

Geolocated Twitter-based population mobility in Victoria, Australia, during the staged COVID-19 restrictions

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Twitter data are geotagged. Each tweet contains the following metadata: anonymised user identifier, geolocation in latitude and longitude, and date and time stamps. The geolocation of each tweet is mapped to a suburb. For all users posting five or more tweets in a specified period, we extracted the number of unique suburbs travelled in this period. As an example, Table 1 illustrates the data of a user who posts five tweets and traverses three unique suburbs.

Using this approach, weekly mobility for Victoria, Australia, can be defined as the average number of unique suburbs travelled by the users in the state during the week. While this is not a calibrated sensor of real mobility, it may be considered as a useful sensor of mobility if viewed in relative terms. We obtained data from 28 654 users and 2 374 770 tweets. Figure 1 shows the mobility index per

ABSTRACT

Using geotagged Twitter data in Victoria, we created a mobility index and studied the changes during the staged restrictions during the coronavirus disease 2019 (COVID-19) pandemic. We describe preliminary evidence that geotagged Twitter data may be used to provide real-time population mobility data and information on the impact of restrictions on such mobility.

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Table 1. An example of a timeline of tweets for a user in the week of 3–9 August 2020. The user posted five tweets and travelled three suburbs (Port Phillip, Melbourne inner city, and Yarra North) in this period

| Date | Time | Longitude | Latitude | Suburb |
|-----------|-------|-----------|----------|------------------------|
| 3/08/2020 | 21:19 | 144.9616 | -37.8352 | Port Phillip (C), west |
| 4/08/2020 | 21:24 | 144.9661 | -37.8156 | Melbourne (C), inner |
| 4/08/2020 | 21:24 | 144.9661 | -37.8156 | Melbourne (C), inner |
| 4/08/2020 | 21:25 | 144.9661 | -37.8156 | Melbourne (C), inner |
| 6/08/2020 | 20:39 | 144.9817 | -37.7802 | Yarra (C), north |

C = city.

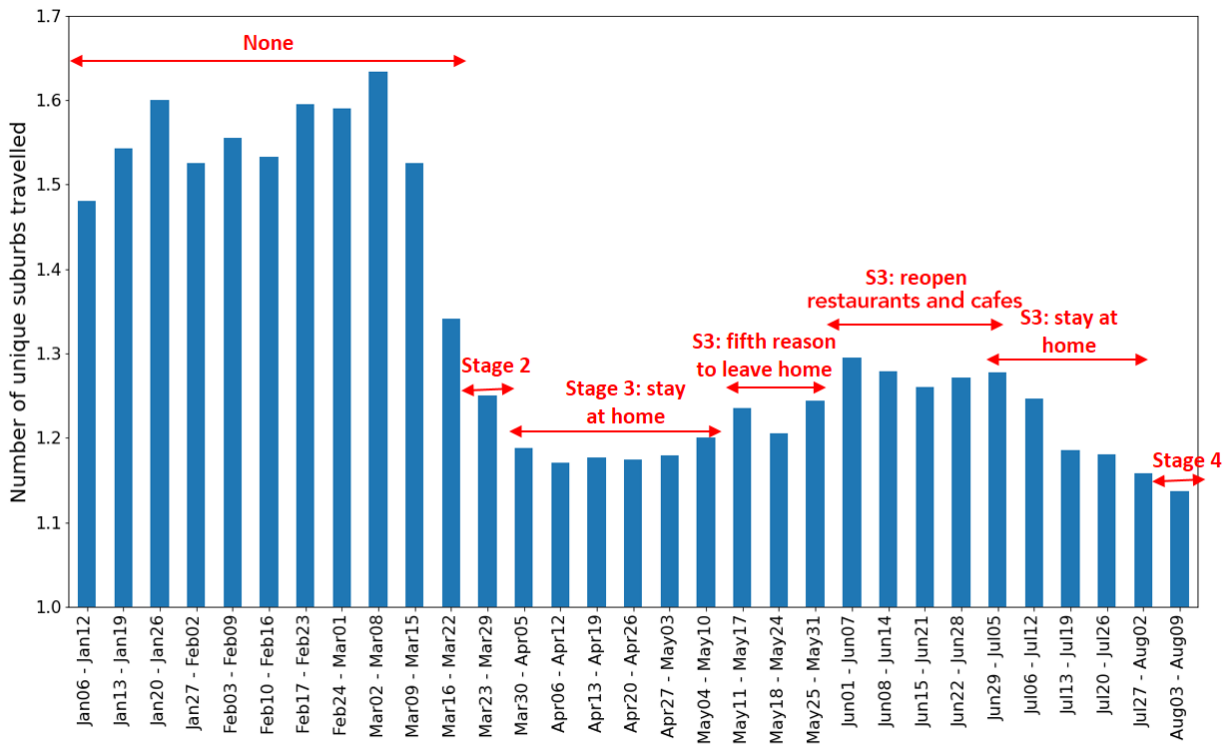
week relative to the periods of staged restrictions during the coronavirus disease 2019 (COVID-19) pandemic.¹ Since there were no restrictions between January and March 2020, the mobility in this period represents the baseline mobility. Stage 2 restrictions extended from 25 to 30 March 2020 and caused a drop in the Twitter mobility index by about 20%. Stage 3 restrictions commenced on 30 March and continued up to 12 May. In this period, the

mobility index decreased but only by a further 4%. Stage 3 restrictions were relaxed with the addition of a fifth reason to leave home on 12 May, increasing the mobility immediately. This trend continued with the reopening of restaurants and cafes on 1 June, slowly increasing the mobility index to Stage 2 levels. On 1 July, Stage 3 restrictions were implemented on ten postcodes and they were later expanded to include metropolitan Melbourne from 8 July to 2 August, with a 21% mobility decrease compared with the baseline.

Stage 4 started on 2 August, with a curfew restriction, and the mobility decreased by 26% compared with the baseline for the first week of Stage 4.

Despite the obvious limitations of such data about Twitter users, our observations provide preliminary evidence that geotagged Twitter data may be used to provide real-time population mobility data as well as information on the impact of restrictions on such mobility.

Figure 1. Weekly Twitter-derived mobility index over time*



* The periods of staged restrictions are indicated in the figure; the restriction timeline is provided in the article. Source: State Government of Victoria.¹

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Competing interests

None declared.

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