MAURITIUS RESEARCH COUNCIL

ADVANCED MICRO SIMULATION OF ROAD TRAFFIC IN CONGESTED AREAS OF MAURITIUS

Final Report

Year 2008

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MRC Final Report

Advanced Micro Simulation of Road Traffic in Congested Areas of Mauritius

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1. Introduction

The following report provides an overview of work carried out as part of the MRC project. The report briefly describes two main modules that have been developed; the Road Traffic Data Acquisition System and the Road Network Capture System. The aims and outputs of the different modules have also been specified and some screen shots to support the Road Network Capture System have been provided.

2. Modules Developed:

A: The Road Traffic Data Acquisition System

The Road Traffic Data Acquisition system was used to process the road traffic as captured by a camera. Different image processing techniques were applied for vehicles detection and a neural network was used to give the values of the vehicles speed. The Road Traffic Acquisition System allowed real time data to be obtained. Real time data obtained as output was as follows:

- Detection of Vehicle across different point on the road network

- The exact number of vehicles (in both directions) per lane

  Different counters were used on different lanes to keep track of the vehicle count. The list structure was used as a container for the different counters.

- Speed of the vehicles detected (this part was still under development)

  A feed forward artificial neural network was trained for classification and detection of vehicle speed.

Note: This module was developed and tested under the windows operating system. Due to performance issue, the whole system was designed for and run on the UNIX operating system.

