futurice

AI and statistics in digital business

Matias Heikkilä

Aalto University

13.05.2018

Futurice
Digital Engineering and Innovation

Nordic Roots, Global Mindset

People
550+

Nationalities
38

Offices
7

YoY Growth
30%

Family of Companies

Columbia Road
eCommerce & Growth Hacking

aito powered by futurice
Artificial Intelligence & Machine Learning

Talea SOLUTIONS
Media Advertising, Joint Venture with Kärkimedia

Solar2Go
futurice ⚡fortum
Solar power for Developing markets

Tampere

Helsinki

Oslo

Stockholm

London

Berlin

Munich

Our clients_

zalando

Allianz

Nordea

e·on
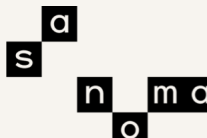
sky

vodafone

NOKIA

HELEN

DEEZER

VW

NESPRESSO

BMW

caruna

RTL

Fortum
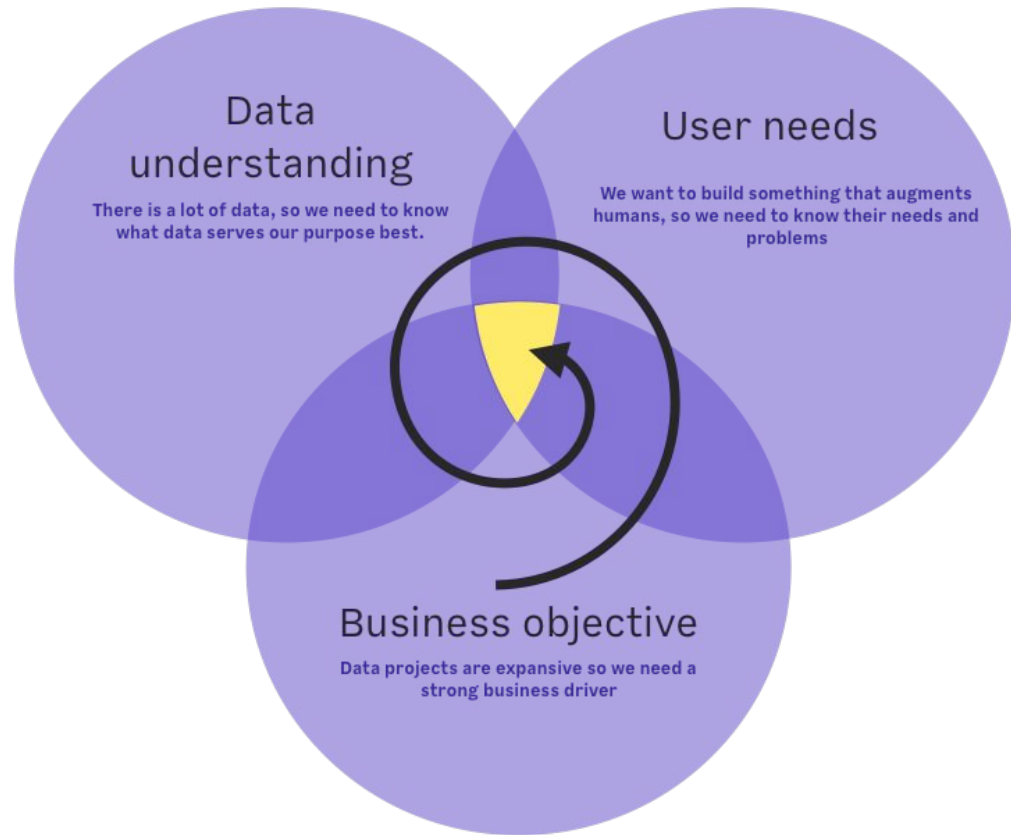
ELENIA

sanoma

SAMSUNG

Wall

here

germanwings

axel springer

Our approach: Lean Service Creation

Can data help us solve the problem?

