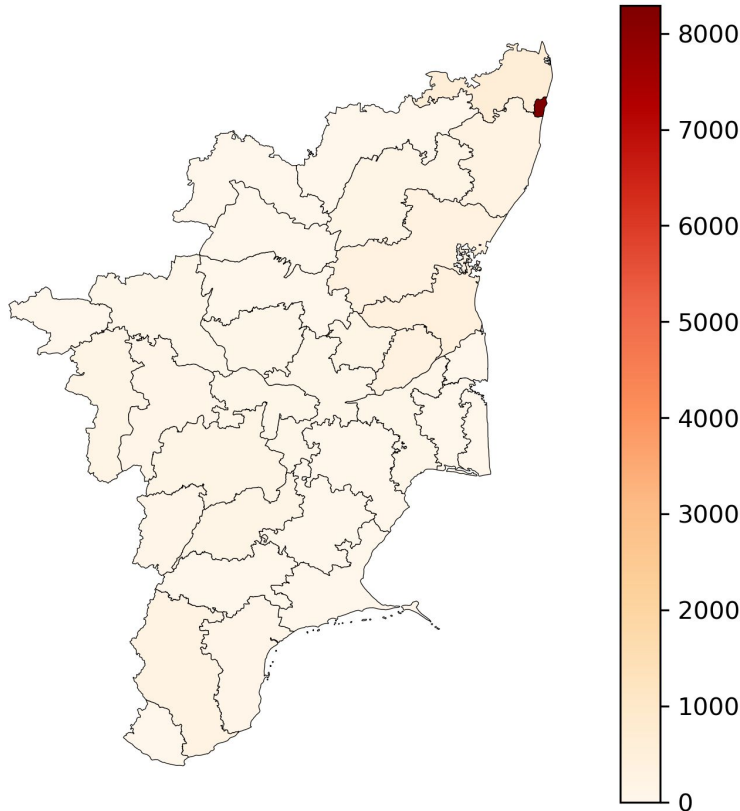# Visualizations - Inter-district mobility -- Before 2 weeks
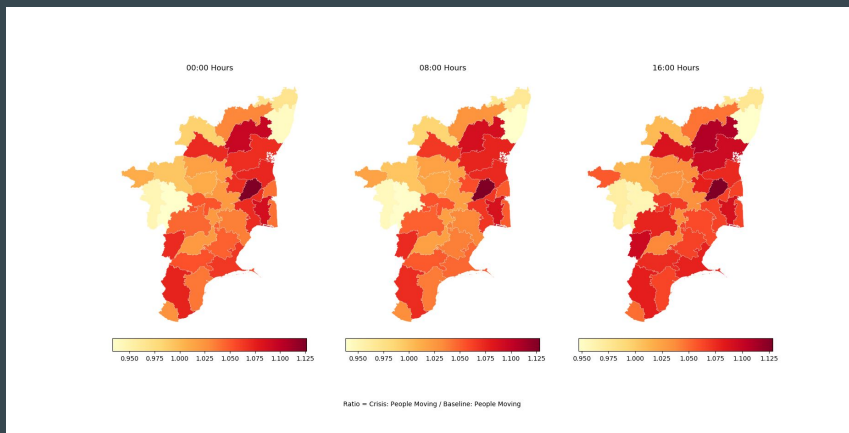
These three maps show movement between districts before two weeks (May 7 - 9). Tiruvannamalai, Ariyalur and Villupuram are showing high mobility whereas districts like Coimbatore and Chennai show low mobility.
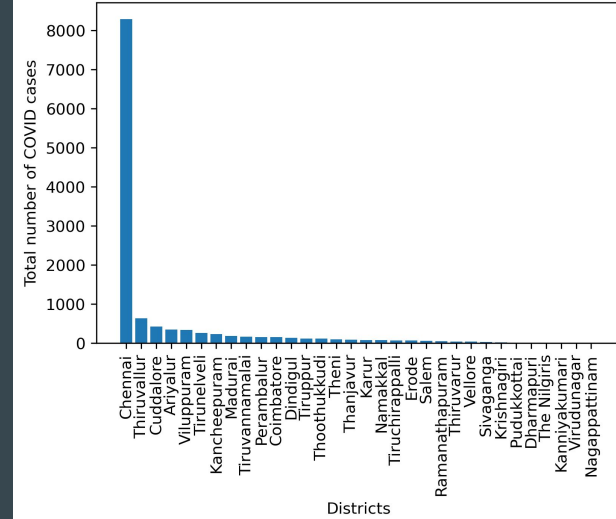
Southern and western districts are now showing less mobility comparing to data two weeks ago.
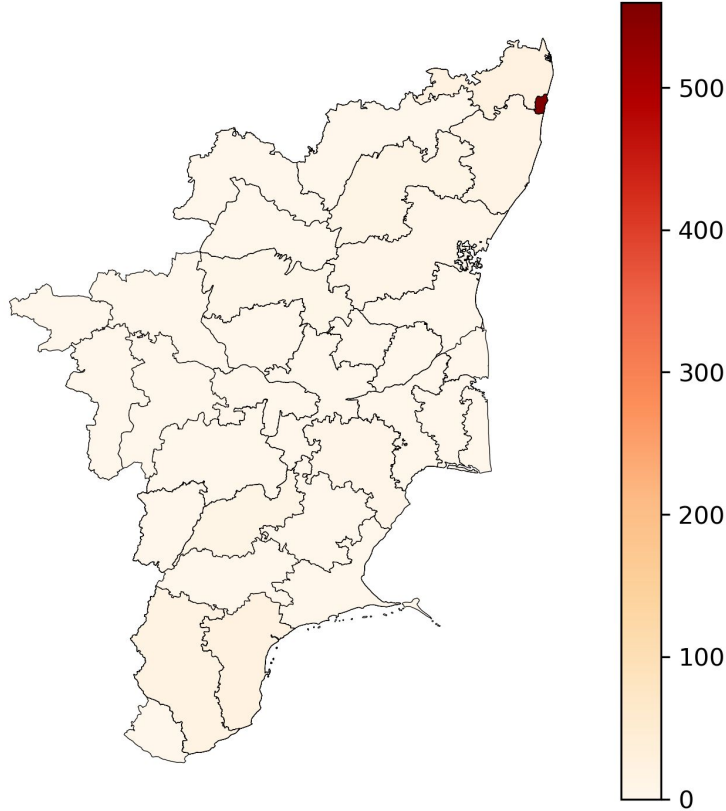
Visualizations (Total number of cases)

