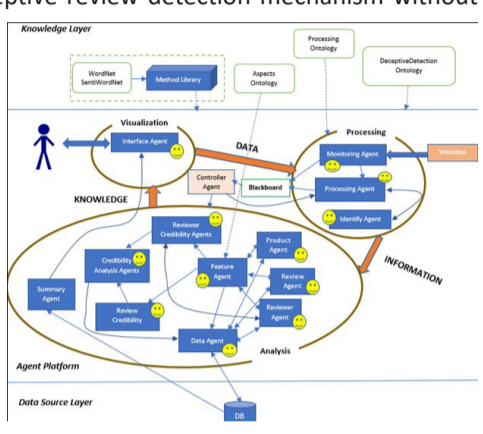


University of Moratuwa Awards 10 PhDs 44th General Convocation-2023 20-21 December



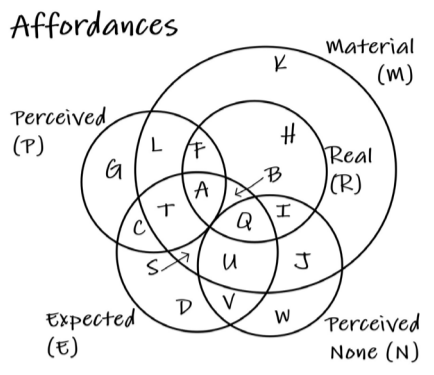
Ms. Dushyanthi Vidanagama
Multi-Agent based Big Data Analytics using Ontological Modeling and Fuzzy Logic for Deceptive Consumer Review Detection.
Supervisors: Dr. (Mrs.) A.T.P. Silva
Sr. Prof. A.S. Karunananda
Dept: Computational Mathematics
Faculty : Information Technology

The credibility of online reviews significantly impacts the company's reputation. Consumer reviews are produced at a high volume, velocity, and degree of unstructured. There is a research challenge in designing an effective deceptive review detection mechanism without focusing on classifications with labelled datasets in real-time. This research combines reviewer-centric and reviewer-centric features in the feature selection stage and finds the deceptive level of each review based on those features without focusing on classification. The purpose of this research is to support the deceptive review detection process to automate complex tasks such as real-time data acquisition, feature selection, and calculating deceptive levels by ensuring high accuracy with the support of Multi-Agent Technology, Ontological Modeling, and Fuzzy Logic. The ultimate goal is to create an assured customer who will boost the business's revenue by expanding purchases because of the trustful and reliable reviews.



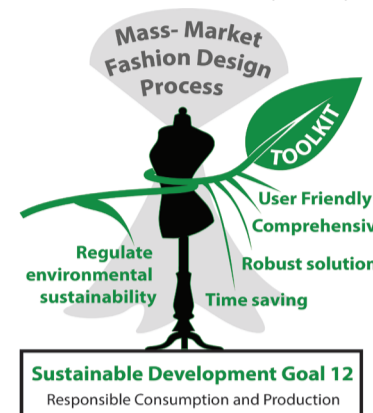
Mr. Suranga Jayasena
Framework of Understanding for BIM Adoption in a BIM Infant Industry: Case of Sri Lanka.
Supervisors: Prof. Kanchana Perera
Assoc. Prof. Niraj Thurairajah
Prof. Chitra Weddickara
Dept: Building Economics
Faculty : Architecture

The Affordance-Led Framework of Understanding (AFU) is a structured approach developed to assist in the adoption of innovations like Building Information Modelling (BIM). Unlike traditional innovation models that primarily focus on the innovation itself, the affordance-led perspective emphasizes the interplay between the user and the innovation. The AFU provides a unified, interconnected framework for comprehending the status and dynamics of affordances within a user's BIM adoption context. By utilizing the AFU, adopters can assess their position in the BIM adoption process at any given point and develop strategies to realize the expected dynamics of affordances, ensuring the successful integration of BIM or making informed decisions to withdraw from their BIM adoption efforts. As innovation continues to reshape industries, the insights offered by the AFU will play a vital role in facilitating informed decision-making and promoting the diffusion of innovation across diverse sectors.