**Discovery:
Understanding
how & why**

General problem definition

Service idea

**Concept:
Discover
& validate**

Solid concept Vision

Diverge — **Converge** — **Diverge** — **Converge**

Gathering insights & data is the key in understanding the user, the business and the restrictions.

Activities:
• Kick-off workshop
• Business stakeholder and legal interviews
• End-User interviews
• Quantitative user insights from system analytics

Results:
• Business understanding and objective
• Client insights

Processing the findings to create an initial draft of the solution.

Activities:
• Review of architecture and system landscape
• IT stakeholder interviews
• Data exploration and analysis
• Ideation workshop: Summarise and prioritise findings and ideate on solutions
• Creation of possible solutions matching business, customer and data insights

Results:
• One or multiple possible solutions e.g. click dummy, high-level concept

Validating the service idea and explore the technical restrictions.

Activities:
• Validation workshop
• Qualitative user tests with business stakeholders and end-customers
• Validate data integration (API vs. files)
• Evaluate data pipelining (streaming vs. batch)
• Evaluate data processing and clean-up
• Evaluate the target environment (On-premise vs. Cloud)

Result:
• Validated service vision
• Risk assessment

Focusing exercises helps you define where to start. This is done by revising, prioritising and planning.

Activities:
• Proof of concept with dummy data to explore and validate the approach
• Concept iteration
• Defining the MVP scope
• Agreeing on success metrics e.g. accuracy

Result:
• Defined MVP scope

Open Source Tools for
Change Agents
- the what, the how and the why

Lean Service Creation
Futurice

AI in principle

Defining some terms_

Artificial intelligence (AI): computer systems that show human-like intelligence in some task(s)

Machine learning (ML): toolbox of algorithms and techniques that learn rules from data. Used to implement "AI" in single, well-defined tasks

Deep learning: one of the most popular tools from the machine learning toolbox. Particularly effective when the dataset is very large

