GREEN TRANSITION
DEPARTMENT OF COMPUTER SCIENCE

The green transition depends on solutions that involve many different scientific disciplines. The research at the Department of Computer Science at Aalborg University (CS) is collaborative and interdisciplinary.

It contributes foundational technologies and methods within areas like data science, data engineering, machine learning, advanced modelling, and interaction design that support the green transition within sectors such as transport and energy.

CORE AREAS

- Data Engineering, Science and Systems
- Data, Knowledge and Web Engineering
- Distributed, Embedded and Intelligent Systems
- Human-Centered Computing
- AI and Machine Learning

SELECTED TOPICS WITHIN GREEN TRANSITION

BUILDING A DATA WAREHOUSE TO INCREASE THE POSSIBILITIES WITH GEOLOCATION DATA

Geolocation data, e.g., GPS data, hold the potential to enable safer, greener and more cost-effective and predictable mobility.

However, incomplete, noisy and poorly structured data render it challenging to analyse and extract value from the data. Researchers from CS are leading a collaboration aiming at building data foundations and a data warehouse to better enable value extraction.

One goal is to develop a data analysis software stack that allows users, e.g., municipalities, to enter and analyse their own transportation-related data.

KEYWORDS: DATA MANAGEMENT AND AI

Project:Mobility Analytics using Sparse Mobility Data and Open Spatial Data

DIGITAL CHANGE AND TRANSFORMATION OF ENVIRONMENTAL ASSESSMENTS

Environmental assessments (EAs) are applied worldwide as a decision support tool in developing projects and plans. However, current EA practices have shortcomings.

Researchers from CS are part of the DREAMS project, working to promote SDGs by digitally transforming how society accesses and communicates information about environmental impacts of projects and plans.

CS contributes expertise in knowledge management, extracting information from documents, search along with knowledge of digitalisation, diverse users' needs and tool requirements.

KEYWORDS: KNOWLEDGE MANAGEMENT, NLP, INFORMATION RETRIEVAL AND DIGITALIZATION

Project: DREAMS: Digitally supported Environmental Assessment for SDGs

OPTIMISING TRAFFIC FLOW IN SIGNALISED INTERSECTIONS

Too much waiting time at traffic lights is not only annoying - it is a major societal challenge. Researchers from CS have developed a highly promising technology that contributes to making traffic move more smoothly in signalised intersections.

To do so, they use the tool UPPAAL Stratego as an online controller, combining machine learning and model checking.

The controller continuously receives data from radars that is used for on-line learning of near-optimal control strategies, resulting in considerable reduction in the waiting times and fuel consumption.

KEYWORDS: REINFORCEMENT LEARNING AND MODEL CHECKING

Project: ATS - Advanced Traffic Systems

PROJECTS WITHIN
GREEN TRANSITION

ABRA: Artificial Biology, Robotics and Art
Timothy Robert Merritt with the Research Laboratory for Art and Technology (AAU), the Department of Architecture, Design and Media Technology (AAU), the Department of Materials and Production (AAU), Aalto University, Trento University and ADES

ATS - Advanced Traffic Systems
Kim Guldstrand Larsen with Harry Lahrmann and Ambolt

Behavioural change support systems in citizen-driven initiatives in the green transition with Human Machine Interaction
Nicolai Brodersen Hansen with the Department of Politics and Society (AAU) and the Department of Architecture, Design and Media Technology (AAU)

Bus driving support system
Kim Guldstrand Larsen, Mikael B. Skov and Anders R. Bruun with the Department of the Built Environment (AAU), NT, AKK Kollektiv Trafik, AKK Plusbus, MultiQ and Keolis

CLAIRE: ControLing wAter In an uRban Environment
Kim Guldstrand Larsen, Thomas Dyhre Nielsen, Jiri Srba and Martijn Goorden with the Department of the Built Environment, AAU

Data Science meets Microbial Dark Matter
Katja Hose, Thomas D. Nielsen and Andre Lamurias with Centre for Microbial Communities (AAU)

Data and sustainable food: An HCI perspective
Martin Lindrup, Mikael B. Skov and Dimitrios Raptis

DiCYPS: Center for Data-Intensive Cyber-Physical Systems
Kim Guldstrand Larsen, Arne Skou, Torben Bach Pedersen, Christian S. Jensen, Jesper Kjeldskov, Mikael Skov, Brian Nielsen and Dimitrios Raptis with the Department of Build Environment (AAU) and AAU Energy