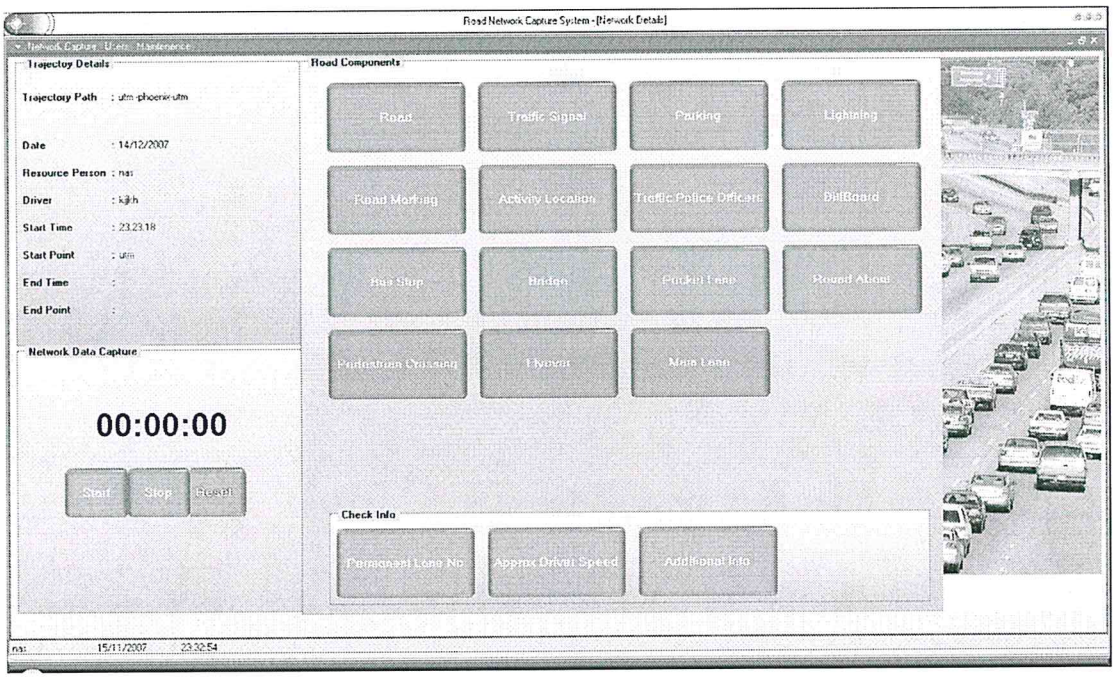
B: The Road Network Capture System

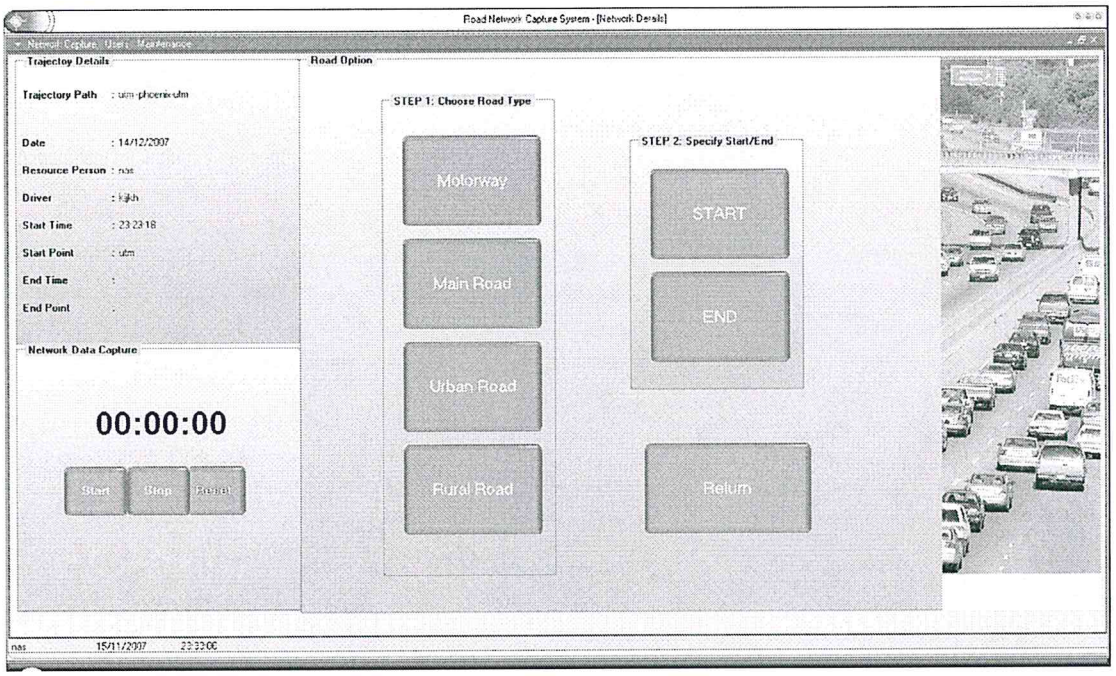
In this module, the Mauritius Road network was captured using the DL2 data logger and an application tailor made for the purpose.

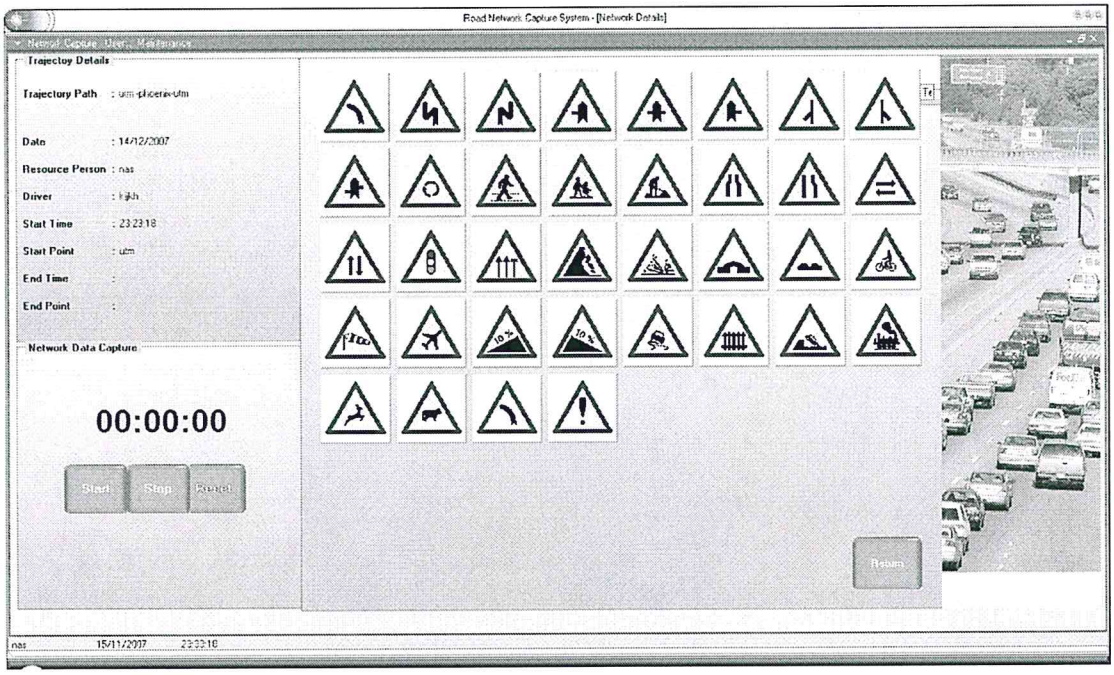
Results from the road network capture system were meant to exactly reproduce the road network and to be used as input for a road traffic micro-simulator. The required files for the micro-simulator could be grouped into 4 different categories: Network Files, Census Files, Traveler Activity Survey file, and vehicle information files.

