Contextual Navigation

Where Can I Go From Here?

The Scenario

A fictional scenario involving a suspect attempting to escape into a London Underground station. Law enforcement need a visualization to help them best deploy their resources to apprehend this suspect.

The Background

Part of a wider project to visualize complex and 'busy' networks, such as the Internet. The overall aim to to produce a projection that allows patterns to be analyzed visually. This project is a proof-of-concept using the easy to conceptualize London Underground network, before moving on to bigger and more complex networks.

Visual Layout

Stations are arranged in a radial fashion based on journey time from the center. Optionally users can provide a destination, which is then highlighted, and a time window to filter the stations to those that can be reched inside that window.

River Thames

A Breadth First Search provides the shortest route through the network, at the expense of number of changes. Depth First Searches provide routes with the fewest changes, but potentially longer. Our Prioritised Breadth First Search provides a 'best of both worlds' solution, fewer changes and shorter journeys.
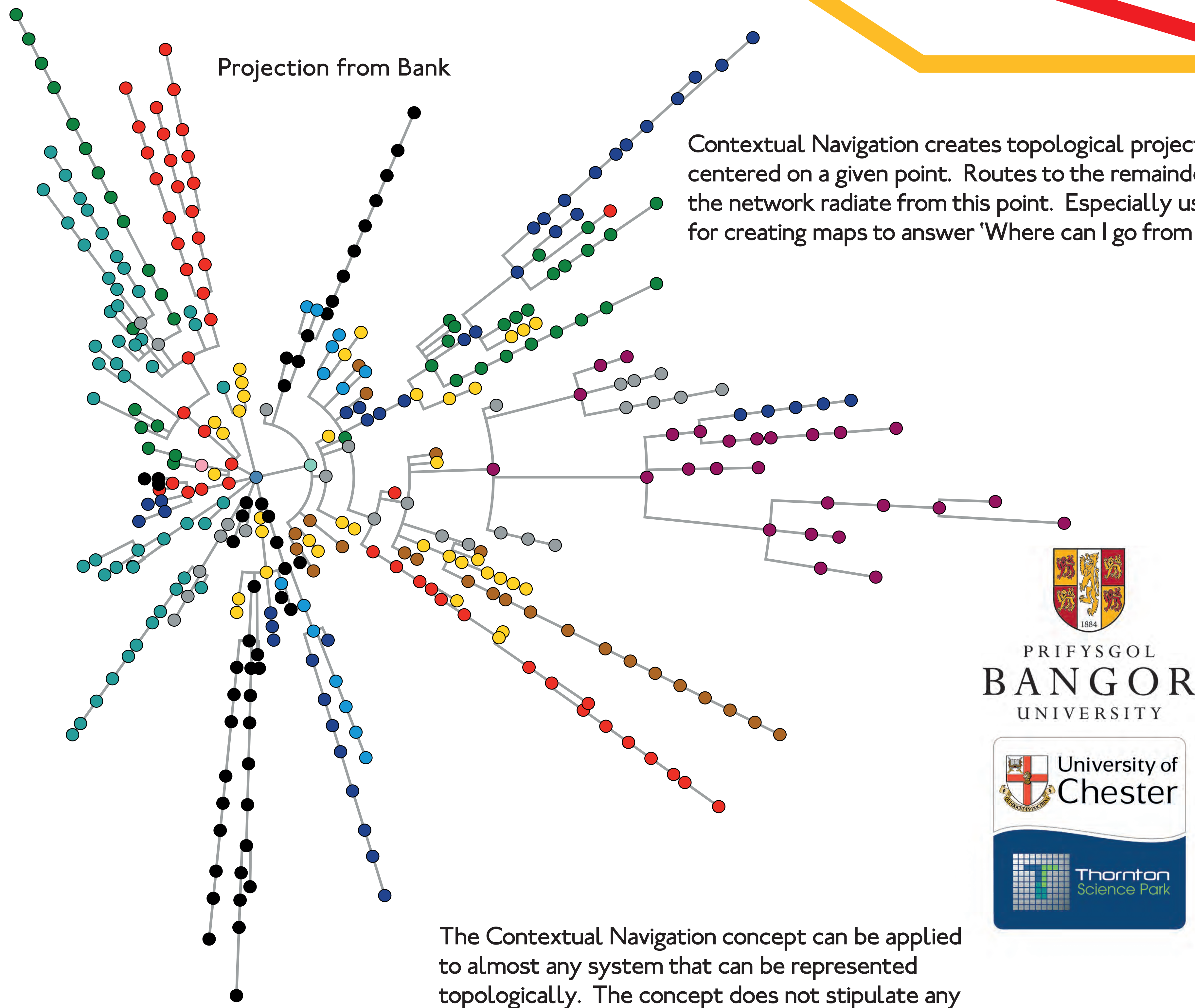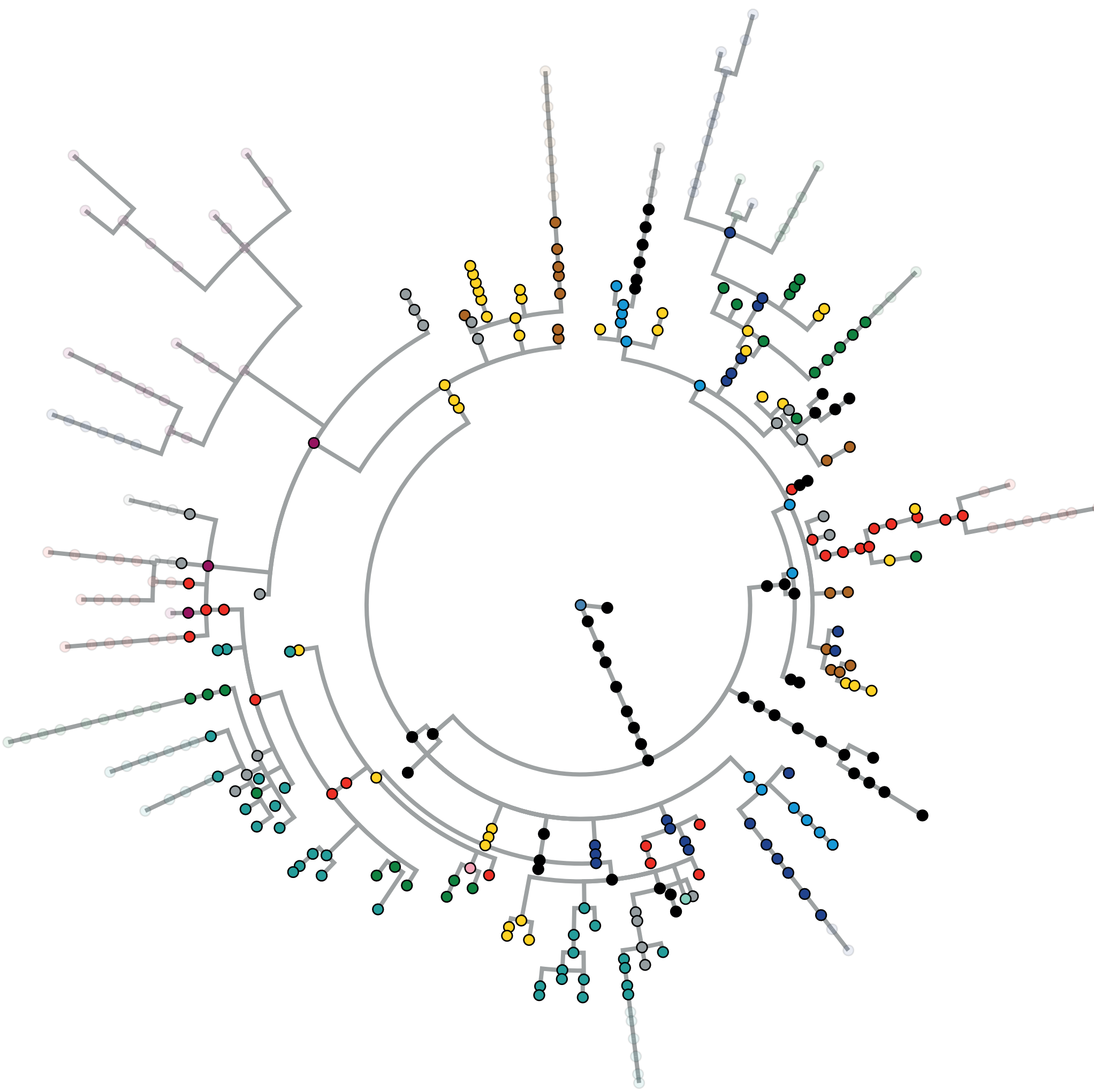
Results

The initial results have been encouraging, however some issues remain outstanding. With complex networks, the amount of nodes presents a challenge to labelling any given node.
The current strategy maintains the link with the node at the expense of being obscured/overplotted when placed in a dense part of the projection.