Artificial Intelligence

Machine Learning

Deep learning

futurice
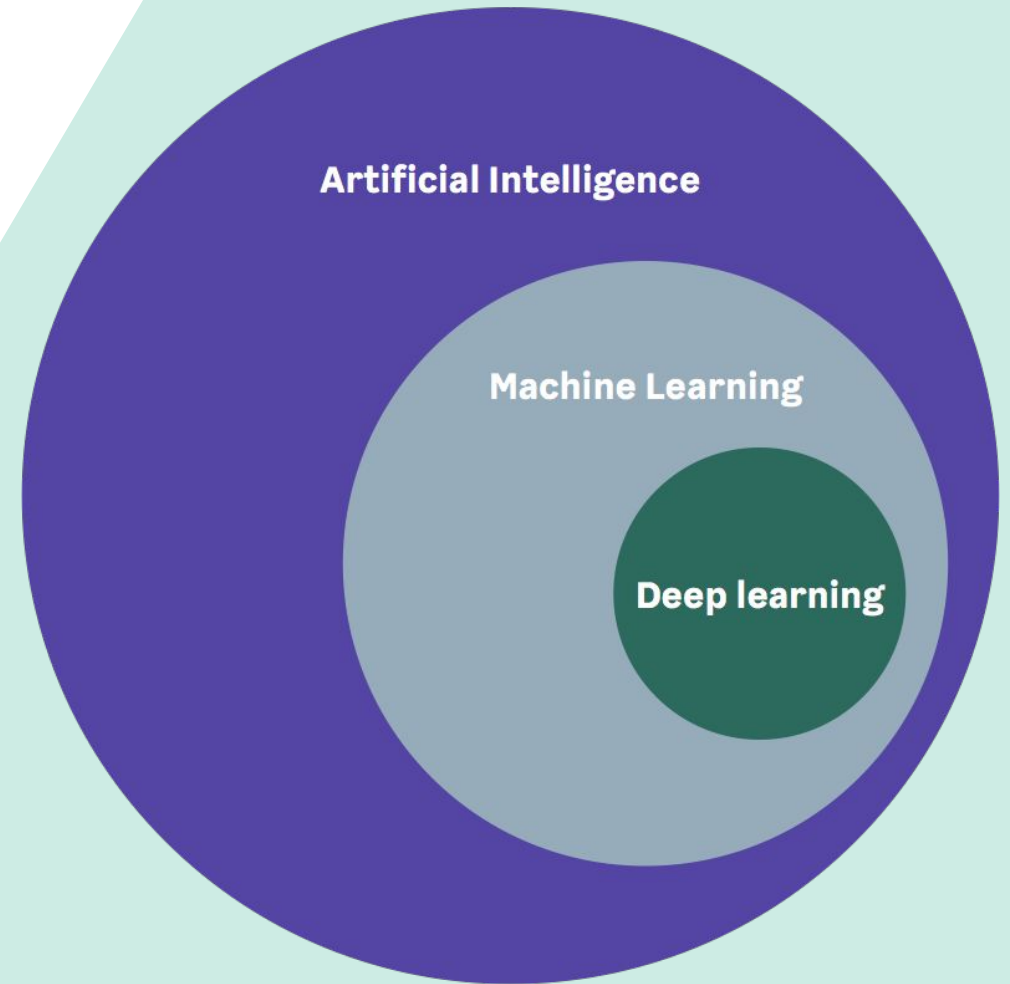
For example_

Baby's first self driving car

Narrow question: given the road looks like this, how should I turn the steering wheel to not crash?

Input: camera image of the road
Output: steering wheel angle

