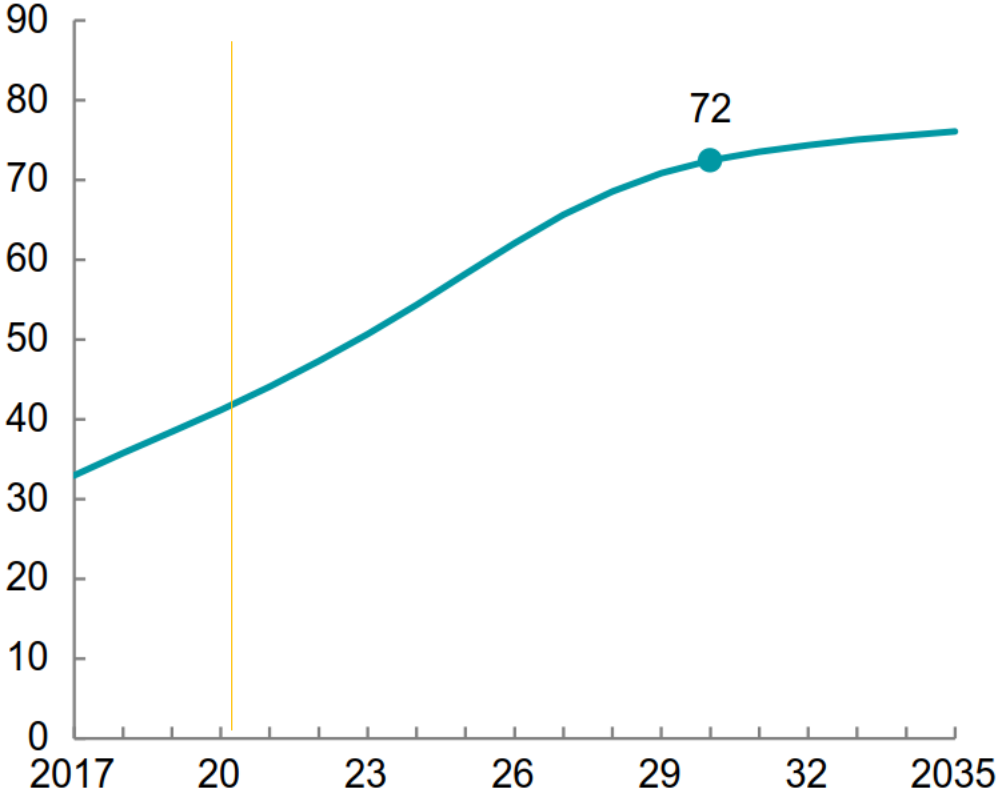


B2BAI project introduction and key learnings

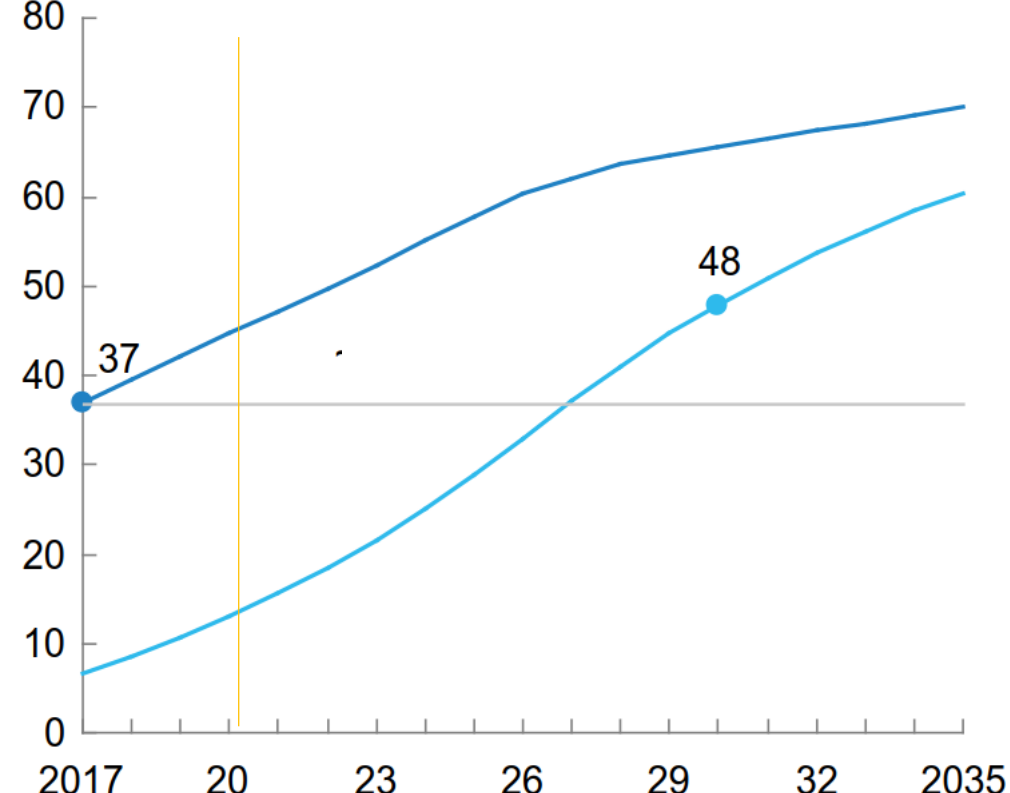
Juho-Petteri Huhtala

STAYING AHEAD OF THE CURVE: CONTEXT IN 2017 VS. NOW VS. 2030

Firms' AI adoption (Share of firms, %)



Firms' AI absorption (Share of firms, %)



(source: McKinsey Global Institute, 2018)

— Digital technologies (big data, cloud mobile, and web technologies)
 — AI technologies

THE BIG PICTURE – ACADEMIC AI CAPABILITIES IN FINLAND

(lähde: Valtioneuvoston kanslia, 2019)

Tutkimusaihe

Algorithms

Computation and computing

Computers

Data analysis and processing

Decision support systems

Feature extraction

Human (biomedical literature)