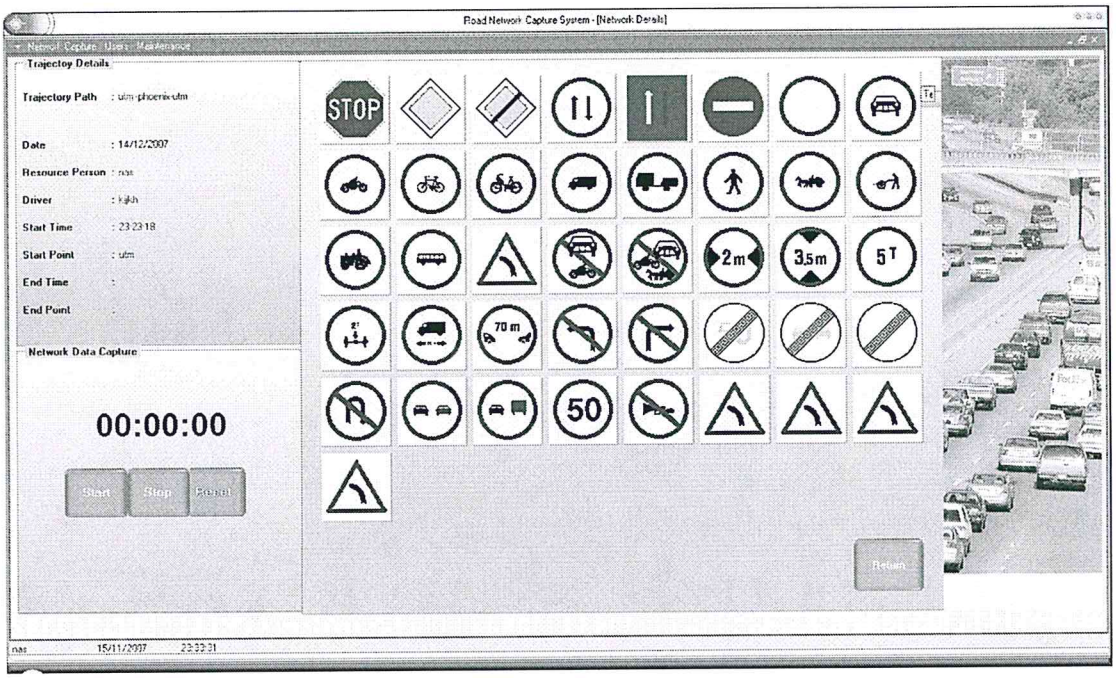
The road network capture exercise was carried out in different sessions for the different categories. However, main work carried out was for the network files. The network representation provides detailed information about streets, intersections, signals and transit in a road network. The network files include data on nodes, links, lane use and connectivity, activity locations, parking and transit stops.