Mr. Prabod Munasinghe
Developing a Toolkit to Incorporate Environmental Improvements into the Fashion Design Process.
Supervisors: Dr. D.G.K. Dissanayake
Prof. Angela Druckman
Dept: Textile and Apparel Engineering
Faculty : Engineering

The fashion industry is a crucial driver of the global economy, but it employs significant environmental strain due to resource consumption, waste generation, and various emissions to air, water, and land. The mass-market segment, characterized by high production volumes and low prices, raises sustainability concerns. There is a growing call for the industry to address these issues early in the product development process. Despite various initiatives, progress has been limited. This study presents a user-friendly toolkit for mass-market fashion designers, enabling eco-conscious decision-making in design and product development. Through a mixed-method approach, a decision support toolkit was developed by integrating a comprehensive database of environmental impact data. The toolkit, a web-based application, offers environmental impact data processing, eco-friendly decision support protocols, and an intuitive user interface. Fashion designers validated its effectiveness, affirming its role in promoting sustainable design choices to support SDG 12: Responsible Consumption and Production.



Mr. Asitha Kulasekera
Development of a Soft Linear Actuator to Use in Wearable Assistive Exosuits.
Supervisors: Dr. Damith Chathuranga
Prof. Ruwan Gopura
Dr. Thilina Lalitharatne
Dept: Mechanical Engineering
Faculty : Engineering

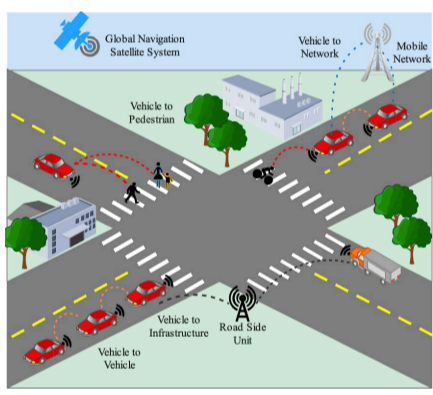
Exosuits (cloth-like wearable, assistive devices) with thin, low-profile, and lightweight actuators have the potential to revolutionize assistive technology for the elderly, obese, and patients with neuromuscular skeletal diseases. This research developed two types of soft, linearly contractile actuators, ThinVAC and LPVAC, designed to provide high forces to move the respective limb while being lightweight and flexible. The ThinVAC, weighing only 0.75 g, can lift a 500 g load, while the LPVAC, weighing 14 g, can lift a 4kg weight, similar to and above the capabilities of human muscles. These actuators have been tested in wearable applications, such as a knee rehabilitation assist device and a mono-articular sit-to-stand transition assist exosuit, showing promising results in helping the wearer. The research aims to integrate these actuators into a wide range of assistive devices, including knee or ankle braces, exoskeletons, and prosthetics, to enhance mobility for those in need.



Gold Medal Winner The Most Outstanding Doctoral Researcher

Mr. Geeth Priyankara
Modeling the Medium Access Control Layer Performance of Cellular Vehicle-to-Everything Mode 4 and IEEE 802.11p.
Supervisors: Dr. Tharaka Samarasinghe
Dr. Jussi Haapola
Dept: Electronic and Telecommunication Engineering
Faculty : Engineering

Vehicle-to-everything (V2X) communication has the potential to reduce vehicle collisions, congestion, fuel consumption, and pollution by wirelessly sharing vehicle information. This technology is crucial for intelligent transport systems, with IEEE 802.11p and cellular-V2X (C-V2X) as key contenders. The research employs discrete-time Markov chain (DTMC) models to evaluate these technologies at the medium access control (MAC) layer. It focuses on IEEE 802.11p and C-V2X Mode 4, assessing their performance with periodic and event-driven messages. IEEE 802.11p offers a lower average delay, while C-V2X Mode 4 excels in collision resolution and achieves higher throughput. The study extends to support four multi-priority data streams vital for quality of service (QoS). IEEE 802.11p maintains fairness among data streams, while C-V2X's higher delay negatively affects low-priority streams. The research proposes an approach for allocating multiple candidate subframe resources (CSRs) per vehicle based on the number of vehicles, demonstrating reduced delay with minimal packet collision impact.



