ROAD TRAFFIC ESTIMATION FROM CELLULAR NETWORK MONITORING

Prepared by

K.G.G Kandapahala

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Declaration

I declare that this thesis is my own work and has not been submitted in any form for another degree or diploma at any university or other institution of tertiary education. Information derived from the published or unpublished work of others has been acknowledged in the text and a list of references is given.

Signature: ..... Date: ....11../.05../.2013..

Supervised by

Name: Dr. G.D.S.P. Wimalarathne. Signature: .....

Date: 11/05/2013

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Abstract

Traffic information systems play an important role in the world as numerous people rely on the road transportation network for their most important daily functions. This dissertation proposes general system architecture for processing and predicting accurate, timely traffic information via existing mobile telecommunication network. It also specifically addresses the challenges with estimating traffic conditions using traditional methods.

This dissertation introduces architecture to design and implement of a *Mobile Telecommunication Network Based Traffic Calculating and Estimating Method.* The proposed system will be built on top of the existing cellular network infrastructure. It can be identified as an efficient, low cost and real-time method. Based on concept that 'many road users are also the customers of a cellular operator', this study demonstrate how specific road conditions are mapped to certain signaling patterns in the cellular core network. In order to estimate the road traffic, signaling is collected from the core network of an operational mobile network. Based on the explorative analysis of real signaling and traffic data; normal and abnormal road conditions are mapped into mobility signals in a real cellular network. This method will increase the accuracy and helps to build an optimal or near optimal Road Traffic Monitoring System. This study will provide the base to build the complete and accurate traffic estimation and control system by giving mobile signaling traffic models. Thus, with the increasing competition among the service providers, providing valued services will be a key factor in retaining and attracting customers.

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List of Acronyms and Abbreviations

3GPP	-	3rd Generation Partnership Project (3GPP)
MM	-	Mobility Management
RRC	-	Radio Resource Control
CS	-	Circuit Switching
PS	-	Packet Switching
GSM	-	Global System for Mobile
UMTS	-	Universal Mobile Telecommunications System
RAU	-	Routing Area Updates
LAU	-	Location Area Updates
TCH	-	Traffic channel
SDCCH	-	Standalone dedicated control channel
GPS	-	Global Positioning System
MSC	-	Mobile Switching Center
BSC	-	Base Station Controller
BTS	-	Base Transceiver Station
RNC	-	Radio Network Controller
SGSN	-	Serving GPRS Support Node
LAU	-	Location Area Update
RAU	-	Routing Area Update