The Concept

Contextual Navigation creates topological projections centered on a given point. Routes to the remainder of the network radiate from this point. Especially useful for creating maps to answer 'Where can I go from here?'.
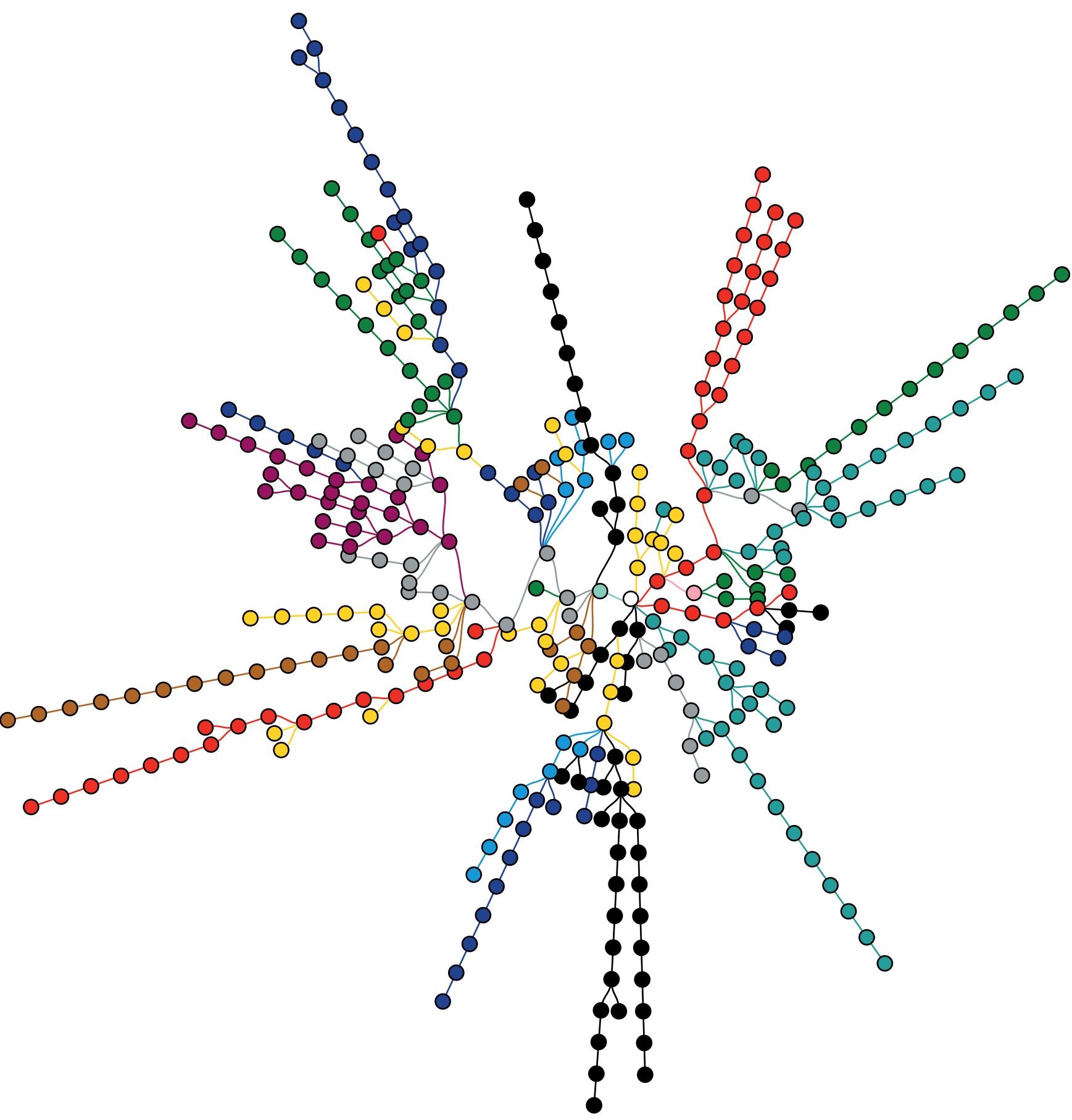
Algorithms