(CMU did this in 1995 - the car drove 3000 miles across the US)

What kind of things machine learning can do?_

Predict
- Recognize a face
- Dynamic price
- Need for maintenance

Recommend
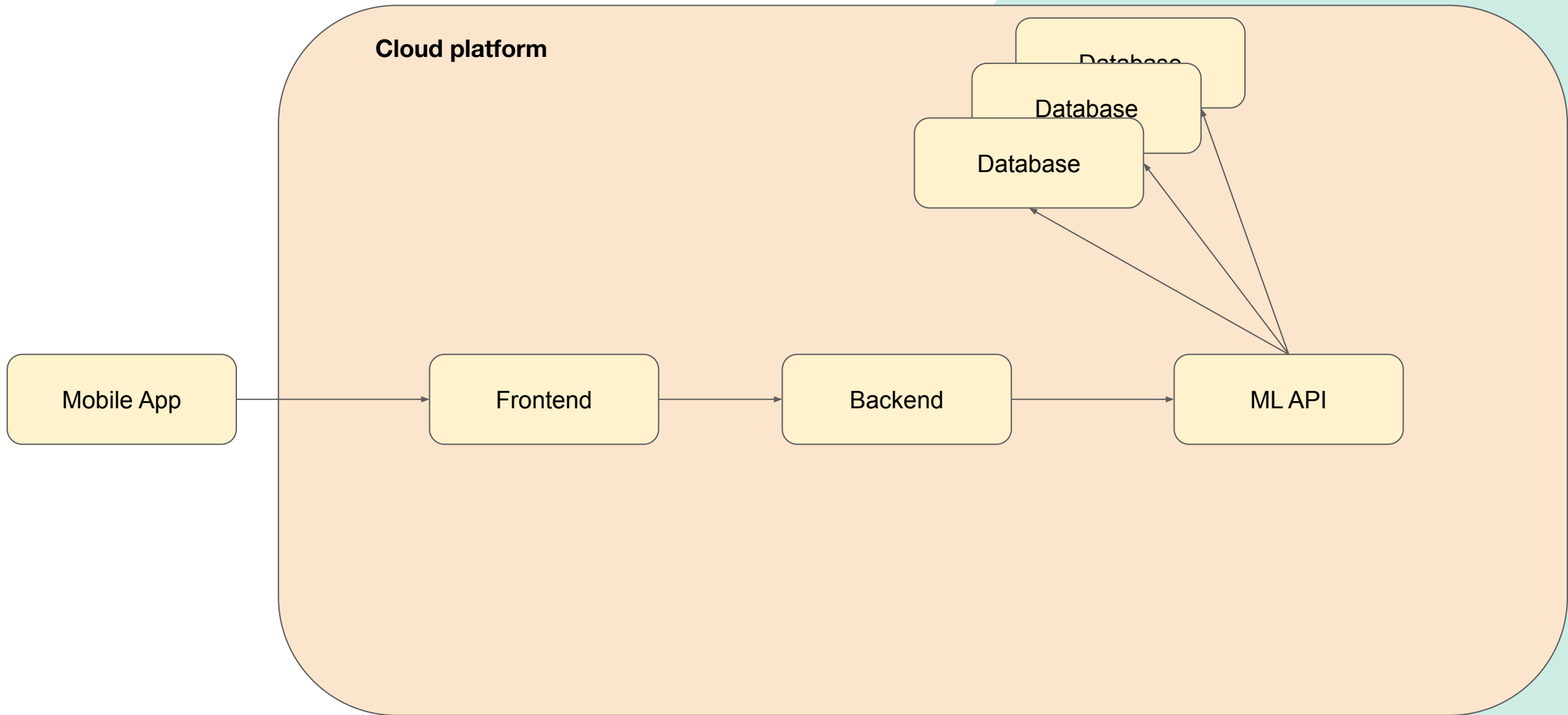- Movies
- Songs
- Books
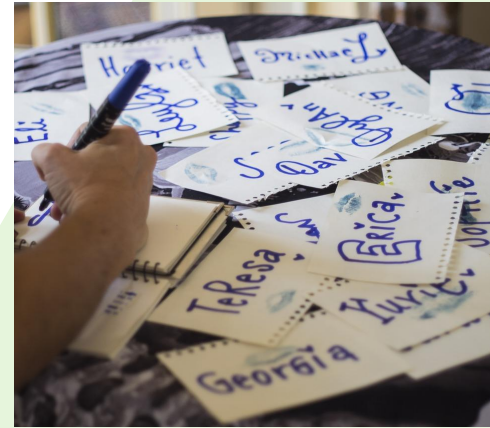
Personalize
- News
- Targeted email campaign
- Course content

