OMSRI KUMAR AEDDULA

Ph.D. (August 2019 – Present)

CONTACT INFORMATION	Blekinge Institute of Technology, Karlskrona, Sweden ✆ +46-709468941 ✉ omsri.kumar.aeddula@bth.se https://www.bth.se/staff/omsri-kumar-aeddula-oka/
Supervisor	Tobias Larsson (https://www.bth.se/eng/staff/tobias-larsson-tlr/)

Product Development Research Lab

RESEARCH INTERESTS	• Artificial Intelligence • Product-Service Systems	• Signal/Image Processing • Design Automation	• Data-Driven Design • Decision Support Systems

CURRENT POSITION

Ph.D Candidate, Blekinge Institute of Technology
(August 2019 - Present)

Vice-Chairman of PhD Committee at Blekinge Institute of Technology
(December 2021 – Present)

EDUCATION

Blekinge Institute of Technology: BTH, Karlskrona, Sweden.
Degree of Licentiate (December 2021)
https://www.productdevelopment.se/?p=12295

Blekinge Institute of Technology: BTH, Karlskrona, Sweden.
Master of Science in Electrical Engineering with emphasis on Signal Processing (2015- 2017) Master Thesis Grade – A

Jawaharlal Nehru Technological University: JNTU, Hyderabad, India.
Bachelor of Technology in Electronics and Communication Engineering (2012-2016) Grade – A

PUBLICATIONS

Omsri Aeddula, "Data-Driven Decision Support Systems for Product Development - A Data Exploration Study Using Machine Learning"**,** Licentiate dissertation, Blekinge Tekniska Högskola, Karlskrona, 2021**,**
DOI: http://dx.doi.org/10.13140/RG.2.2.35254.22085

Omsri Aeddula, Johan Flyborg, Tobias Larsson, Peter Anderberg, Johan Sanmartin Berglund, Stefan Renvert, "A Solution with Bluetooth Low Energy Technology to support Oral HealthCare Decisions for Improving Oral Hygiene" In Proceedings of the 5th International Conference on Medical and Health Informatics (ICMHI 2021). DOI: https://doi.org/10.1145/3472813.3473179

Omsri Aeddula, Johan Wall, Tobias Larsson, "Artificial neural networks supporting cause and effect studies in product-service system development", ICORD 2021 - 8th International Conference on Research into Design, Springer, 2021**.**
DOI: https://doi.org/10.1007/978-981-16-0119-4_5

Johan Wall, Omsri Aeddula, Tobias Larsson, "Data analysis method supporting cause and effect studies in product-service system development", DESIGN 2020 - 16th International Design Conference, Cambridge University Press, 2020**.**
DOI: https://doi.org/10.1017/dsd.2020.123

Omsri Kumar Aeddula, Irina Gertsovich, "Image-Based Localization System", 8th ICIECE Conference, August 2019. DOI: https://doi.org/10.1007/978-981-15-3172-9_52

Omsri Kumar Aeddula. Automatic Image Based Positioning System.
(Digital Scientific Archive, URN: urn:nbn:se:bth-15224)

Omsri Aeddula, Peter Anderberg, Johan Sanmartin Berglund, "Automated Radiological Analysis of Distal Femoral Epiphysis and Proximal Tibial Epiphysis Based on MRI: A Feasibility Study ". **(Manuscript submitted)**

Martin Frank, Omsri Aeddula, Jenny Elfsberg, Christian Johansson Askling, Marco Bertoni, "Conceptualizing Autonomy- Mapping Industrial Offering as an Integrated Product Service Systems". **(Manuscript final version)**

Research Overview: Modern product development is a complex chain of events and decisions. The ongoing digital transformation of society, increasing demands in innovative solutions puts pressure on organizations to maintain, or increase competitiveness. As a consequence, a major challenge in the product development is the search for information, analysis, and the build of knowledge. This is even more challenging when the design element comprises complex structural hierarchy and limited data generation capabilities. This challenge is even more pronounced in the conceptual stage of product development where information is scarce, vague, and potentially conflicting. The ability to conduct exploration of high-level useful information using a machine learning approach in the conceptual design stage would hence enhance be of importance to support the design decision-makers, where the decisions made at this stage impact the success of overall product development process.

The research aims to investigate the conceptual stage of product development, proposing methods and tools in order to support the decision-making process by the building of data-driven decision support systems. The study highlights how the data can be utilized and visualized to extract useful information in design exploration studies at the conceptual stage of product development. The ability to build data-driven decision support systems in the early phases facilitates more informed decisions.

AWARDS
- Recipient of Scholarship from BTH for academic performance, 2016 – 2017.
- Recipient of Scholarship at School level for securing first place in state level examination.
- Full time Project Assistant (January 2017- July 2019) in Blekinge Institute of Technology:
    - Data Acquisition and technical problem solver in Support Monitoring and Remainder Technology for Mild Dementia (SMART4MD), funded by European Union under Horizon 2020.
    - Technical head for design of a system for data acquisition in E-dent health project.

