OF ECONOMIC DISRUPTION AND ARTIFICIAL INTELLIGENCE –
AI and the Future of Business

Cambridge: February 6th, 2018
Hans-Christian “Chris” Boos, arago, @boosc
AGENDA

1.1 Challenges for the established economy
1.2 Deep Dive into AI
1.3 How Arago’s AI HIRO™ works

Entrepreneur Journey
BUSINESS PEOPLE HAVE GOALS.

ENGINEERS HAVE PROBLEMS.
BUSINESS PEOPLE EXECUTE PLANS.

ENGINEERS WRITE PROGRAMS.
CHALLENGES FOR
THE ESTABLISHED ECONOMY
DISRUPTION.

THE PLATFORM COMPANIES’ CASH POSITION
Lots of cash to invest with no urgency to prioritize budgets.

THE ESTABLISHED COMPANIES’ CASH POSITION
Very little cash to invest, high pressure through external stakeholders (capital market, customers etc.).
DISINTERMEDIATION.

IN THE PAST: DIRECT CUSTOMER RELATIONSHIP

Customers choose platform

- RETAIL
- CUSTOMIZED ADVERTISING, IN-/OUTBOUND
- E-COMMERCE

Brand influences customers to buy their products/services

BRAND NO. 1
BRAND NO. 2
BRAND NO. 3

Customers choose goods and services from platform

Brand offers its products/services on multiple channels

TODAY: POINT OF SALE MOVES INTO THE PLATFORM

Platform chooses goods/services from the brand based on the customers’ preferences

BRAND NO. 1
BRAND NO. 2
BRAND NO. 3

Platform will always satisfy the customers to keep them from switching

Customers choose an AI assistant platform!

How can I help you?  Need something?
REQUIREMENTS FOR SURVIVAL.

STRONG BRAND

INNOVATION

SERVICE
CHANGE OF BUSINESS MODEL FROM LINEAR TO EXPONENTIAL

PLATFORM COMPANIES THINK BIG
Platforms are exponential and think big regarding their targets for improvement. They choose to start disrupting industries that touch billions such as healthcare, transportation, communications, energy, finance and telecoms.

AI IN THE CORPORATE TOOLKIT
AI is one of the tools – potentially the only one – in the corporate toolkit to help overcome these competitive threats AND make use of the strong side of established players: THEIR EXPERIENCE.
THE FUTURE OF BUSINESS: ANYTHING THAT IS A PROCESS CAN AND WILL BE RUN BY AN AI.
DEEP DIVE INTO AI
THE CORE DIFFERENCES BETWEEN MARKETING AND SCIENCE (OR HYPE AND REALITY)
1. MACHINES DO NOT UNDERSTAND.
2. MACHINES DO NOT HAVE HUMAN-LIKE BRAINS.
3. MACHINE LEARNING IS NOT EQUAL TO AI.
THREE TYPES OF AI.

NARROW AI

GENERAL AI

SCI-FI STORIES
THE FOUR PILLARS OF BUILDING A GENERAL AI.

**POWERING** the AI with compute, storage and other resources.

**COMPUTE**

Providing the AI with the necessary **intelligence**, performance and efficiency.

**ALGORITHM**

Developing, improving and refining the AI, its environment and necessary algorithms.

**DATA**

Perpetually filling the AI with **understanding of its environment** and **experience**.

**PEOPLE**

GENERAL AI
ARTIFICIAL INTELLIGENCE EXPLAINED.

- MACHINE LEARNING
- LANGUAGE PROCESSING
- MACHINE REASONING
- GENETIC ALGORITHMS
Artificial Intelligence Explained

Data Processing as Neural Network in all approaches and with any extension

Recognize Pattern from Input and Memory

Determine Reaction in Context of given Goal and Environment

Habit, Skill, Genetic

Recurrence to form temporal memory

Unstructured Data like "Input from sensory organs"

Memory

Pattern
Goal
Environment
Reaction

Animal - Pattern based instinctive activity
abstract constructs for interfacing

Human - Dynamically planned multi-goal activity
Artificial Intelligence Explained

Data Processing
- Neural Network in all approaches and with any extension
- Recognize Pattern from Input and Memory
- Determine Reaction in Context of given Goal and Environment
- Habit, Skill, Genetic
- Experience
- Consious Knowledge
- Context sensible Knowledge Pool
- IF THIS THEN THAT

Memory

Language

Concepts

Data Processing
- Hybrid Reasoning System or General Problem Solver
- Dynamic Sequence of Action from Knowledge Pool to create individual Solution
- Step-by-step Solution building with respect to Dynamic Context Model

Pattern based behavior

Kontext

Goal Assumption

Unstructured Data like input from sensory organs

Animal - Pattern based instinctive activity
abstract constructs for interfacing

Human - Dynamically planned multi-goal activity
The Hotel California Effect.

Consumers give data back in return.