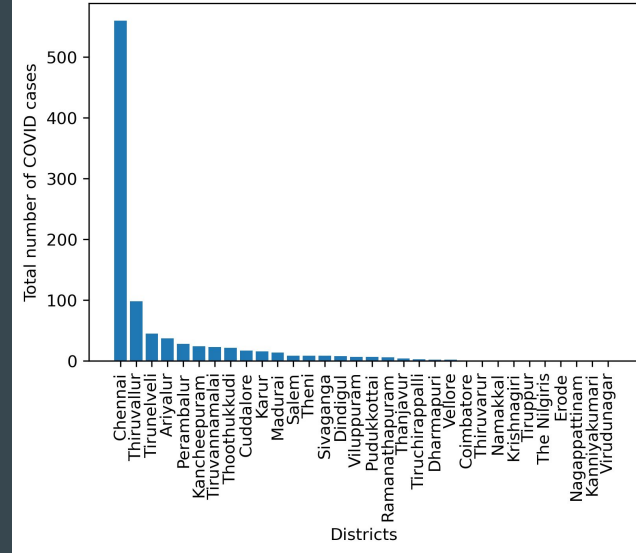# of cases - total cases (upto 2020-05-21)

This map shows district wise total number of covid-cases. Chennai is the most affected region and Nagapattinam is the least affected region. You can also see the number of cases in the bar plot on the right.