Uncover patterns
- Topics in text documents
- Cluster similar customers
- Discover anomalies

AI in practice

Cloud platform

Mobile App → Frontend → Backend → ML API

Database
Database
Database

futurice

Results are not made in isolation

BUSINESS

Business modelling

Proposition development

Digital visioning

Current state analysis

Portfolio analysis

Organizational design

Culture change

DESIGN

User insights

Business design

Service design

User interface design

Prototyping

Brand development

TECH

Technical advisory

Front end development

Back end development

Mobile development

QA

DevOps

Lifecycle Management

DATA

Predictive analytics

Data science

Web/mobile analytics

A few rules of thumb_

1. Preprocessing is 90% of the total work.

2. Data is more important than methodology in gaining competitive advantage.

3. When making a PoC, try the existing tools before making your own.

4. It's easier to develop technology than to optimize business KPIs.

5. The last 10% of the development takes 90% of the time.

futurice

LEAN SERVICE CREATION PROCESS

NEW IDEAS

BUSINESS IDEA

SERVICE VISION SPRINT

TEAM :
Business / Technology
Design / End-Users

SERVICE VISION

MVP TO LAUNCH

Improve

Improve

Improve

FIND A PROBLEM WORTH SOLVING

Days to Weeks

FINDING PRODUCT MARKET FIT

Weeks to Months

SCALING & TWEAKING

Months to Years
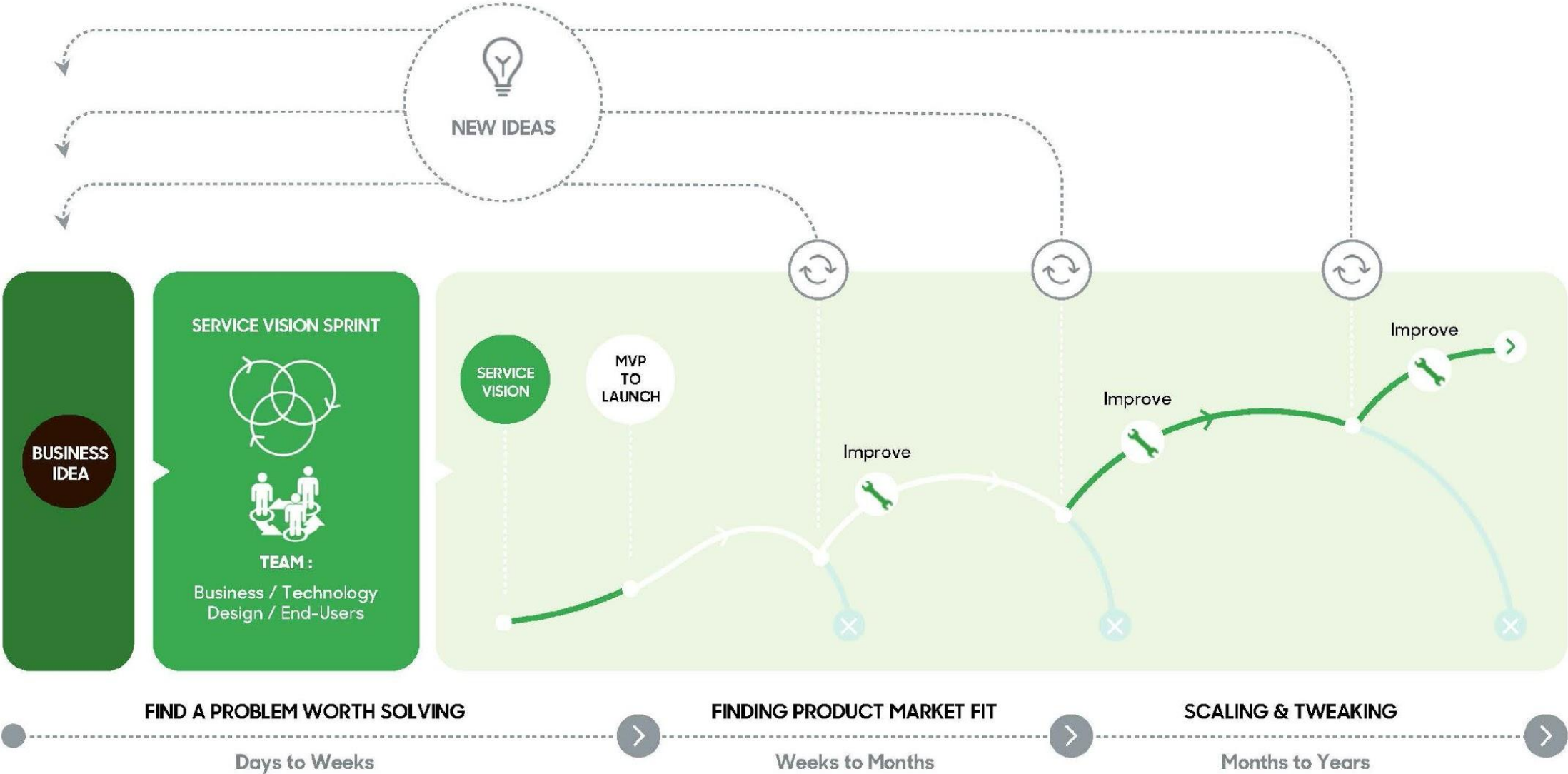
What's a data scientist (roughly)?_

1. A data scientist (often) is a statistician with (backend) developer skills. The ratio may vary.

2. A data scientist will spend 80% of their time developing and 20% of their time building models.

3. A junior data scientist will spend a lot of time developing **communication**, learning business development and learning sales.

futurice

Some cases

Jelpp

Barona Jelpp
Recruiting AI

- Easier, faster and more accurate recruiting than ever before
- Find the right person out of quarter million profiles in 100 ms, based on half million profile features
- Top results are thousands of times more suitable
- Cuts down on expenses. And risks.

barona
Henkilöstöpalvelu

Haku   Toimeksiannot   Profiilit

94   ██████████████████████s, Kirjanpitäjiä/avustaviakirjanpitäjiä | Soila P. 8.2.2016
Aloitus ti 9.2.2016. Ehdokkaita 4 / 1. Uusia hakijoita 27.