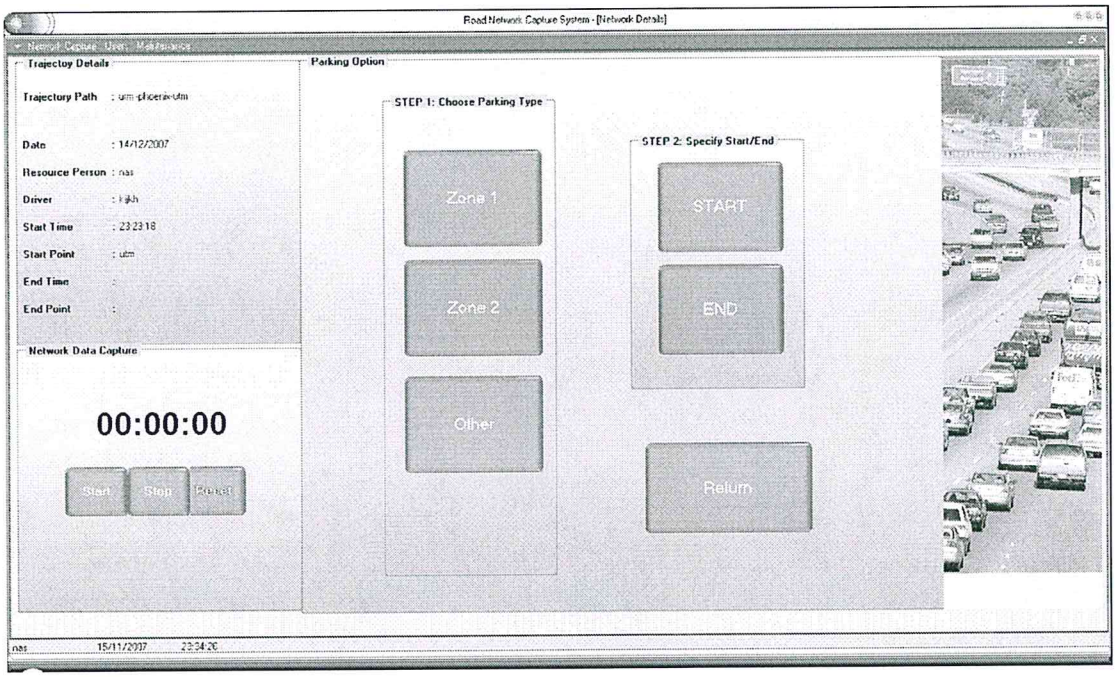
Following are some screen shots of the Road Network Capture system application:

