

# **An Island-based Genetic Algorithm for Shortest Path Computation on Complex Real-world Road Networks**

Student Name: Harish

Supervisor's:

- Dr. Peter Mooney
- Dr. *Edgar Galván*

## **Abstract**

We describe the feasibility evaluation of a Genetic Algorithm (GA) on a real-world road network to find the shortest paths between any two given nodes. The shortest path (SP) routing problem in computer science is a well-known problem but for real-world applications such as vehicle routing we believe that a single optimum solution does not represent all real-life scenarios. We propose a Island-Based Genetic Algorithm (IBGA) yielding multiple solutions which could be used as an alternative to other static route planning algorithms. The results generated by the GA on four large real-world networks are compared with the Dijkstra's algorithm, the built-in functions of the Python package NetworkX along with an well-known EA algorithm. We show that our approach can explore the solution space effectively while delivering a fast convergence rate and consistent solution quality.