Perustiedot   Haku   Ilmoitukset ja hakijat   Ehdokkaat

Lisää hakuehto

Vapaana heti (225289)   Vapautumassa (4331)   Järjestä tekoälyn mukaan (beta) ☑

04410 JÄRVENPÄÄ — Kirjanpitäjä, Maksuliikenteenhoitaja, Myyntireskontra, Ostoreskontra, Perintä, Taloushallinto   63
Ehdokkaana toimeksiannossa: to 4.2.201
████ kertoo hakevansa aktiivisesti töitä. Työ
Varattu. | Tuija T. 22.12.2015
Tilanne nyt: Kirsti on tehnyt projektitöitä talou

00520 Helsinki — Ostoreskontranhoitaja   234
Työllistynyt muualle eikä seuraavaan vuotee
████ Accountant -tehtävään. /MR█████
kiinnostava. Monipuolinen taloushallinnon
TYÖLLISTYNYT muualle eikä seuraavaan v
Päivityshaastattelu: 26.3.2015 / tute. Talous

33870 Tampere — Kirjanpitäjä, Reskontranhoitaja, SAP, Taloushallinto   72
Jättänyt hakemuksen 13.2.2016
Kävi haastattelussa K-talouspalvelukeskuks
kuitenkaan löytänyt oman alan töitä joten pä
Suoritti taloushallinnon ammattitutkinnon 20
Taloushallintoa yrittäjänä jonkin aikaa tehny
Tilanne: ottanut vastaan määräaikainen äitiy

12400 Tervakoski — Kirjanpito, Kirjanpitäjä, Myynti- ja ostoreskontra, Myyntilaskuttaja   332
████ hakee aktiivisesti töitä taloushallinnosta
pahoillaan kun ████ irtisanoutui. █████ on mu
monipuolisesti taloushallinnon tehtävistä.
Työllistynyt meidän kautta rekrynä ██████
esittely Vallila Interiorille myyntilaskuttajaksi

Reinventing the Job Market with AI

Barona's business is finding jobs for people and finding people for jobs

The Barona Jelpp recruitment AI provides instant access to the top applicants and available professionals on the job market.

The AI utilises 500,000 attributes gathered from a quarter million résumés, desires, competences and countless other details, which are combined with the applicant's level of involvement in seeking a job to find the best matches.

Jelpp positions Barona as a world leader in providing effective and flexible employment solutions.

1. The top 10 recommendations are, on average, 2500 better than the average candidate. Top 10 candidates were approximately 12,500 better than bottom 80,000.