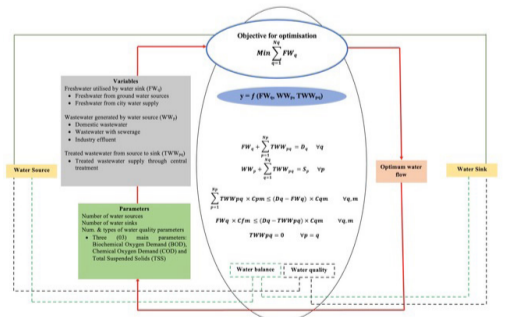
Mr. Sampath Abeygunasekara
Development and Validation of a Novel CFRP/Steel Hybrid Crack Repairing Technique for the Steel Structure.
Supervisors: Prof. J.C.P.H. Gamage
Prof. S. Fawzia
Dept: Civil Engineering
Faculty : Engineering

The crack stop hole (CSH) technique could be considered as an emergency repairing technique to extend the fatigue life of a cracked steel structures that is quick, simple and economic. Carbon fiber reinforced polymer (CFRP) materials have become popular due to its light weight, corrosion resistivity, fatigue resistivity and high tensile features. Therefore, this study proposes a CSH technique combined with a CFRP strengthening method to acquire the lost capacity due to fatigue in old structures. A hydro-electric controlling fatigue loading apparatus was designed and fabricated as an initiation to this research study. A numerical model was developed using finite element model (FEM) and results were validated using the laboratory test results. This investigation reported the strength gains with CFRP; which is in the range of 32 % to 45 %. This investigation recommended by CFRP strengthened technique has significantly enhanced fatigue bearing capacity of structural members with CSH. Design guidelines are developed for practical implementations.



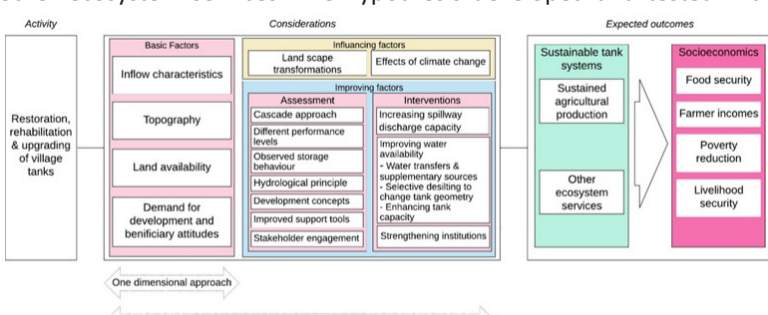
Ms. Harshini Mallawaarachchi
An Investigation into Optimising Water Flow of Industrial Symbiosis: Development and Application of a Model.
Supervisors: Prof. Yasangika Sandanayake
Dr. Gayani Karunasena, Prof. Chunlu Liu
Dept: Building Economics
Faculty : Architecture

The deficiencies in planning and evaluation of Industrial Symbiosis (IS)-based water sharing networks emphasise the need to have a standardised way to assess the optimum water flow of IS. Thus, the current study aimed to develop a model to assess the optimum water flow of IS. Based on the key literature reviewed, the conceptual model was developed by integrating mathematical formulae based on single objective optimisation and mixed integer linear programming (MILP) approaches. In Phase II, the conceptual model and mathematical formulae were refined to the selected context of Sri Lanka. The assessment model was developed and tested using SageMath software. The applicability and feasibility of the model were then evaluated during Phase III. The current study's optimisation model, developed by considering the objective of reducing freshwater consumption of the industrial symbiosis network through maximum wastewater recovery, underpins the novelty of this research. Furthermore, the variables, functions and formulae embedded in the conceptual model create a unique foundation for assessing the optimum water flow of IS networks, thus contributing to new knowledge on industrial symbiosis.