DONUT: Distributed ONline monitoring of the Urban waTer cycle
Kim Guldstrand Larsen, Thomas Dyhre Nielsen, Martijn Goorden, Arne Skou, Brian Nielsen, Junior Dongo, Manfred Jaeger, Muhammad Naeem, Per Printz Madsen, Thomas Pedersen and Weizhu Qian with Aarhus Vand, VandCenter Syd, the Department of Civil Engineering (AAU), MONTEM, InforMetics, and Aarhus Municipality

DREAMS: Digitally supported Environmental Assessment for Sustainable Development Goals
Peter Axel Nielsen, Katja Hose, Ashna Mahmood Zada, Johannes Bjerva, Eike Schneiders and Dario Garigliotti with DCEA, The Danish Environmental Portal, DTU Compute, SDU, The Ministry of Environment and Food of Denmark, Danish EPA, BaneDanmark, Cowi, Rambøll, DinGeo, Instituto Superior Tecnico, The Danish Road Directorate, EnergiNet and The Copenhagen Metro

Energy certification of software
Bent Thomsen with Edora, Digiplex Copenhagen 1, Infrateam, RUC and DTU

Energy Certified DevOps
Bent Thomsen and Junior Dongo with RUC, DTU, Edora, Digiplex 1 and KMD

FEVER: Flexible Energy Production, Demand and Storage-based Virtual Power Plants for Electricity Markets and Resilient DSO Operation
Arne Skou, Torben Bach Pedersen, Mikael B. Skov, Rikke Hagensby Jensen and Dimitrios Raptis with B.A.U.M, CERTH/ITI, Es-Geht, Estabanell y Pahisa Energia, Estabanell y Pahisa Mercator, FOSS, FlexShape, HEnEx, INEA, Intracom Telecom, Stadtwerk Haßfurt, SWW Wunsiedel, Universitat de Girona, CitCea, UCLouvain, and University of Patras

Illuminating Microbial Dark Matter through Data Science
Katja Hose, Thomas D. Nielsen and Andre Lamurias with Centre for Microbial Communities (AAU)

Mobility Analytics using Sparse Mobility Data and Open Spatial Data
Christian S. Jensen, Kristian Torp, Kasper Fromm Pedersen and Bin Yang with the Department of Computer Science (AU), The Alexandra Institute and The Maersk Mc-Kinney Moller Institute, SDU

Multimodal Data Processing of Earth Observation Data
Kristian Torp and Christian S. Jensen with The Alexandra Institute and The Maersk Mc-Kinney Moller Institute, SDU, Danish Environmental Protection Agency, GEO and The Danish Geodata Agency

ODA: Open Data for Sustainability Assessment
Katja Hose, Christian Thomsen, Emil Riis Hansen and Matteo Lissandrini with the Department of Planning

optiTruck
Kristian Torp and Kasper Fromm Pedersen with Ertico, Ford Otosan, IAV, Eliadis Transport, Codognotto, CERTH/HIT, ICOOR, ISBM, University of Leeds and OKAN

S4OS: Scalable analysis and Synthesis of Safe, Secure and Optimal Strategies for Cyber-Physical Systems
Kim Guldstrand Larsen, Andreas Holck Høeg-Petersen, Anton Christensen, Asger Horn Brorholt, Martijn Goorden, Nikolaj Jensen Ulrik, Pieter Jan Laurens Cuijpers and Sean Kristian Remond Harbo

Synchronizing energy consumption with energy production
John Stouby Persson, Peter Axel Nielsen, Michael Kvist Svangren and Alisa Ananjeva with the Department of Planning (AAU) and the Department of Architecture Design and Media Technology (AAU)

TECH4CE: TECH Centre for Circular Economy
Bent Thomsen with the Department of Electronic Systems (AAU), the Department of Planning (AAU) and the Department of Architecture, Design and Media Technology (AAU)

Want to know more? Contact research leaders below

Verifiable and Safe AI for autonomous systems
Kim Guldstrand Larsen, Thomas Dyhre NIelsen, Martijn Goorden, Esther Hehyeon Kim, Martin Zimmermann and Christian Schilling, with Aarhus Vand, Seluxit, Grundfos, Hofor and ITU

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