Lift in recruitment probability

2. Recruitment AI was integrated in both candidate search view and applicant list view. In this way, it provided instant access to both top applicants, and the top professionals of the job market.
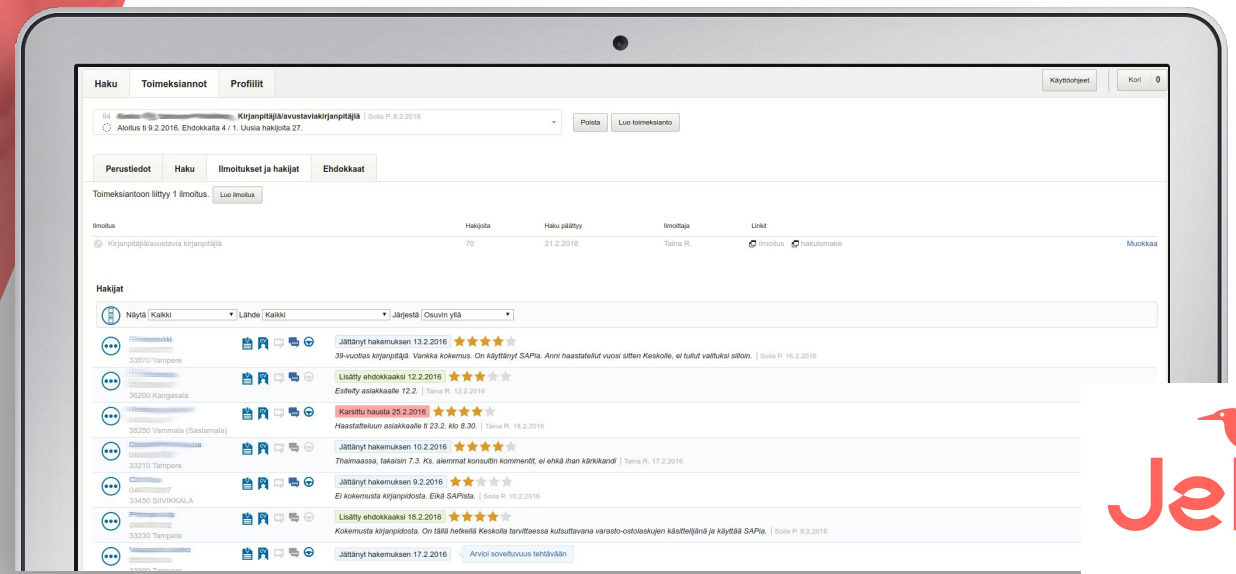
HELSINKI AIRPORT

FINAVIA — for smooth travelling

Facial Recognition

What we did

Finnair and Finavia, together with Futurice, tested the use of face recognition technology for the check-in process at Helsinki Airport. It was one of only three field test done until now world wide. The goal: Find out if the technology is reliable enough and can be humanised enough to create real customer benefit.

When checking in to their flights, customers used a designated check-in desk, where the face recognition technology was installed.

The system used in the test was built using widely available hardware and software as well as cloud-based services, and with a strong view to the customer experience.

Why it matters

Experimenting with newest technology is our daily business. To create real value, we always combine the tech and the human perspective. Pushing the boundaries of what is possible.