Image analysis and processing

Knowledge systems

Machine learning

Natural languages

Neural networks

Pattern recognition

Prediction

Semantics and ontology

Signal processing

Speech recognition and processing

Supervised learning, regression, classification

Unsupervised learning and clustering

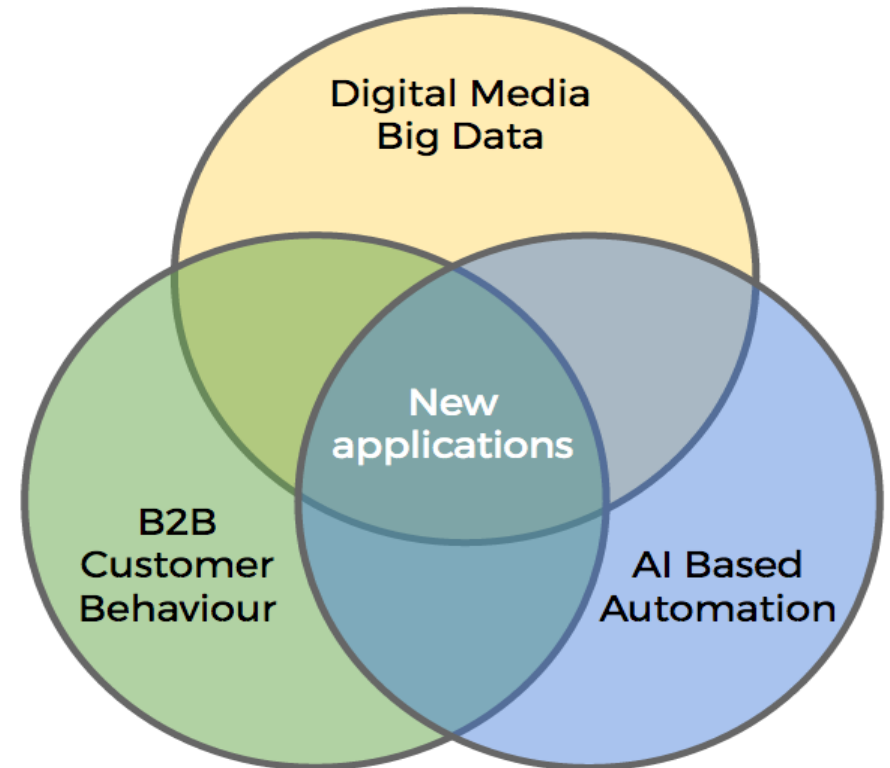
	Aalto yliopisto	AMK:t	Helsingin yliopisto	HIIT	Itä-Suomen yliopisto	Jyväskylän yliopisto	Lappeenrannan tek. yliopisto	Oulun yliopisto	Tampereen tek. yliopisto	Tampereen yliopisto	Turun yliopisto	Vaasan yliopisto	VTT	Yliopistosairaalat	Åbo Akademi
Algorithms	0,26	0,19	0,23	0,34	0,25	0,30	0,21	0,20	0,25	0,19	0,20	0,34	0,18	0,21	0,25
Computation and computing	0,13	0,15	0,12	0,18	0,09	0,16	0,12	0,12	0,13	0,09	0,13	0,07	0,09	0,08	0,17
Computers	0,20	0,16	0,19	0,21	0,19	0,22	0,21	0,27	0,23	0,34	0,28	0,14	0,27	0,23	0,16
Data analysis and processing	0,19	0,22	0,20	0,29	0,21	0,20	0,10	0,15	0,14	0,15	0,18	0,05	0,16	0,16	0,23
Decision support systems	0,09	0,15	0,12	0,06	0,11	0,13	0,21	0,07	0,09	0,14	0,12	0,38	0,24	0,22	0,17
Feature extraction	0,08	0,09	0,06	0,05	0,10	0,12	0,13	0,16	0,15	0,06	0,05	0,02	0,05	0,06	0,01
Human (biomedical literature)	0,08	0,04	0,20	0,07	0,11	0,11	0,03	0,10	0,07	0,33	0,24	0,00	0,10	0,77	0,06
Image analysis and processing	0,11	0,13	0,11	0,09	0,13	0,08	0,16	0,25	0,21	0,10	0,08	0,11	0,07	0,21	0,02