RESEARCH PROJECTS

VaViM – Validation of virtual models used for simulation of autonomous vehicle systems | 2022-

In order to achieve scalability and robustness, verification and validation (V&V) of self-driving vehicle systems need to be largely performed virtually. This requires validated models on sensors, vehicles and environments where the systems are to operate. The aim of this prestudy is to identify state-of-the-art (SoA) and high-priority research questions within methods for validating models required for virtual V&V of self-driving vehicle systems within a fenced area, and to formulate a joint project application with identified key actors for further studies.

https://www.productdevelopment.se/?p=12403

ASPECT – A System for Electric and Connected Transport Solutions | 2021-

Project ASPECT aims to, based on learnings from pilot Electric-Site, lift the technology to an energy optimized solution to scale in both volume and size. Focus for this project is within confined area. The project includes design of energy infrastructure, electric system on machines and site management system. Furthermore, it includes validation of digital infrastructure for system, method and requirements on infrastructure, digital twin for energy optimized system and to understand if it is possible to increase energy efficiency by using teleoperation.

https://www.productdevelopment.se/?p=12235

EDent- new technical devices for better oral health for older people | 2019-

Project Edent aims to evaluate if new technical devices can assist in obtaining good oral health for older people with various degrees of mild cognitive impairments. By introducing an electric toothbrush with functions that make it possible to remind and gather information about use we will primarily facilitate oral care for this group, and we are proposing that this will lead to higher quality of life of the persons involved. Secondarily this will have great impact on the care/carer situation as well as the need for reactive dental care. Expected results is to see both how the actual reminders can be designed in order to accommodate for this group and informal/formal, the context of how these reminders can be used and ultimately if this has an impact on oral health for the group.

https://healthtechnology.se/edent-new-technical-devices-for-better-oral-health-for-older-people/

BAIAA (Blekinge Artificial Intelligence study on Age Assessment) | 2018-

Bone age assessment (BAA) is an important tool for diagnosis and in determining the time of treatment in a number of pediatric clinical scenarios, as well as in legal settings where it is used to estimate the chronological age of an individual where valid documents are lacking. Traditional methods for BAA suffer from drawbacks, such as exposing juveniles to radiation, intra- and interrater variability, and the time spent on the assessment. The employment of automated methods such as deep learning and the use of magnetic resonance imaging (MRI) can address these drawbacks and improve the assessment of age.

https://healthtechnology.se/baiaa-blekinge-artificial-intelligence-study-on-age-assessment/

SMART4MD (Support Monitoring and Reminder Technology for Mild Dementia) | 2017-2019

SMART4MD project is developing a computer tablet-based platform especially for the needs of people with mild dementia, to help remind them to take prescribed medication, as well as allowing them to share health-related data with their caregivers and doctors.

As well as giving people more control over their care, the app, also called SMART4MD, aims to help slow functional decline, relieve pressure on caregivers, and reduce costs for healthcare providers. The project aims to improve the quality of life of people with dementia and their carers, increase treatment compliance, reduce dementia-related costs by helping reduce the number of missed appointments and of hospital re-admissions and help reduce functional decline.

https://healthtechnology.se/smart4md/

OTHER PROJECTS

Real Time Human- Detection Using Deep Learning (Stanford & BTH) | April 2019 – June 2019

The project developed an algorithm to detect pedestrians and their attentiveness in a real-time scenario. This project is a collaboration between Stanford University and Blekinge Institute of Technology.

Scale Autonomous Machine Development: Phase – I and II, Volvo CE | 2017-

Volvo CE is making steady progress towards realizing their sustainable construction vehicle goals of zero accidents, zero emissions, zero unplanned stops and 10x increase in efficiency. The main strategies include Autonomization, Electrification and Site Optimization. In an effort to export this radically new vision in a palatable experience for decision makers, BTH developed a fully functioning scale site emerged as the best approach for engaging viewers to better grasp the new artifacts and site operations scheme. Leveraging BTH's expertise in both connected solutions and digital mechanical engineering, a 5m x 5m construction site with 4 fully autonomous HX02's transporting material to and from 2 human operated loading machines was constructed. Simulating the two most common operations created a relatable operation to the broad audience of customers for this new electric autonomous site solution.

https://www.productdevelopment.se/?p=9624

Automatic Image Based Positioning System | Feb 2017- June 2017

Extending the capabilities of the scale autonomous machine development, the project demonstrated an algorithm to estimate the indoor location of the machines or vehicles in a real-time scenario.

Image Enhancement and Restoration | Nov 2016 – Dec 2016

The project designed a software to enhance and restore an image which has distorted in an imaging system with imperfect lens.

Enhancement of Signals in Squelch System | Sep 2016 – Oct 2016

The project developed a new system by integrating a variable threshold matched filter to avoid the attenuation of the weak signals in squelch system resulting in sending the signal without any loss of information.

Case Study – Telemetry system | Jun 2016 – Aug 2016

The project, a part of internship work, conducted a case study on telemetry system at Defence Research and Development Organization (DRDO), Hyderabad, India. Study included analysis of different sensors, reconstruction of distorted signal at the receiver end.

Sound Source Localization | Apr 2016 – May 2016

The project aims to develop a software to identify the sound source in an acoustic environment in terms of its coordinates in a three-dimensional space by using an array of microscopes and algorithms such as Least Mean Square and steepest descend algorithm.

Fusion of Two Fingerprints | Jun 2015 – Dec 2015

The project objective is to develop a software for enrolment and authentication of a user by extracting minutiae points from one fingerprint and orientation from another fingerprint. This system increased the privacy of the fingerprints without using any keys and token.

TECHNICAL SKILLS

- MATLAB
- C++
- Python
- Arduino
- Prototyping
- Verilog and other hardware languages

CO-CURRICULAR ACTIVITES

- Student volunteer, a guidance and teaching unit for students in need of additional lectures.

- Founder and CEO of Research Project Development Wing Organization for researchers.

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