Modelling Traffic Networks

Osvaldo Anacleto-Junior (1st year PhD Student)
Supervisor: Dr. Catriona Queen

Statistics Group
Department of Mathematics and Statistics
The Open University

Problem

- Congestion on roads is a worldwide problem causing environmental, health and economic problems.
- Short-term forecasting and monitoring models can be very useful to support decisions and take actions to reduce congestion
- These models need to:
  - Describe multivariate time series of traffic counts
  - Work in real time
  - Be able to accommodate changes in a traffic network

Project

This project will focus on the development of statistical models to forecast and monitor traffic flows.

The Model

The model to be used is the Linear Multiregression Dynamic Model.

- It represents traffic counts time series by a graphical structure
- Each time series is described as a separate model
- The model provides an easy way to
  - handle changes in a network and
  - include external information (e.g. traffic accidents or roadworks)

Networks to be considered

- London Network (M25/A2/A296 Junction)
- Manchester Network (M60/M62/M602 Junction)

Possible Research Topics

- The model has so far been used to forecast hourly traffic flows. Will the same be useful for data collected in smaller time intervals?
- Is it possible to create a technique that can detect any unexpected changes in a traffic flow?
- Can a monitor detect when a road is reaching capacity, so that congestion is likely to occur?
- How to deal with data errors and missing values in the traffic counts time series?