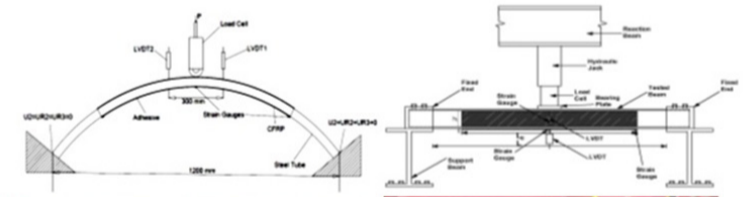
Ms. Tushara Perera
Restoration of Ancient Tank Systems in Ruhunu Rata with Enhanced Adaptive Capacity for Water Security.
Supervisors: Dr. T.M.N. Wijayarathna
Prof. J.M.A. Manatunge, Prof. Tilak Priyadarshana
Dept: Civil Engineering
Faculty : Engineering

Restoring abandoned ancient village tanks has been identified as an adaptation option to climate change. However, a lack of understanding of storage behaviour and the hydrological principle behind the building series of bunds in cascades has resulted in restoring individual tanks with different levels of water security and low flood resilience. This study investigated restoration potential of village tanks for water security using monthly storage state data of 580 tanks over three water years. The developed five-storage state model reveals the high temporal variation of storage behaviour while indicating a higher potential for providing other ecosystem services. The hypothesis developed and tested with HEC-HMS model reveals the hydrological principle behind the formation of tank cascades as the technique used to store water safely by regulating peak inflows. Conceptual and decision-making frameworks developed with multidimensional and transdisciplinary approaches incorporating design-level strategic considerations ensure developing village tank cascades as sustainable social-ecological systems.



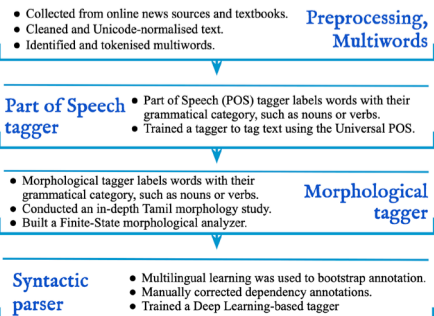
Mr. Buddhika Weerasinghe
Behaviour of in Plane and out of Plane Curved Steel Beams Strengthened with Carbon Fiber Reinforced Polymers (CFRP).
Supervisors: Prof. J.C.P.H. Gamage
Dr. Sabrina Fawzia, Prof. David Thambiratnam
Dept: Civil Engineering
Faculty : Engineering

Application of curved steel members in constructions have shown an increasing demand during the last few decades not only due to the aesthetic appearance, but also some structural advances. These curved steel beams need retrofitting due to many reasons. Among many methods available to retrofit steel structures, CFRP became popular within the industry during the last decade due to many of its favourable properties. The first stage of the study focused on the behaviour of CFRP strengthened in plane curved circular hollow sections under flexural loading and the main findings revealed that CFRP wrapping length, layer orientation, and number of CFRP layers are the major contributing factors in strength gain of strengthened beams. The second stage of the study focused on the flexural performance of out of plane curved I beams strengthened with CFRP and CFRP application profiles, CFRP length and number of CFRP layers were identified as the main contributing factors for ultimate strength.



Mr. Kengatharaiyer Sarveswaran
A Deep Syntactic Parser for the Tamil Language.
Supervisors: Prof. Gihan Dias
Prof. Miriam Butt
Dept: Computer Science and Engineering
Faculty : Engineering

Natural Language Processing (NLP) revolutionises digital communication by enabling computers to interpret human language, thereby powering AI and a variety of everyday applications, including voice assistants and language translation services. Syntactic parsers, crucial in NLP applications, uncover syntactic relationships between words in sentences and facilitate mapping to structures such as trees or graphs. Tamil, a language with scarce NLP resources, poses challenges due to its intricate morphosyntactic properties. Conventional language-agnostic parsers perform poorly with Tamil, highlighting the necessity for specialised tools. This study focused on the development of the first grammar-driven syntactic parser for Tamil using Lexical-Functional Grammar, alongside a data-driven parser utilising the Universal Dependencies framework. Furthermore, a comprehensive set of tools, including a part-of-speech tagger, a morphological analyser cum generator, pre-processing tools, and treebanks, has been developed. Additionally, insights into various linguistic aspects of the language are offered in this study, contributing significantly to its broader understanding.



Visit our website for more details
UoM Research Magazine
Like Mora Minds on FB

