One Page Proposal – BT Young Scientist 2015

During the summer of 2014 there were many reports in the national press and a Prime Time Report on the state of the ambulance service in Ireland. Despite numerous changes in the Health Service, the abolition of Health Boards and the closure of hospitals with rationalisation of services, more and more stories of ambulances not reaching their patients on time have emerged, despite the promises from Government of allocating more resources. This project using a combination of Graph Theory and census data aims to discover if our ambulances are located in the optimal locations to serve Ireland's ageing population.

This project requires the use of graph theory methods, a mathematical method for analysing the optimal locations for objects of interest within a defined space. Ireland will be the defined space in this project. Initially, graph theory methods will be used to analyse the current positions of the ambulance stations located throughout Ireland. We will investigate the locations of these stations in relation to several key factors, including the proximity to the nearest hospital and also the proximity to the areas of most need throughout Ireland.

Data will be collected from an abundance of sources including the 2011 Census, the HSE and the National Ambulance Service. This data will be analysed to examine the current failings of the Irish Ambulance Service, the degree to which the current ambulance stations are “mis-located”, the areas of Ireland which most require the services available and also the age demographic of individuals in Ireland will be examined as it is a known fact that elderly people are much more likely to require the ambulance service than the younger population.

Similar graph theory methods used earlier to assess the current situation will be used to find the optimal locations for ambulance stations in Ireland. To date we have carried out extensive research into the current problems experienced in Ireland with the "mis-location" of the Ambulance Stations. We have found that on several cases in the past 12 months ambulances have not been within a distance of patients to allow paramedics to save lives. We have also found that these ambulance stations can be significant distances from hospitals with full A&E hours, causing patients to be at a higher risk as the travelling to the nearest hospital is dramatically increased.

The final stage of the project will be to combine all our research findings and develop an interactive application to present the findings effectively. The application will be built using a basic statistical software and will be made available on the Internet once the project has been completed.

In this project we have and will contact several sources:

- Kevin Brosnan – Bio-Statistics PhD Student at the University of Limerick
- Health Services Executive – Current data for the project
- Ambulance Service of Ireland – Current experiences of the Irish Ambulance Service
- Central Statistics Office – A data source which will be used throughout this project