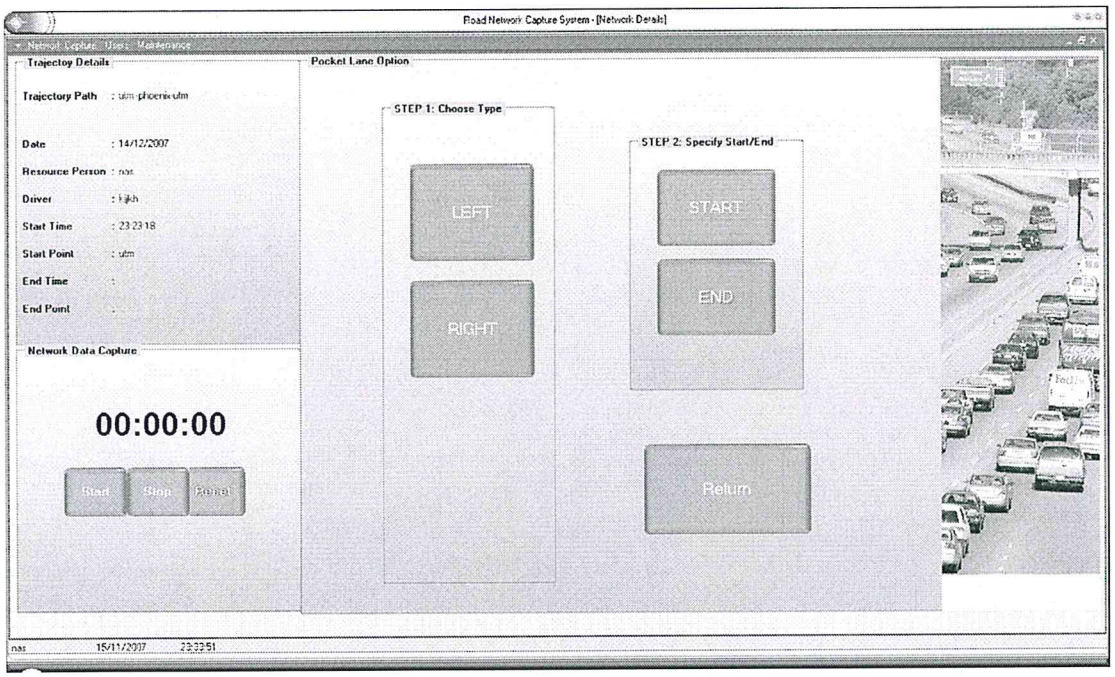


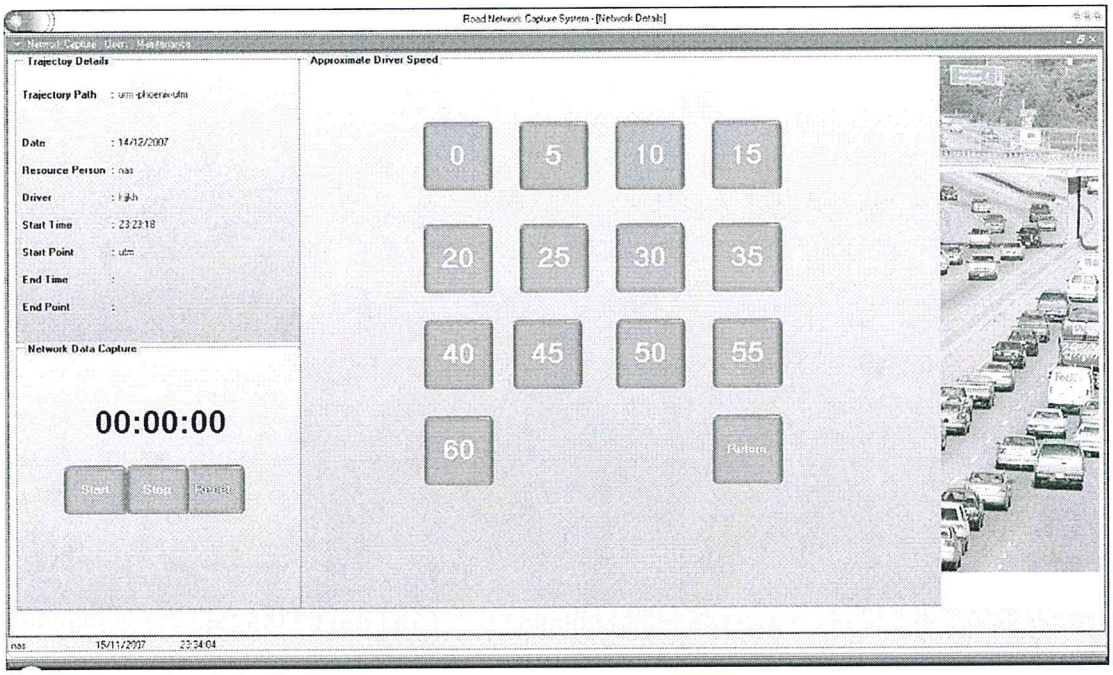

Road Network Capture System - [Network Details]
Trajectory Details
Trajectory Path : utm-phoenix-utm
Date : 14/12/2007
Resource Person : nas
Driver : kjkh
Start Time : 23:23:18
Start Point : utm
End Time :
End Point :
Network Data Capture
00:00:00
Start
Stop
Reset
Road Option
STEP 1: Choose Road Type
Motorway
Main Road
Urban Road
Rural Road
STEP 2: Specify Start/End
START
END
Return
nas
15/11/2007
23:23:00


Road Network Capture System - [Network Details]
Trajectory Details
Trajectory Path : utm-phoenix-utm
Date : 14/12/2007
Resource Person : nas
Driver : kjkh
Start Time : 23:23:18
Start Point : utm
End Time :
End Point :
Network Data Capture
00:00:00
Start
Stop
Reset
Return
nas
15/11/2007
23:23:18

