# Conclusions

Summary of key findings and points in the discussion section

Longitudinal patterns of the average level of mobility changes across regions in England

Identifying similar trajectories have different shapes with the regard to the pace of reduction in mobility.

We have identified four temporal evolution patterns of changes in mobility over time across space according to the characterisation of speed of reduction (the speed of effect) – range of reduction – recovery of reduction.

And then MLR LASSO offers further insight into the significant features of cluster membership to evaluate their different influences on the classification.

Mainly,

This paper has sought to provide rigorous evidence that trajectories of mobility change under the lockdown, and contribute to the methodological development to characterise trajectories of mobility coping with socioeconomic and demographic factors. The research was founded on the integration of novel data and data mining techniques. In detail, employing longitudinal perspective to explore changes in mobility by using mobile phone data spanning seven months. And then, Clustering analysis and classification model were chosen to collect similar trajectories of mobility and find the significant factors to predict the clusters, respectively. Two main conclusions can be drawn.

First, people’s everyday mobility has been changed, and it could be the clear evidence of the effectiveness of government interventions in times of the pandemic. In England, mobility levels already falling about 50% compared to the pre-pandemic in the early stage of the pandemic (i.e., the first day of lockdown). Mobility levels continuously declined towards 80% (i.e., 7-day on lockdown) but soon bounced back up to 50% over the course of the national lockdown. Easing lockdown supported the mobility recovery so that mobility levels returned to normal in the post-lockdown period. However, the trajectory of mobility reduction under the lockdown is not the same extent. Spatial heterogeneity in clusters relating to trajectories of mobility change was evident throughout time-series clustering analysis. It revealed differences in the recovery of mobility levels during the lockdown between the generated clusters. The finding that areas with the greatest reduction in mobility levels before the government-mandated lockdown and marginal recovery during the lockdown were observed in Inner London. In contrast, areas with the lowest reduction in mobility and rapid mobility bound back can be found in North West, and Yorkshire and the Humber.

Second, people’s mobility levels have been influenced by government interventions, but it was also coupling with the individual ability to restrict everyday mobility (Lee et al., 2021). Unsurprisingly, high-income workers mainly were working from home, and felt to adapt successfully to the new normal (Office for National Statistics, 2021). Racial and ethnic minorities and poor people lived in crowded conditions and generally worked in essential industries (Huang et al., 2021). Additionally, Lou et al. (2020) found that stay-at-home orders did not significantly reduce low-income work trips. Thus, it is vital to demonstrate the effects of socioeconomic and demographic factors to predict the patterns of temporal evolution of mobility level in pandemic times. Our classification model, MLR LASSO, has examined the significant factors and assessed the importance of selected features between clusters. As a result, income, employment and accessibility are quantified as the most effective domains. Subsequently, housing type, perceived risk of COVID-19 (before the lockdown), and BAME (Black, Asian and minority ethnic) variables were also selected.