**Automated detection of plausible low traffic neighbourhoods**

**Context**

Whilst the concept of low traffic neighbourhoods (LTNs) is well understood, knowledge on where these are located are remains largely lacking. Many LTN zones were designed and implemented in the 1960s, many were implemented as recently as last year. The tools and methods used to create neighbourhoods which are better suited to active travel vary greatly. Given this, it is perhaps unsurprising that there remains no central dataset of where LTNs are located. This work looks to create a method of **automatically** detecting **plausible** LTNs in the UK using entirely open and reproduceable datasets and software. It will hopefully provide a dataset which can be used in future research related to LTNs and active travel more widely. This work is still currently experimental and should be treated as such.

**Methods**

This section is a high-level overview of the methods used to create this dataset. For more in-depth detail, feel free to contact me at [c.larkin@newcastle.ac.uk](mailto:c.larkin@newcastle.ac.uk), or have a look at my GitHub page (<https://github.com/Froguin99/LTN-Detection>).

**Neighbourhoods:** Neighbourhoods are defined by where a person can walk or cycle with relative comfort and safety before a barrier of some form is reached. Predominantly, these are in the form of busy roads (based on speed and hierarchy of roads), with railways, rivers, bus routes and land use also considered. Data for these comes from OpenStreetMap and the DLR Global Urban Footprint data.

**Modal Filters**: Modal filters are extracted from OpenStreetMap. Four types of modal filter are accessed; barriers (bollards, planters, barriers), bus gates, cycle contraflows and street continuations (streets where the mode type changes).

**Neighbourhood permeability**: neighbourhood permeability is a measure of both how easy a neighbourhood is to pass through and move around within. It compares driving distances to walking distance, and measures the difference between in terms of meters.

**Rat runs**: rat runs are found by findings streets within neighbourhoods which provide connection between boundary roads. Fastest paths are calculated between all nodes on boundary roads, with any path passing through a neighbourhood being stored and counted.

**LTN Scoring:** Each of the three metrics (Modal filters, neighbourhood permeability, rat runs) are combined to create an overall “plausibility” score which indicates how likely a neighbourhood is to be classified as “Low traffic”.

**Using the webmaps**

The webmaps show the results at the current level of development of the process. The main features of the map are as follows:

* **LTN Plausibility Score**: this value can range between 0 (extremely unlikely to be an LTN) to 100 (extremely likely to be an LTN). As it stands, locations with a score above ~70 generally are found to be LTNs. Values from ~65 to ~70 are less clear, with values beneath ~65 generally missing a high score on one of the three score metrics and thus unlikely to be LTNs.
* **Rat run score**: Locations with no rat runs through them have a perfect score of 100. This goes exponentially downwards with the number of times are rat run is found through a location. Anywhere with a score lower than 100 is likely not an LTN.
* **Mean Distance Difference Score**: as mentioned in the methods, this is a measure of the permeability of the neighbourhood via active modes against driving. Locations with a greater difference than 800m have a perfect 100 score, with this value decreasing linearly to 0 at 0m.
* **Filter Road Density Score**: the number of modal filters within a neighbourhood divided by the density of the filters on the road. A filter density score of over 40 is given a score of 100, with values decreasing linearly back to 0.
* **Cluster label**: ignore this value for now as this is still in development stage. It shows the cluster label from k-means clustering of the scores, looking to sort the neighbourhoods into either “likely LTN” or “not likely LTN”.
* **Streets**: driving streets from OpenStreetMap. Shown for context.
* **Busy Roads**: the roads determined to be the boundary roads for most neighbourhoods, based on speed limit and road classification.
* **Rat runs**: Roads which have been found as a fastest path between boundary roads.
* **Modal filter points:** Points which have been determined to be modal filters, such as bollards or planters.
* **Modal filter streets**: Streets which have modal filters on them, such as bus-gates, cycle contraflows or street continuations. Both filter points and filter streets are detected automatically from OpenStreetMap and are the filters used in the Filter Density score.