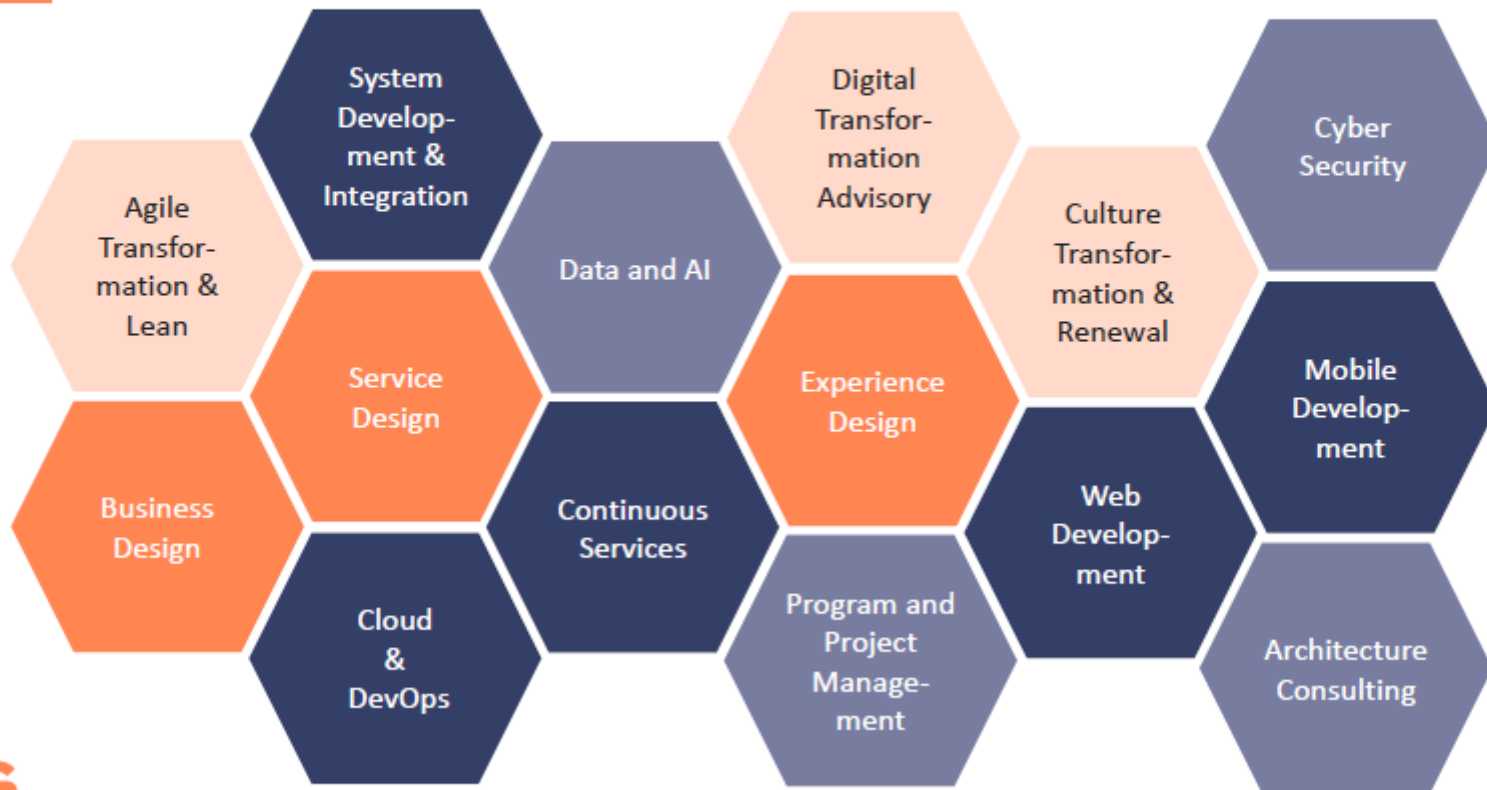


ENERGY OPTIMIZATION (GOFORE)

Gofore – energy savings based on algorithms & AI

Our core capabilities



GOFORE

Gofore – energy savings based on algorithms & AI

<https://www.yardmate.fi/en/members/member/?member=Gofore>

- Shipping equipment algorithms and analytics (machine performance etc.)
- AI solutions, e.g. for customer service (chat bots etc.)
- Gofore company (2020): turn over 78 M€, personnel 750