Knowledge systems	0,11	0,23	0,08	0,11	0,08	0,09	0,15	0,09	0,10	0,12	0,06	0,23	0,15	0,01	0,17
Machine learning	0,09	0,15	0,09	0,14	0,06	0,07	0,03	0,05	0,05	0,12	0,10	0,02	0,07	0,12	0,04
Natural languages	0,07	0,06	0,08	0,03	0,06	0,03	0,02	0,03	0,03	0,10	0,13	0,04	0,01	0,02	0,09
Neural networks	0,27	0,17	0,14	0,07	0,15	0,15	0,18	0,18	0,28	0,17	0,14	0,09	0,15	0,24	0,28
Pattern recognition	0,10	0,04	0,19	0,06	0,19	0,12	0,14	0,27	0,17	0,19	0,21	0,09	0,11	0,36	0,08
Prediction	0,07	0,07	0,08	0,10	0,06	0,02	0,01	0,05	0,04	0,06	0,08	0,04	0,06	0,14	0,10
Semantics and ontology	0,06	0,04	0,05	0,05	0,04	0,06	0,04	0,04	0,06	0,03	0,07	0,05	0,08	0,02	0,10
Signal processing	0,11	0,03	0,06	0,04	0,11	0,09	0,06	0,13	0,23	0,08	0,06	0,05	0,07	0,16	0,02
Speech recognition and processing	0,13	0,02	0,08	0,03	0,25	0,04	0,00	0,08	0,10	0,12	0,05	0,02	0,02	0,04	0,03
Supervised learning, regression, classification	0,15	0,20	0,14	0,12	0,14	0,15	0,13	0,19	0,23	0,15	0,12	0,07	0,12	0,20	0,10
Unsupervised learning and clustering	0,07	0,06	0,06	0,07	0,11	0,10	0,04	0,04	0,05	0,02	0,05	0,04	0,06	0,03	0,09

RESEARCH OBJECTIVES AND REQUIREMENTS

Primary objective

- The primary objective of the B2BAI research project is to identify the impact of content marketing to B2B decision maker behaviour on different stages of buyer journey and to learn to predict this behaviour (purchase intent) using algorithms and data.

