IITB-Monash Research Academy

Indian Institute of Technology Bombay | MONASH University

An Indian-Australian research partnership

Project Title:	**Model and simulation development for two-wheelers traffic**	
Project Number	**IMURA0704**	
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Research Clusters:

Highlight which of the Academy's CLUSTERS this project will address?
*(Please nominate JUST **one.** For more information, see www.iitbmonash.org)*

1	*Material Science/Engineering (including Nano, Metallurgy)*
2	*Energy, Green Chem, Chemistry, Catalysis, Reaction Eng*
3	*Math, CFD, Modelling, Manufacturing*
4	*CSE, IT, Optimisation, Data, Sensors, Systems, Signal Processing, Control*
5	*Earth Sciences and Civil Engineering (Geo, Water, Climate)*
6	*Bio, Stem Cells, Bio Chem, Pharma, Food*
7	*Semi-Conductors, Optics, Photonics, Networks, Telecomm, Power Eng*
8	*HSS, Design, Management*

Research Themes:

Highlight which of the Academy's Theme(s) this project will address?
(Feel free to nominate more than one. For more information, see www.iitbmonash.org)

1	*Advanced computational engineering, simulation and manufacture*
2	*Infrastructure Engineering*
3	*Clean Energy*
4	*Water*
5	*Nanotechnology*
6	*Biotechnology and Stem Cell Research*

The research problem

Define the problem

As the urbanisation intensifies, mixed or heterogeneous traffic contains vehicles (such as cars) and two-wheelers (such as bicycle or motorcycle) becomes more common in the urban networks. Such traffic characteristic is often observed in south-eastern Asia countries such as India, but has now spread out to others such as France, Netherlands etc.

In contrast to the conventional vehicle traffic flows that has been long researched and reasonably understood, the mixed traffic received comparably less attention in the scientific literature. The existing two-wheelers traffic models focus on extending the model of conventional vehicles and often lack of flexibility or the uniqueness behaviour of the two-wheelers. This project aim to fill this gap and develop a more versatile mixed traffic model and simulation for both car and two-wheelers traffic.

Project aims

Define the aims of the project

The aims of this project are

1) develop a new traffic model for two-wheelers traffic that accounts for uniqueness behaviour
2) develop more flexible mixed traffic model
3) develop simulation using the proposed models and validate using real data

Expected outcomes

Highlight the expected outcomes of the project

The expect outcomes are

1) New traffic model for two-wheelers traffic
2) New mixed-traffic model for heterogeneous traffic with two-wheelers
3) Applications of models for mixed-traffic simulation

How will the project address the Goals of the above Themes?

Describe how the project will address the goals of one or more of the 6 Themes listed above.

The project develops novel mathematical models based on which new, more realistic advanced computational methods and simulation will be developed to cater for the future mixed traffic.

Capabilities and Degrees Required

List the ideal set of capabilities that a student should have for this project. Feel free to be as specific or as general as you like. These capabilities will be input into the online application form and students who opt for this project will be required to show that they can demonstrate these capabilities.

The candidate should have

1) a solid background in mathematics and optimisation
2) good software engineering skills (i.e. programming skills) to develop and use traffic simulation packages
3) good writing and communication skills
4) having (preferable but not compulsory) back ground and experience in traffic modelling

Potential Collaborators

Please visit the IITB website www.iitb.ac.in OR Monash Website www.monash.edu to highlight some potential collaborators that would be best suited for the area of research you are intending to float.

The Monash Faculty of IT has software development and visualisation expertise that will enable the collaboration with this project.

Select up to **(4)** keywords from the Academy's approved keyword list **(available at www.iitbmonash.org)** relating to this project to make it easier for the students to apply.

Computational science, Computer graphics, Data mining