Neighbourhood trajectories in the UK

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INTRODUCTION

Key expected national changes in the UK

Major demographic and socio-economic changes are expected to challenge the UK in the next 20 years.

- Ageing population
- Family downsizing
- Migration

Are set to change the structure and spatial distribution of the British population, which are anticipated to trigger major demand in the provision of housing and social services.

Likely long-term implications in resources

These demographic and socioeconomic changes are expected to trigger major changes in future housing and infrastructure needs:

- Health care provision
- Housing
- Transportation
- Educational facilities

The spatial distribution is one of the most important factors when analysing neighbourhood characteristic changes from the highest to the lowest geographic level.

Likely long-term implications in urban fabric

The demographic neighbourhood change is a driver for changes in the built environment in other ways too.

New neighbourhoods that are projected to be formed in the future, will have a need for other forms of infrastructure:

- Green spaces
- Blues spaces
- Open spaces
- New roads

Are main components that compose higher quality of life and consequently higher quality built environment.

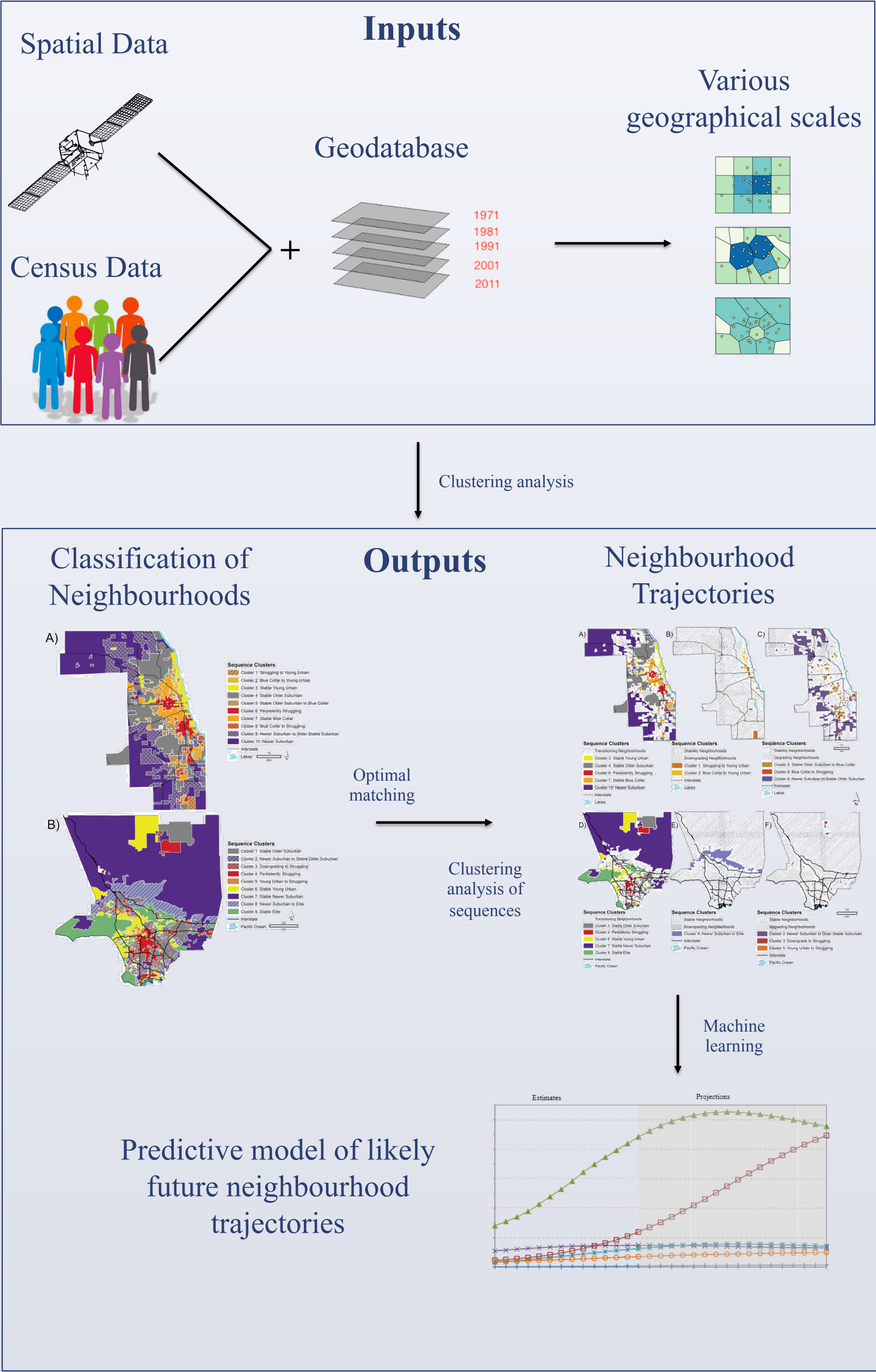## AIMS

This research project will seek to:

1. Create a space-time database of census demographic and satellite imagery built-environment variables for the UK;
2. Identify representative types of neighbourhood structures in the UK, based on their demographic trait and urban environments;
3. Determine common trajectories of neighbourhoods between these representative classes over a fifty-year period, expanding from 1971 to 2011;
4. Predict the most likely trajectory of neighbourhoods into the next 20 years.

RESEARCH QUESTIONS

These aims will address the following set of research questions:

1. Can representative types of neighbourhood structures be identified based on their demographic trait and urban environments? How have these representative types of neighbourhood structures change over time? Can undesirable neighborhood types be identified?
2. Can representative trajectories of neighbourhood transition between these types of structures be identified? What are the most common trajectories? How and why these trajectories differ across the urban hierarchy?
3. Can the future trajectories of neighborhood be predicted? How accurate are these predictions? Can neighborhoods in high risk of transitioning into an undesirable condition in the next 20 years be identified?

METHODOLOGICAL FRAMEWORK

Inputs

Spatial Data

Census Data

Geodatabase

1971 1981 1991 2001 2011

Various geographical scales

Clustering analysis

Outputs

Classification of Neighbourhoods

A)

B)

Optimal matching

Neighbourhood Trajectories

Clustering analysis of sequences

Machine learning

Predictive model of likely future neighbourhood trajectories

Estimates   Projections

EXPECTED OUTCOMES

- A space-time database with information about demographic, socioeconomic and built-environment characteristics for the whole UK at various geographical scales
- Understanding neighbourhood trajectories that will be covering the period from 1971 to 2011
- A scalable time-space framework for performing similar analysis at higher geographical levels such as Output Areas, Local Authority boundaries or Regional boundaries
- A prediction model to identify the most likely trajectory of neighbourhoods into the next 20 years

This study will contribute to existing knowledge in three ways:

1. Linkage of population and built-environment data creating a 'geodatabase' for the UK
2. A space-time framework for analysing demographic, socioeconomic characteristics of population and the built environment changes at different scales
3. A tool for targeting the resources may be needed in the future at small area level

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