Visualizations (Reported cases for past 10 days)

# of cases - from 2020-05-11 to 2020-05-21

# of cases from 2020-05-11

This map shows district wise number of covid-cases announced since May 11. Difference between recent cases and total cases show that Tirunelveli and Perambalur are reporting more cases in the past 10 days compared to previous time points.
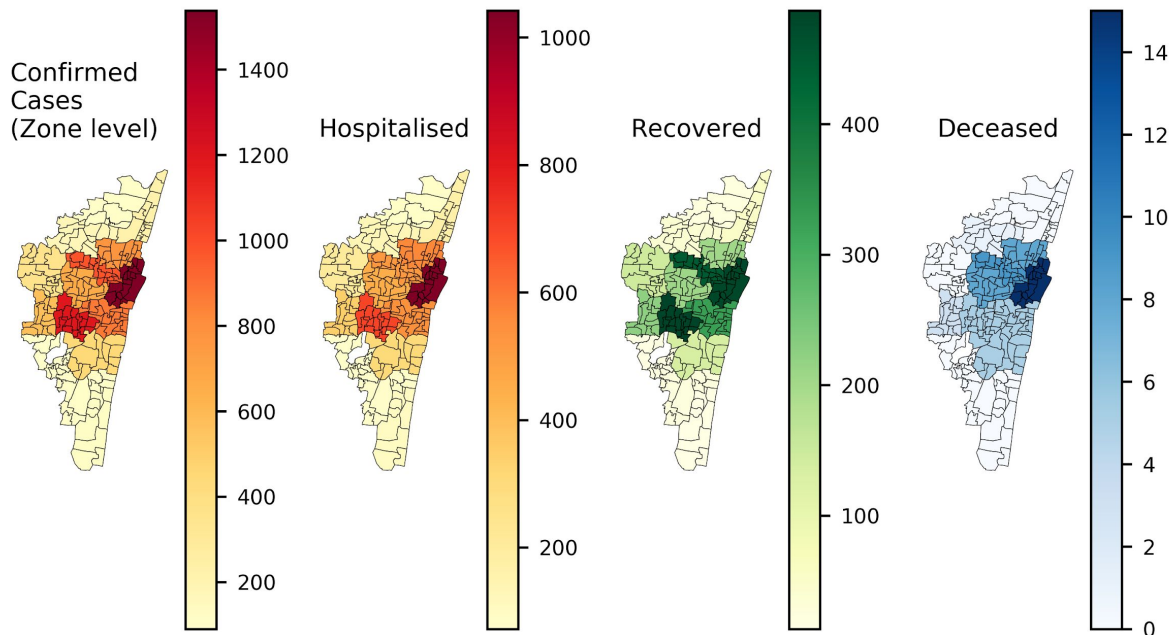
Inferences for Tamil Nadu

- Apart from Ariyalur and Perambalur, all other red zones are showing less mobility compared to other districts.
- Infected cases data shows that Chennai, Thiruvallur, Tirunelveli, Ariyalur are heavily affected. Less affected districts include Virudhunagar, Krishnagiri and Nagapattinam.
- Effect of resuming transportation is reflect in intra-district mobility maps. Western districts show huge increase in movement. Movement in southern districts is significantly reduced compared to the status before two weeks.
- Tirunelveli, which showed consistent high mobility is now reporting more cases in the past 10 days than previous time periods.

CHENNAI - ANALYSES

Daily number of cases in Chennai
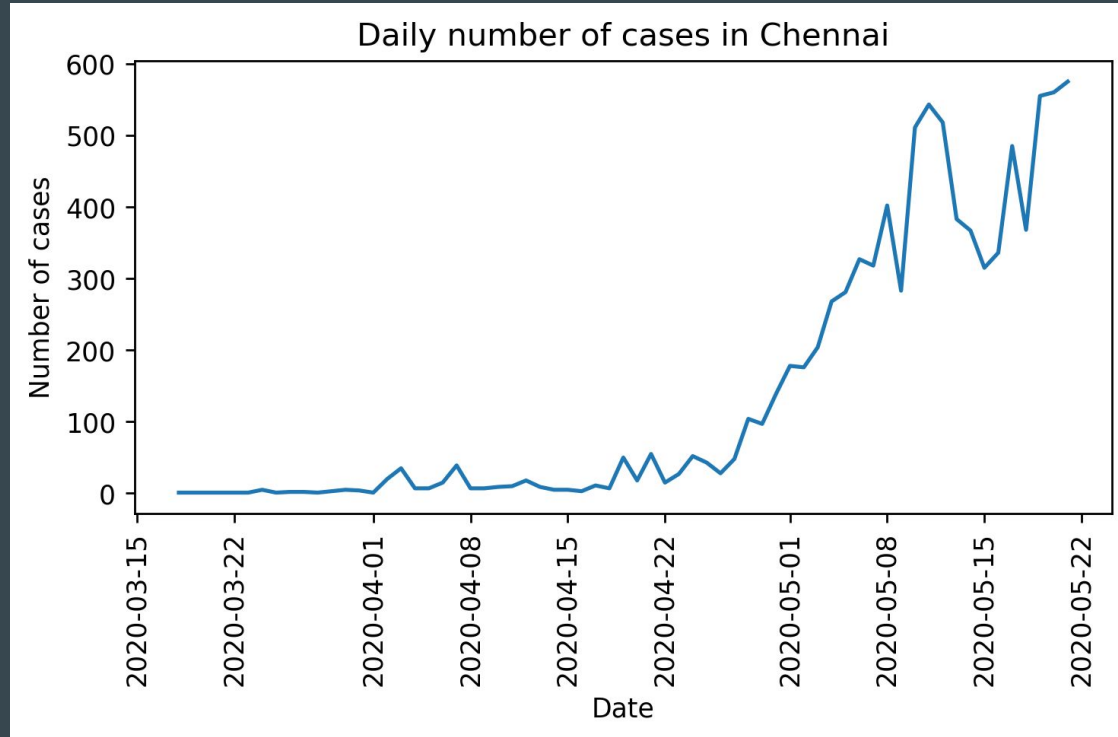
Status-wise breakup of COVID-19 cases in Chennai