Sustainability: some references

- **Virta**
 - Solutions for [charging electric vehicles](#)
- **Air-d**
 - [Intelligent solutions that save energy](#) in air conditioning
- **Public employment and business services: Työmarkkinatori**
 - Platform that uses AI to [match jobseekers with employers](#)
- **SocFinder**
 - Search engine helping social workers to [match a child welfare customer with the best suitable foster family](#)
- **Multiple large projects that develop solutions for early childhood education, pre-schools and schools for cities in Helsinki Metropolitan area (Helsinki, Espoo, Vantaa)**
 - Building [new solutions](#) that support [children](#), [families](#) and [people who work with them](#)



Industrial design: some references

- **CCI A3 joystick for CCISOBUS**
 - <https://www.cc-isobus.com/cci-a3-2/>
 - <https://www.machineoftheyear.de/en/contestants/cci-a3-joystick-2/>
 - Gofore: [Physical](#) design & User [interface](#) design
- **Car industry**
 - [Several customers](#)
 - Mango Design (fully owned by Gofore): User [experience](#) design and [development](#), [embedded software](#) design
 - <http://mango-design.de/en/projects/>



AI & Data applications

Discussion



Fuel consumption & sustainability

- **Data about engine & fuel consumption data combined e.g. with**
 - Weather and air/sea conditions
 - Tides, currents, waves, wind, temperature, humidity, etc.
 - Speed, drifting, trimming, tilt, rocking, etc.
 - Engine, propellers, thrusters, gearing
 - Electricity production & usage
 - Heating, ventilation, air conditioning
 - Route, schedule, ports, program onboard
 - People & cargo onboard
- **Target is to gain information about things affecting fuel consumption to make operation of boat and energy usage more effective and sustainable**



Heating, ventilation, air conditioning – HVAC

- **Data about e.g. following**
 - Outside weather & conditions
 - Air quality in room/space
 - Temperature, humidity, CO2, etc.
 - People amounts, movements, activities
 - Heating, cooling, air flow
 - Pumps, pipes, valves, filters, compressors, machinery, etc.
 - Thermal models of different spaces, structures, materials, etc.
- **Data combined with each other and analyzed to gain understanding of how different things affect on each other**
- **Target is to optimize customer well being and energy consumption**



Customer buying behaviour

- **Customer profile information combined with eg.**
 - Transaction data before and during the cruise (shops, restaurants, events, entertainment, etc.)
 - Information about services on board
 - Weather & conditions
 - Targeted real time marketing on board (and before the trip)
 - How people move around, cruise program, activities
 - Cruise schedule, destinations, program
 - Services on board, needed capabilities, opening hours
 - Personnel capabilities, personnel profile
- **Results as better understanding of where profitable business on the ship comes from and how resources, service offering, service personnel, etc. could be optimized in various conditions**



Guiding customers based on their profile

- Intelligent customer service chat bots
 - Targeted marketing & recommendations (e.g. what to do)
 - Program and services on board – schedules, locations, etc.
 - Augmented reality - services, activities, entertainment, marketing, etc.
 - Etc.
-
- All this can be launched by AI solutions e.g in customers mobile device or suite TV screen



Personnel & services optimization

- Customer profiles
 - How customers move around, cruise program, activities
 - Cruise schedule, destinations, program
 - Weather & conditions
 - Services on board, needed capabilities, opening hours
 - Personnel capabilities, personnel profile
-
- Target is to ensure you have right people in right places at right time



Analytics implementation in general

- **Problem to solve**
- **Data collection**
 - Frequency (n times sec/min/h/d), metadata (sensor ID, time, etc.)
 - Places: outside conditions, rooms and spaces, HVAC-system parts & settings, etc.
- **Data storage & processing**
 - Big data, data stream processing, data storages
- **Algorithm modeling**
 - Thermal model converted to analytical algorithm
 - Scope, meaningful and available data, possibilities to affect and respond
- **Model training**
 - Compare model's results to real world measurements
- **Testing and tuning the model**
 - Iterate previous (two) tasks
- **Use model in production**
 - Learn more from data - fine tune the algorithms



Data & AI capability

Data platform, Internet of things, Modern analytics, Artificial intelligence, Machine learning, etc.