Capability requirements



CORE CAPABILITIES (Aalto University)

B2B Customer Behaviour



Prof. Henrikki Tikkanen



Post-doc J-P Huhtala

Strategic marketing group at the Department of Marketing at Aalto University.

Expertise areas: strategic marketing, B2B marketing, marketing x AI interface, CX journeys.

Digital Media Big Data



Prof. Pekka Malo



Post-doc Bikesh Upreti

Data mining group at the Department of Information and Service Economy at Aalto University.

Expertise areas: machine learning, evolutionary multi-objective optimization, text mining, semantic analysis.

AI Based Automation



Prof. Samuel Kaski



Post-doc Neda Marvasti

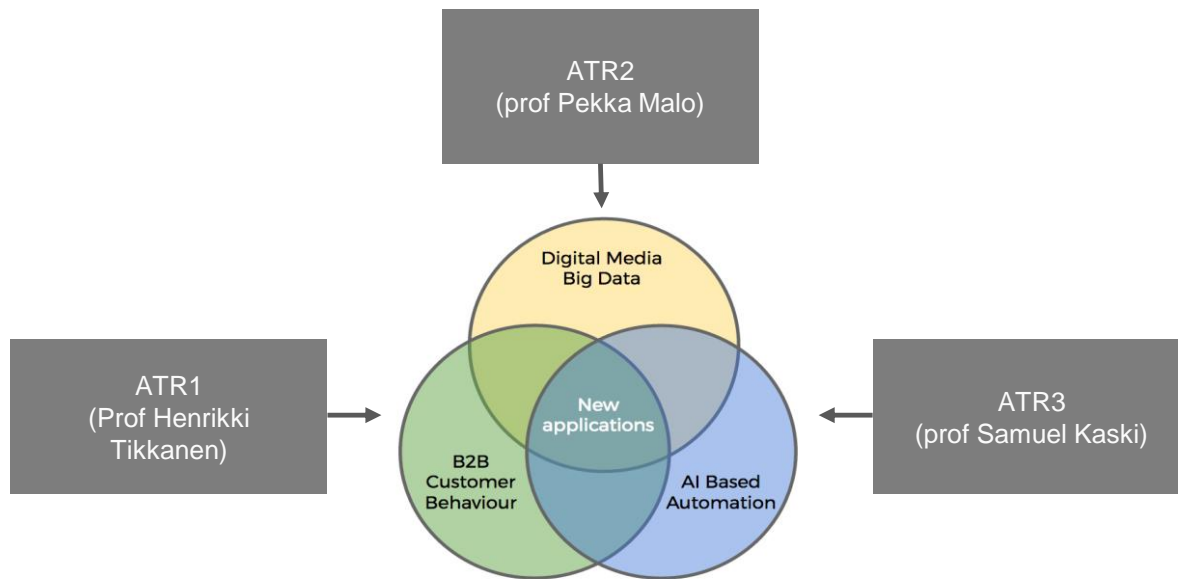
The Probabilistic Machine Learning group at the Department of Computer Science at Aalto University.

Expertise areas: statistical machine learning, probabilistic modelling and bayesian inference.

We together design systems which can model B2B customers' journey by utilizing the state-of-the-art machine learning techniques including the Agent-Based Modeling (ABM) and Approximate Bayesian Computation (ABC) algorithms.

CORE CAPABILITIES (Research consortium)

University researchers



Partner firms



- **Who?** Three research groups + four firms (firms are not straight competitors, B2B journey covered).
- **Collaboration in practice?** Monthly/weekly f2f meetings depending on the project status (+ skype groups, weekly tasks etc.)
- **How long?** 2.5 years.
- **What data?** Partner firms provided objective data sets from 180 million data points to ~5000 datapoints.

WHAT KIND OF METHODS WE USED IN B2BAI? (I/II)

What we aim to design and build in B2BAI?

Artificial Intelligence (AI)

The designing and building of **intelligent** agents that receive percepts from B2B environment and take actions that affect B2B environment.

What methods we actually apply to study AI ?

Machine Learning (M-L)

Application of artificial intelligence that provides the AI with the ability to automatically learn from the environment and applies that learning to make better decisions.

