

An Indian-Australian research partnership

Project Title:

Project Number

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IITB Department:

Research Clusters:

Research Themes:

Highlight which of the Academy's CLUSTERS this project will address? <i>(Please nominate JUST <u>one</u>. For more information, see www.iitbmonash.org)</i>		Highlight which of the Academy's Theme(s) this project will address? <i>(Feel free to nominate more than one. For more information, see www.iitbmonash.org)</i>	
1	Material Science/Engineering (including Nano, Metallurgy)	1	Advanced computational engineering, simulation and manufacture
2	Energy, Green Chem, Chemistry, Catalysis, Reaction Eng	2	Infrastructure Engineering
3	Math, CFD, Modelling, Manufacturing	3	Clean Energy
4	CSE, IT, Optimisation, Data, Sensors, Systems, Signal Processing, Control	4	Water
5	Earth Sciences and Civil Engineering (Geo, Water, Climate)	5	Nanotechnology
6	Bio, Stem Cells, Bio Chem, Pharma, Food	6	Biotechnology and Stem Cell Research
7	Semi-Conductors, Optics, Photonics, Networks, Telecomm, Power Eng	7	Humanities and social sciences
8	HSS, Design, Management	8	Design

The research problem

Long haul truck driving is major industry in India. This industry involves a number of stakeholders ranging from large trucking industries to small and medium scale truck owners. While the larger companies have R&D setups as well as procurement procedures for purchasing the latest technologies for trucking, others rely on the technologies to percolate slowly to the lower end of the economic spectrum. With the rise in the Indian government's mandate for "Digital India", there is a major thrust towards digitalization of services, goods and technologies. In addition, due to the major push towards Internet-of-things/cyber-physical systems worldwide, technology and sensors are getting cheaper and so are embedded technologies in windshield displays. With this dual thrust, augmented technologies for windshield displays will be a major area of concern for future to enhance safety, well-being of trucking operations.

The major challenge in India in this particular problem is not the technology development itself but the deployment and design to suit the Indian context. Thus, Indian technologists will leapfrog in this sector to support the lower end of the economic spectrum of medium to small scale truck owners.

The main aim of this "concept-project" is to design the interactions for future augmented windscreen displays for long-haul trucking in India. The aim of this project will be to understand driving experience for long haul truckers using primary insights from interviews and devising design/cognitive ergonomics models to support interaction design of the displays. The primary questions addressed in this project will be as follows: If augmented windshield technology was to become cheap then how would this technology be for long-haul truckers in India? What will be the day time issues in driving in the hot direct sun? What will be the issues involved in night-time driving in remote areas (no light)? How will this make changes in long-haul trucking business? Can we really make a difference in this space for Indian long-haul truckers for their needs?

This projects bridges Design Ethnography, Mobility and Vehicle Design, Cognitive Ergonomics (Cognitive Systems Engineering) and Interaction Design

Existing Technology: Porsche, Apple and a number of companies are investing in this technology.

<https://ispr.info/2018/08/09/apple-patent-would-add-augmented-reality-to-car-windshields/>

<https://www.youtube.com/watch?v=3ydotXDu9cY>

<https://www.forbes.com/sites/bernardmarr/2019/08/26/are-you-ready-for-augmented-reality-in-your-car/#54b83d823144>

<https://www.theglobeandmail.com/globe-drive/culture/technology/augmented-reality-merges-into-vehiclewindshields/article35096455/>

Project aims

The main aim of this "concept-project" is to design the interactions for future augmented windscreen displays for long-haul trucking in India.

Expected outcomes

Research Outcomes:

RQ1: How do Indian drivers drive in long-haul trucks. This study will involve an ethnographic approach towards understanding the truck driving scene in various parts of India. The study can be scoped to understand the major challenges related to road travelling, movement of goods, travelling in various durations, , day-time and night-time driving, among other challenges of trucking. [duration: 1.5 years]

Deliverable: research paper

RQ2: How can existing issues identified in RQ1 be used to develop a design framework for informing augmented reality design of windscreens. The insights gathered from the previous stage [RQ1] will be collated together in light of existing frameworks and insights from disciplines of visual and cognitive ergonomics (cognitive systems engineering), augmented reality design, among other sub-specialities. [duration: 1 year]

Deliverable: research paper

Design Outcomes:

D1: A concept display will be developed for the next generation interfaces in Mobility and Vehicle Design for long haul trucking in India. A patent will be filed for this design. [duration: 1.5 years]

Deliverable: design patent

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

The project falls under the banner of **Design**.

This project will help the automobile industry in the design of next generation technology that will be specific to Indian roadways, infrastructure and trucking. The design patent can be taken up in terms of industry collaboration and technology transfer and can be developed further for actual use in Indian trucks.

Capabilities and Degrees Required

The student should possess a background in interaction design, systems design, visual ergonomics or cognitive ergonomics [MDes/MTech].

The student should be open to work in interdisciplinary settings and should be able to demonstrate an integrative understanding of how projects can be developed using a variety of methods.

Select up to **(4)** keywords from the Academy's approved keyword list (**available at <http://www.iitbmonash.org/becoming-a-research-supervisor/>**) relating to this project to make it easier for the students to apply.

Transportation and Traffic Engineering and Logistics,
Design