Future business & operations

- **Data-driven**
- **Digital and Automated**
- **Sustainable and Environment friendly**
- **Efficient and Cost effective**
- **Human centric & Value driven**

- **As a decision maker you need to know right facts to succeed**
 - You don't need to know everything when you can rely on solutions and processes handling data in your environment

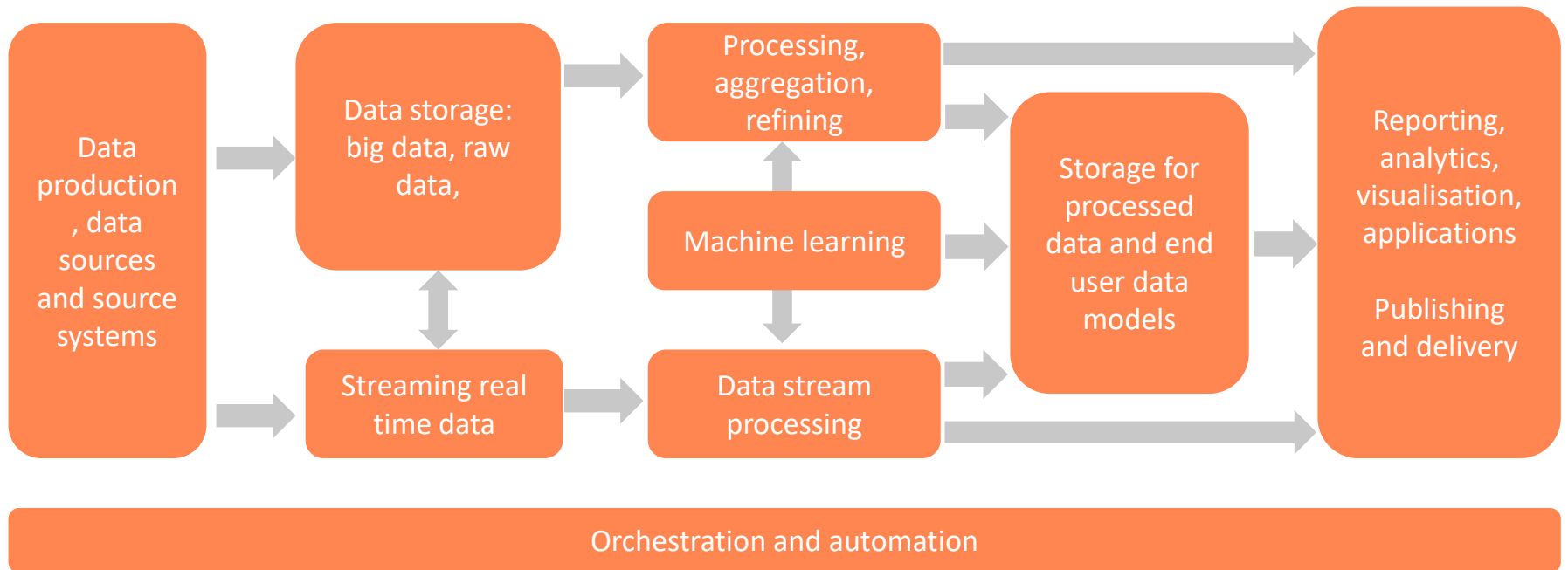


Data platforms

- **Data will be crucial part of infrastructure in any operational or service solution – It will enable completely new business models**
- **Data platform is needed to ensure continuity and development of data driven operations and services**
- **Data platform is collection of technologies and solutions for collecting, refining, cleaning, analyzing, engineering, governing, storing and utilizing diverse data in diverse formats from numerous internal and external sources**



Modern data platform



Modern analytics

- Describing analytics – what has happened
 - Diagnosing analytics – why did it happen
 - Predictive analytics – what will happen
 - Steering analytics – what should happen
-
- Real time, automation, alerts, visuals, statistics, etc.
 - Information delivery – finding the right information
 - Embed into everyday tools and routines



Artificial intelligence

- **Different technologies and approaches**
 - Machine learning, speech and image recognition, text analytics and natural language processing, robotic process automation, autonomous systems, etc.
 - Based on data
- **Problem to solve & data available**
- **Approach to use – modeling the algorithm**
- **Solution development and implementation**
- **Evaluate results – iterate and improve the algorithms and solutions**



New sources of data

- **RFID, NFC, Beacons, electronic keys**
- **Mobile devices, access control, surveillance cameras and sensors**
- **Engine room equipment sensors – engines, power supply, etc.**
- **Ventilation equipment, waste management, electrical equipment**
- **Sensors for measuring different conditions & phenomena**
 - Heat, pressure, vibration, sound, tilt, acceleration, humidity, noise, levels, etc.
- **Video, audio, pictures**

- **Continuously incoming data, huge amount of transactions, automation, pre processing – Modern data and integration platform required**