Date - 21/05/2020

Confirmed Cases (Zone level)

Hospitalised

Recovered

Deceased

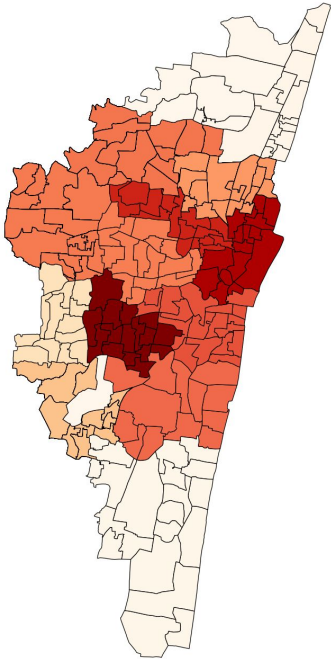**63%** of cases in TN is from Chennai

10.2% Growth rate of cases in last one week

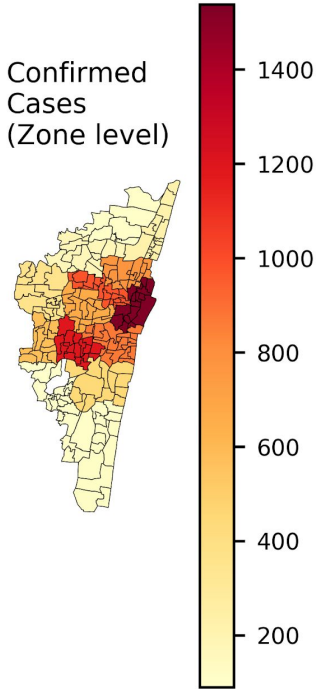**0.68%** Overall mortality rate in Chennai

Comparing mobility and covid-19 cases

Chennai Mobility Heatmap
(April 23 to May 07)

Date - 21/05/2020

Confirmed
Cases
(Zone level)

We mapped the overall mobility for each ward inside Chennai to its corresponding zone. We calculated the total number of mobile units dated from April 23 to May 07 from the Facebook mobility data.

Then we collected the count of zonal level confirmed cases from the twitter handle of Greater Chennai Corporation. Using that, we were able to map the zones and find future hotspots for the disease.

The mobility (left map) and confirmed cases (right map) show a very similar pattern at the zonal level. This suggests that the zones in Chennai in which the movement is high are suffering from large number of covid-19 cases.

Inferences for Chennai

- We tried to incorporate the incubation time difference of COVID-19 into the correlation. **We observed mobility till two weeks ago and the number of cases in the past two weeks.**

- The **pattern between highly mobile regions and COVID hotspots are very similar**. This suggests that the regions with high mobility at present has the potential to turn into future spots for the disease outbreak.

- Zone containing Koyambedu topped in both mobility and infection. **Monitoring the food distribution may help us in making informed decisions.**

- Compared to previous days, movement in **Ambattur** zone has increased significantly. We also see an increase in mobility in **North Madras pockets**.