We have many talents and a lot of knowhow, but having an up-to-date understanding of who knows what is difficult. **How can I find the person, who knows most about a given topic?**
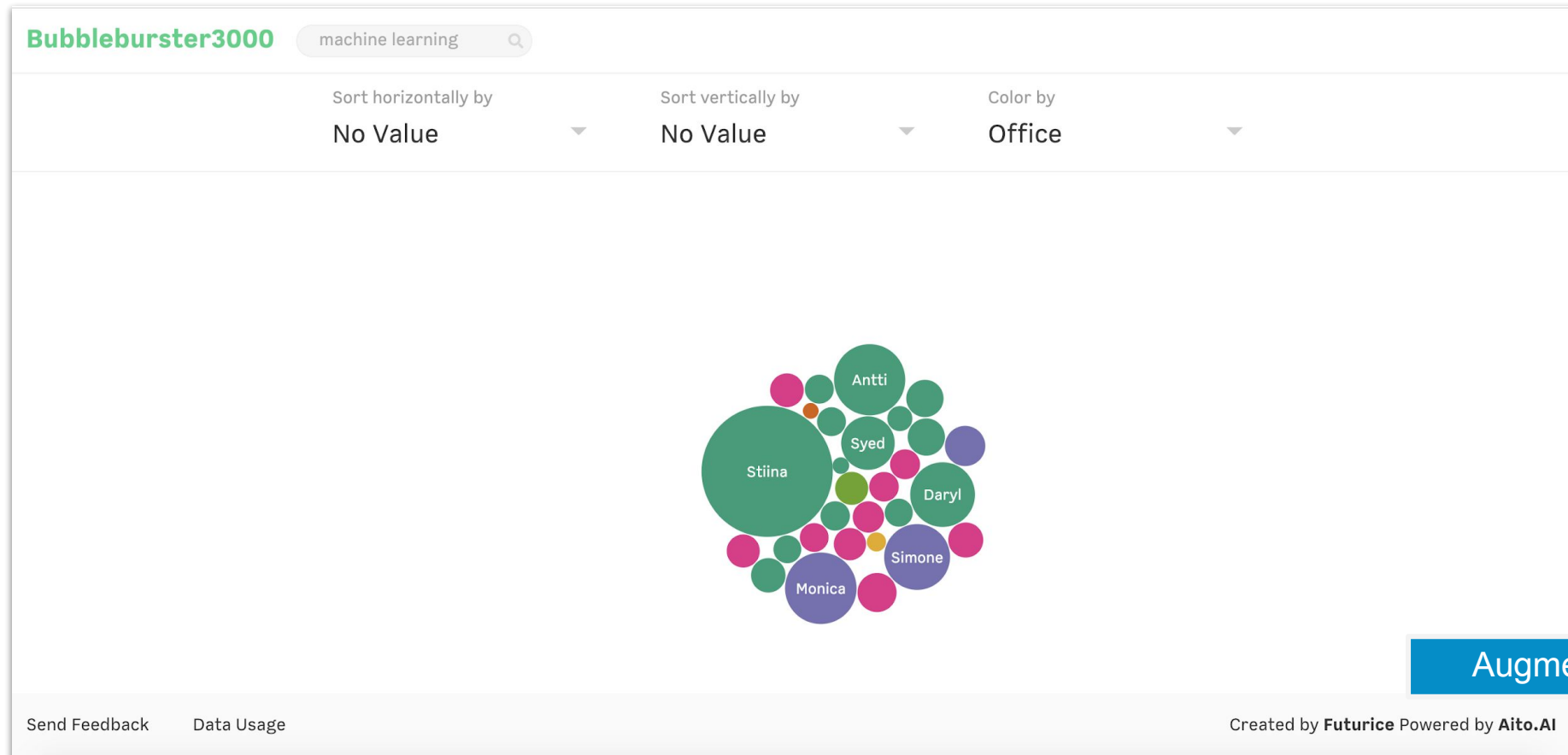
When you find the talent you are looking for, they are often overworked.
Can we find someone else almost like "her"?

```
{
    "$lift": 1.222626843574907E26,
    "name": "Anni Harju",
    "user_id": 213355,
    "competence": "Strategic
initiatives",
    "title": "Business Designer /
Strategist"
},
```

```
{
    "$lift": 3.7197520028961274E12,
    "name": "Mikko Viikari",
    "user_id": 216289,
    "competence": "Strategic initiatives",
    "title": "Senior Consultant"
},
{
    "$lift": 3.7197520028961274E12,
    "name": "Olli Ohls",
    "user_id": 216838,
    "competence": "Strategic initiatives",
    "title": ""
},
{
    "$lift": 3.7197520028961274E12,
    "name": "Tommi Holmgren",
    "user_id": 216790,
    "competence": "Strategic initiatives",
    "title": "Principal, Futurice
&amp;startups"
},
```

```
{
    "$lift": 75.21701489985887,
    "name": "Pekka Lehtinen",
    "user_id": 215272,
    "competence": "Internal functions",
    "title": "Marketing Lead, Finland"
},
{
    "$lift": 26.92380874442644,
    "name": "John Oswald",
    "user_id": 250708,
    "competence": "Advisor",
    "title": "Global Principal, Advisory Team"
},
```

Augment Knowhow

Ethics

Ethics is serious business_

1. GDPR fines are hefty.

2. Consumers are increasingly interested in their privacy.

3. Many companies have dedicated privacy teams and executives.

futurice

Ethics is serious business_

- Bias

- Discrimination

- Opacity

futurice

Thank you!
Kiitos!
Danke!
Tack!

Matias Heikkilä
Data Scientist

matias.heikkilä@futurice.com