Gofore as data partner

Change management and leadership in data ecosystems

Coaching & building **competencies**

Building **partnerships**, workshops, facilitation

System and solution deliveries, **IoT, Data platforms, AI, ML**

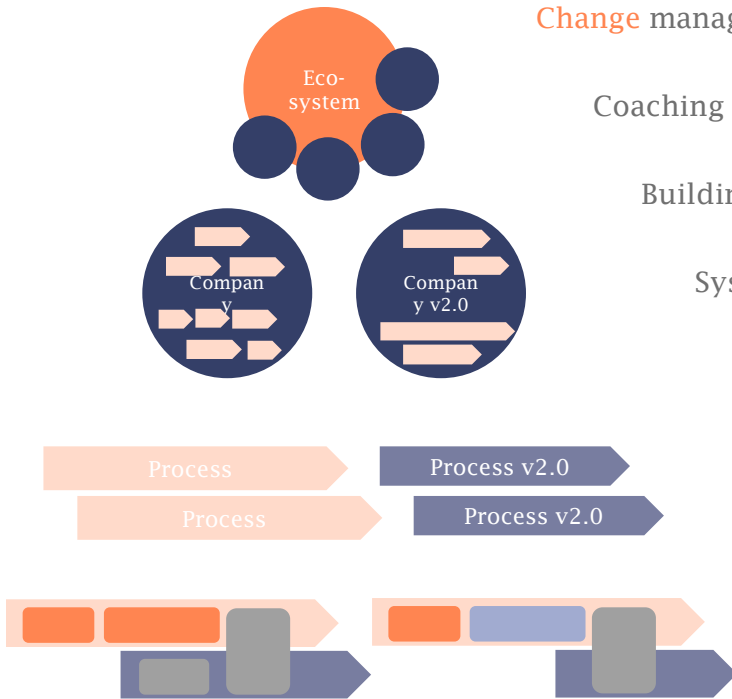
Data & process **analysis**, data & systems **architecture** development

User experience research and **optimization**

Data engineering, **modeling**, sampling, **PoC**

Tool, product or algorithm evaluation & **implementation**

RPA, chatbots, **algorithm** development, PoC's, etc.



First step

Learn the possibilities of AI and data driven operations



$$y_i = b_0 + b_1x_{i1} + b_2x_{i2} + \dots + b_nx_{in} + e_i$$

Advanced Analytics - Start Package

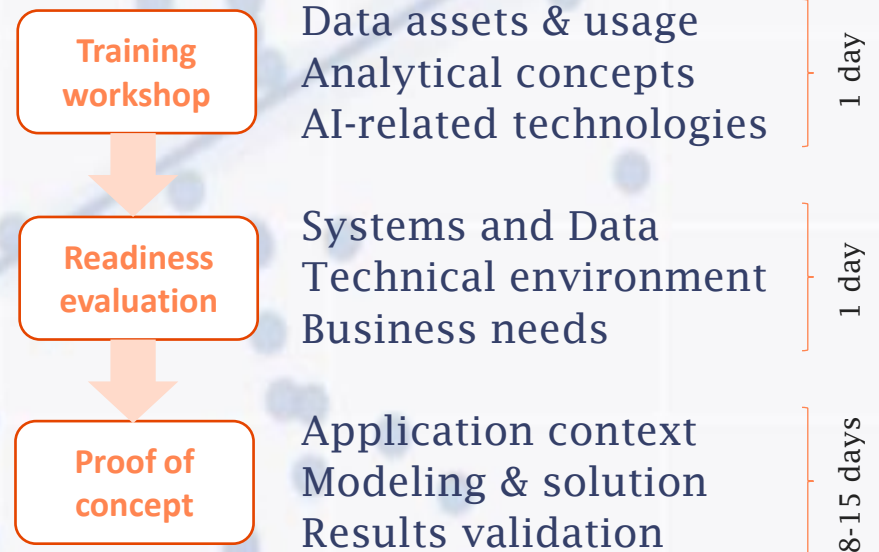
To organizations who want to:

- Use AI to be more effective and sustainable
- Understand data assets and analytical capabilities
- Develop business understanding and profitability with modern tools

What do you get?

- Understanding of AI possibilities
- Knowledge of analytical readiness
- Sample solution with real data

Package components:



$$MSE = \frac{1}{n} \sum_{i=1}^n (y_i - \hat{y}_i)^2$$

Gofore Oyj / kari.karru@gofore.com

KIITOS!

PREMIUMndFit Consulting Oy



Kari Härkönen

I'm hiring! Personnel Analyst and
Headhunter at MindFit Consulting
Oy, co-founder of YardMate Ltd

kari.harkonen@yardmate.fi

www.yardmate.fi

www.mindfitconsulting.com

P. +358 400 752 542

www.yardmate.fi