Borrowing the Phylogram from biology, distance can be included as the radial distance from the central point. Different algorithms are used to present different routes through the network.
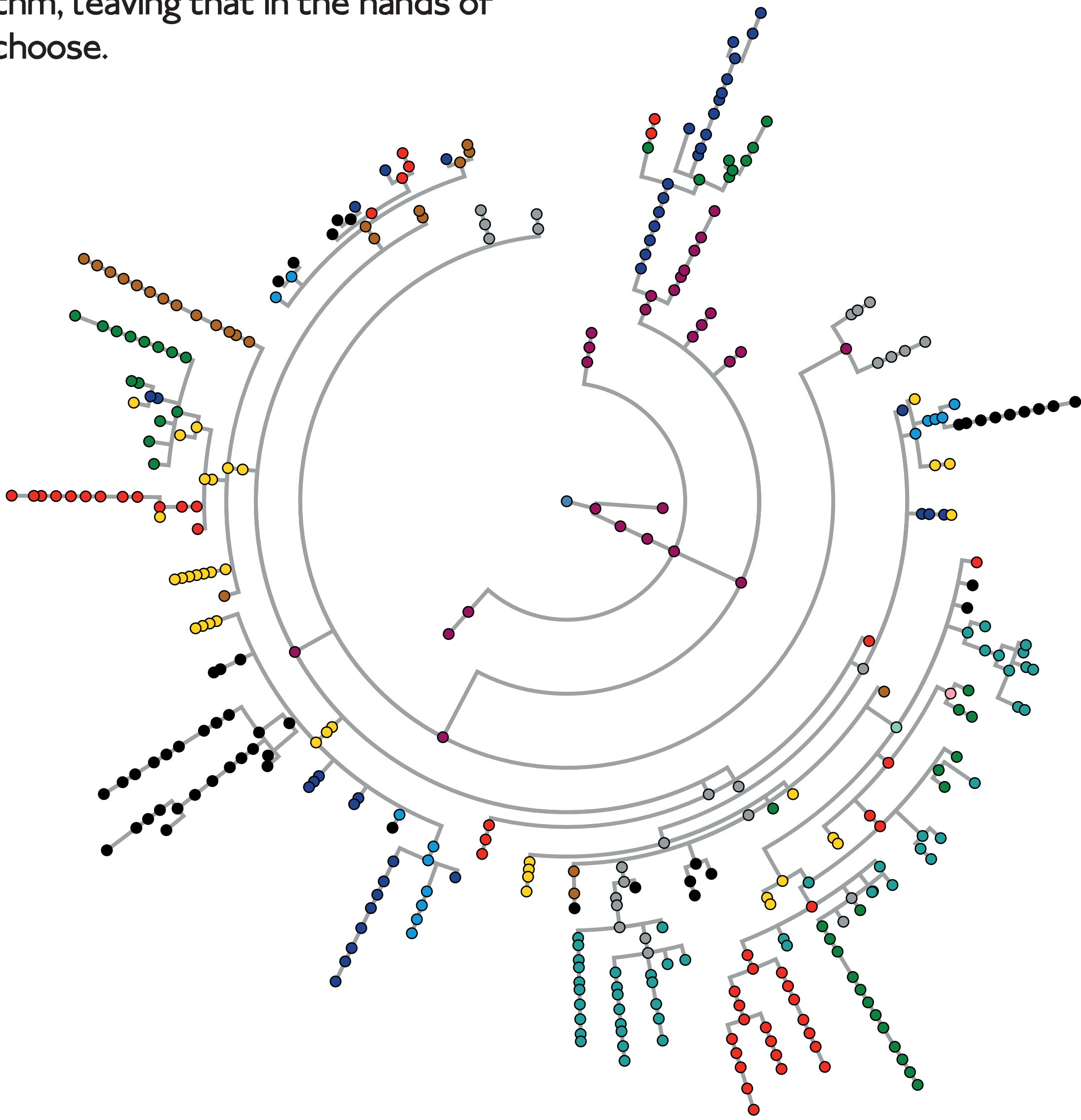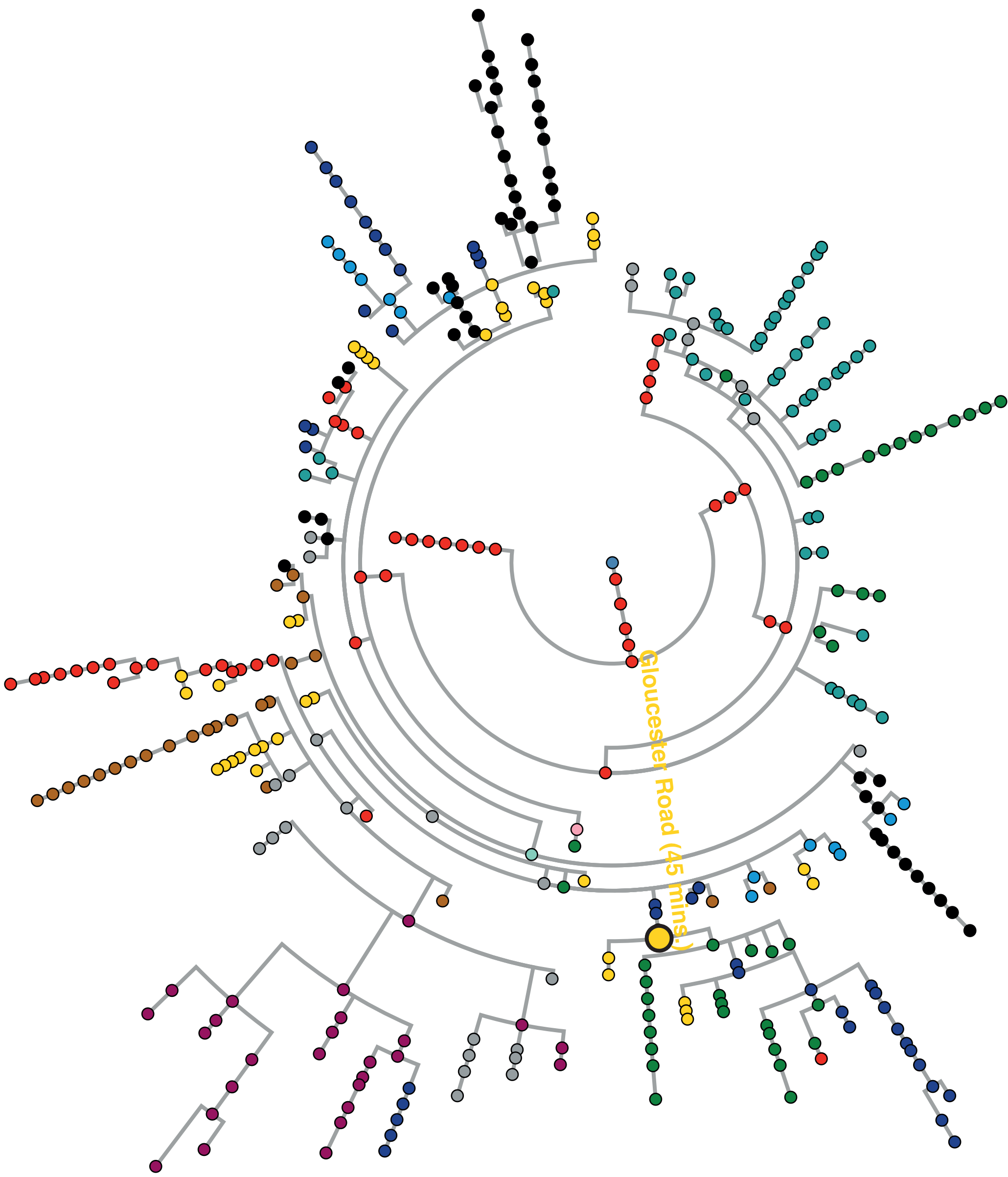

Projection from Bank

The Contextual Navigation concept can be applied to almost any system that can be represented topologically. The concept does not stipulate any given routing algorithm, leaving that in the hands of domain experts to choose.

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Projection from Burnt Oak, with a journey time filter of 45 minutes.

Discarded iteration: Reingold-Tilford Radial Tree Projection from Bank.

Projection from Amersham

Projection from Epping, with Gloucester Road selected as the destination.