- Weak AI (Thinking rationally, acting rationally)
- Mechanistic and analytical tasks in complex buying decision processes
- Data provided by the partner companies is used in both conceptual and empirical work.

WHAT KIND OF METHODS WE USED IN B2BAI? (II/II)

What methods we actually apply to study AI ?

Machine Learning (M-L)
Application of artificial intelligence that provides the AI with the ability to automatically learn from the environment and applies that learning to make better decisions.

**SUPERVIZED
LEARNING**

Learning algorithm from the training dataset.

**UNSUPERVIZED
LEARNING**

Learning is based on finding structures and dependencies in the data.

**REINFORCEMENT
LEARNING**

Learning is based on feedback, either positive or negative.

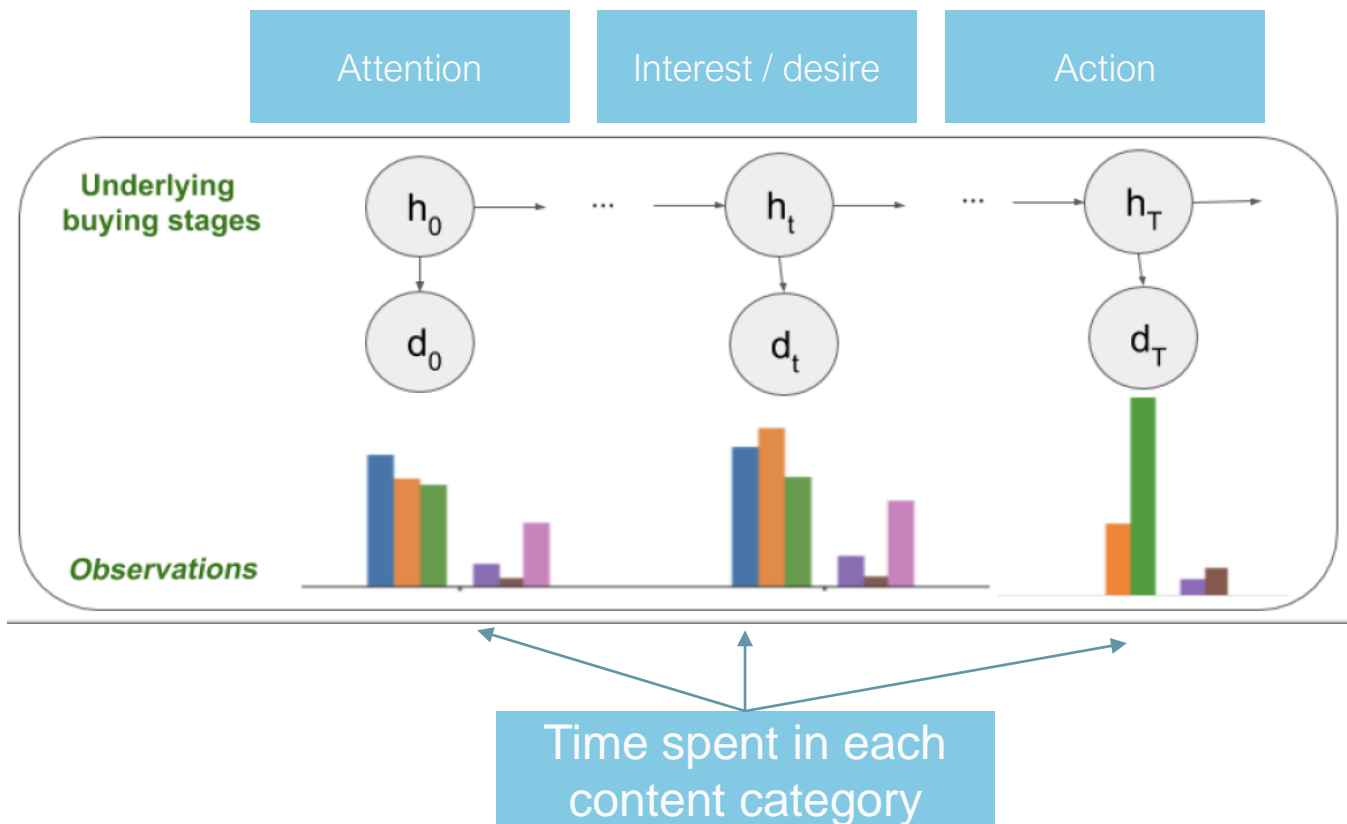
B2BAI Sub-projects:

**Agent-based
B2B buying
journey
modeling**

**Content models
for behavioral
segmentation**

**Algorithm based
email marketing in
B2B context**

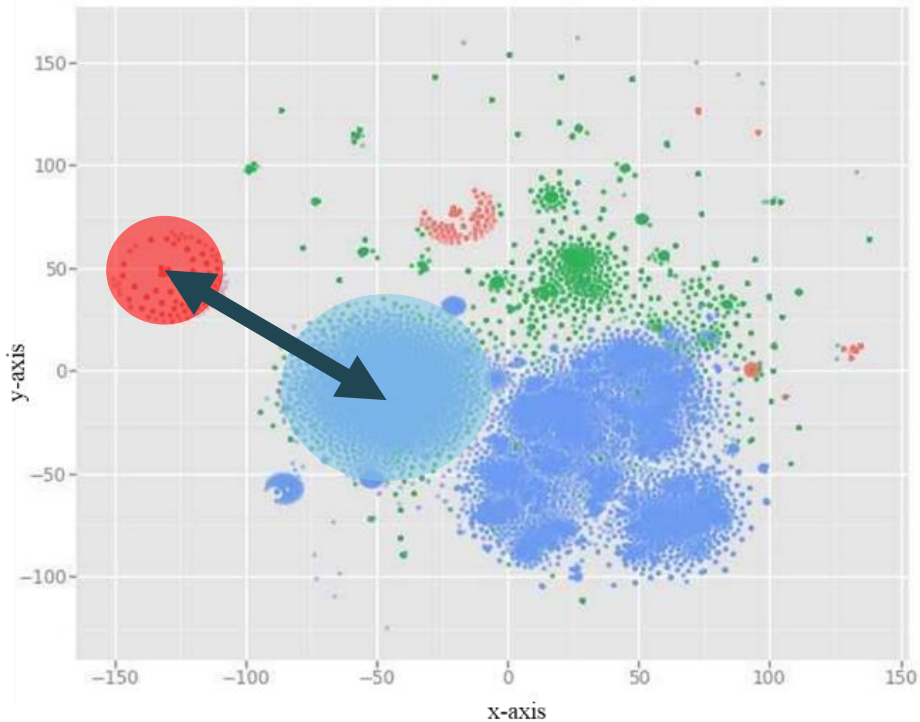
AGENT-BASED B2B BUYING JOURNEY MODELING



- The algorithm developed to model the buyer journey is solving a multi-class (stage) prediction problem
- This predictive model can be used to estimate the buying stage (early, mid, late or no funnel) by only observing company-level browsing behavior.

THE LIKELIHOOD OF WHERE A POTENTIAL CUSTOMER IS IN THE BUYING JOURNEY (NO FUNNEL, EARLY, MID, LATE)

CONTENT MODEL FOR BROWSING DATA ANALYSIS THAT CAN BE USED FOR BEHAVIORAL SEGMENTATION IN B2B CONTEXT.



- Buyer profile 1 patches of interest
- Buyer profile 2 patches of interest
- Seller profile patches of content

- Based on state-of-art neural text embedding model
- Models semantic representation of text and allows for mathematical operations.
- Integrated visualization of content space and buyer seller distances.
- 116 million browsing histories
- 11.44 million cookies from 34.170 potential buyer companies
- 1.2 million unique web contents from 74 seller companies

SEGMENTING INTERESTS OF
POTENTIAL B2B BUYERS
BASED ON THEIR BEHAVIOUR

SEGMENTING THE CONTENT
SELLER COMPANY PROVIDES



”MATCH”

KEY LEARNINGS

- Interdisciplinary approach is often required. In our case, project required theoretical and practical understanding of 1) B2B marketing 2) semantic analysis and statistics 3) machine learning methods. Cutting-edge research is a learning process (in this case for both AI and human).
- Reserve enough time for conceptual development and data processing (50-60% of joint activities with the university partner).
- Validation, validation, validation..

CONTACT INFORMATION



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+358505768382