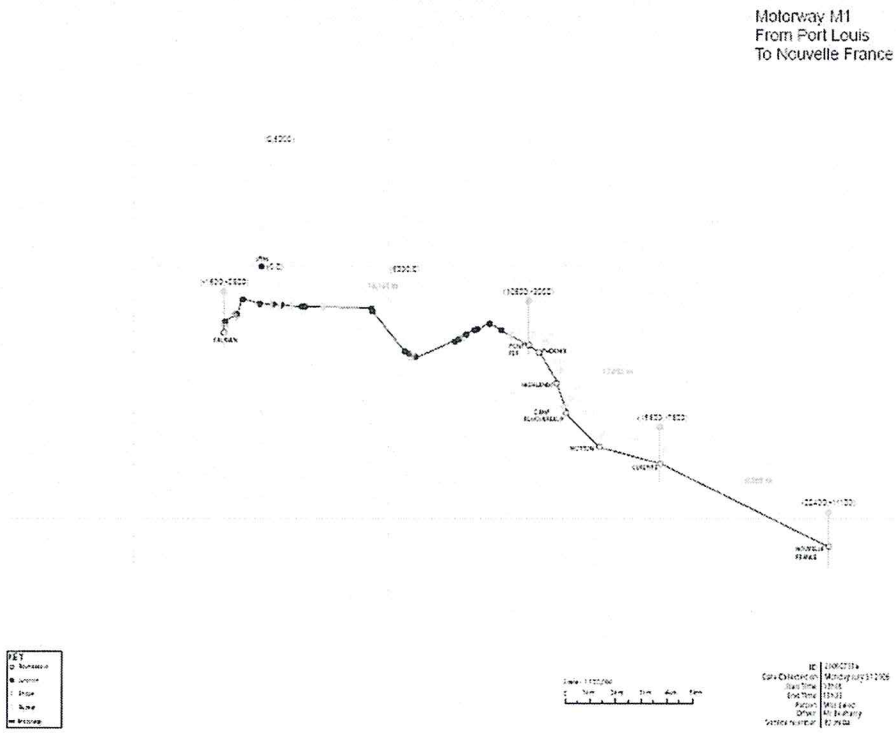

Road Network Capture System - [Network Details]
Trajectory Details
Trajectory Path : utm-phoenix-utm
Date : 14/12/2007
Resource Person : nas
Driver : kjkh
Start Time : 23:23:18
Start Point : utm
End Time :
End Point :
Network Data Capture
00:00:00
Start
Stop
Reset
STOP
2m
3.5m
5T
70 m
50
Return
nas
15/11/2007
23:33:31


Road Network Capture System - [Network Details]
Trajectory Details
Trajectory Path : utm-phoenix-utm
Date : 14/12/2007
Resource Person : nas
Driver : kjkh
Start Time : 23:23:18
Start Point : utm
End Time :
End Point :
Network Data Capture
00:00:00
Start
Stop
Reset
Parking Option
STEP 1: Choose Parking Type
Zone 1
Zone 2
Other
STEP 2: Specify Start/End
START
END
Return
nas
15/11/2007
23:34:20


Road Network Capture System - [Network Details]
Trajectory Details
Trajectory Path : utm-phoenix-utm
Date : 14/12/2007
Resource Person : nas
Driver : high
Start Time : 23:23:18
Start Point : utm
End Time :
End Point :
Network Data Capture
00:00:00
Start
Stop
Reset
Pocket Lane Option
STEP 1: Choose Type
LEFT
RIGHT
STEP 2: Specify Start/End
START
END
Return
nas
15/11/2007
23:33:51


Road Network Capture System - [Network Details]
Trajectory Details
Trajectory Path : utm-phoenix-utm
Date : 14/12/2007
Resource Person : nas
Driver : high
Start Time : 23:23:18
Start Point : utm
End Time :
End Point :
Network Data Capture
00:00:00
Start
Stop
Reset
Approximate Driver Speed
0
5
10
15
20
25
30
35
40
45
50
55
60
Return
nas
15/11/2007
23:34:04

The following figure, illustrates the reproduction of part of the Mauritius road network. Only, intersection, Roundabout, Flyover, Bridge and Motorway are depicted in the diagram below.



Based on data collected, the different activity locations, bus stops, parking areas, traffic signals, lighting spots, Road marking, pedestrian crossings, pocket lane, etc can also be reproduced.

3. Conclusion

Based on observations and works carried out, the Road Traffic Data Acquisition system module, can further be expanded such that views from different cameras are processed for the same lane. This would allow collection of more data; for instance the car plate numbers of the different vehicles can be detected and stored. This would provide control on vehicles entering and exiting different points on the road network. Furthermore, based on number of traffic on different point of the network at different time of the day and night, proper control over the traffic can be implemented.

Through the Road Network Capture system module, the network of the whole country can be collected. With appropriate simulation tools, the different data collected can be analysed to observe their impact on traffic flow.