Established companies do not have access to these General AIs without endangering their very existence.

General AIs are built on the consumers’ data.

Offer (partly free) services to the consumers.
ESTABLISHED COMPANIES NEED A DATA POOL THEY CAN BUILD ON.

Established companies collect every piece of data within the company. Give data to a secure and independent intermediary.

Get access to a shared pool of aggregated organized data. Give new data to the shared data pool.

Use data and the necessary technology to build their own corporate AI. New business models, offerings, services.

The established companies’ General AI.

Independent (partly) shared data pool
Own IP is under control and protected under European law.
DESCRIBING THE WORLD WITH DATA.

OUTSIDE VIEW FROM CONSUMERS:

INSIDE VIEW FROM ECONOMY:
BY THE WAY:

AI AND DATA PROTECTION DO NOT CONTRADICT EACH OTHER.
COMPETING WITH THE INTERNET GIANTS IS POSSIBLE.

INTERNET GIANTS
As an example for the Internet giants, Google’s first commercial application of AI was datacenter optimization. Google plays GO etc.

ARAGO
To compare, Arago has started with AI-based datacenter automation, driving the commercialization of its AI Platform HIRO™. Arago plays Civilization etc.

Google uses DeepMind AI to cut data center energy bills
The AI successfully reduced power consumption by 15 percent overall (July 21, 2016)

With Artificial Intelligence Out of the Platform Trap
(November 12, 2016)

In a Huge Breakthrough, Google’s AI Beats a Top Player at the Game of Go (January 21, 2016)

When Arago taught its Hiro™ IT automation system to play a Civilization-like strategy game, it learned how to make IT more fun (December 6, 2016)

As the algorithm teams are relatively small, Arago is par with the Internet giants on algorithms.
HOW ARAGO’S AI HIRO™ WORKS
A POWERFUL SEMANTIC GRAPH IS AT THE CORE OF THE HIRO™ PLATFORM.

<table>
<thead>
<tr>
<th>Semantic Graph</th>
<th>Advanced IAM</th>
<th>On Graph Computing</th>
<th>Graph Algorithms</th>
<th>Graph Query</th>
<th>Evolving Ontology</th>
<th>Semantic Graph</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>APIs</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Data &amp; Access Security</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Data Processing</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Data Store</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Stream Processing</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Encryption &amp; individual access control</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Time series processing, CEP, Stream Processing</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Centralized Machine Learning</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Centralized Analytics</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Special modules for time series, BLOBS, ...</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Semantic Search</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**EUROPEAN DATA PROTECTION**

HIRO™ Knowledge Core gives the power of a data pool to established companies while they are fully retaining control, ownership, security of their data.
KNOWLEDGE IS STORED EXPERIENCES OF EXPERTS FED TO THE AI WHERE IT IS NEEDED TO SOLVE PROBLEMS.

REAL
Knowledge is taught in step-by-step teaching of actually executed tasks by asking experts “How” and “Why did you do that”. Every single step is stored in a Knowledge Item (KI).

CONTEXTUAL
The HIRO™ engine deals with context and allows overlapping, contradicting knowledge in an ambiguous environment described by partly wrong and unpredictable information.

REUSABLE
80% re-use within organizations and 33% across organizations.

+ EXPONENTIALLY EFFECTIVE!
The number of possible permutations grows exponentially with added knowledge.
DYNAMIC REASONING ALLOWS THE HIRO™ ENGINE TO APPLY KNOWLEDGE LIKE HUMANS WOULD.

- HIRO™ engine uses experience to create, execute and optimize individual solutions for each given task.
- HIRO™ uses machine reasoning to create and follow a strategic plan and execute a solution and machine learning to handle ambiguity, overlap, contradiction or incorrect data in context and knowledge itself.
HIRO™ UNDER THE HOOD.
THE JOURNEY FROM LINEAR TO EXPONENTIAL.

GET YOUR ACT TOGETHER
INTRODUCE A TROJAN HORSE
SET RESOURCES FREE (MONEY AND PEOPLE)
COLLECT DATA
GENERALIZE AI
THINK ABOUT NEW BUSINESS MODELL
SWITCH TO NEW BUSINESS MODEL

NOW
+ 2-3 YEARS
THE FUTURE OF BUSINESS:

ANYTHING THAT IS A PROCESS CAN AND WILL BE RUN BY AN AI.
LEARNING BY OBSERVATION.

VS.

LEARNING FROM SOMEONE WHO KNOWS.
FULFILLING THE PROMISE OF AI MEANS MAKING EXPERIENCE EXECUTABLE.
ENTREPRENEUR JOURNEY
THE FOUR TYPES OF TECH

INNOVATION – When really new things are built

ITERATION – When interesting things are improved

DISRUPTION – When things are used to shake up markets

COMMODITY – When things are used by everyone
TECH ECO SYSTEM

THE CRAZY ONES

THE AMBITIOUS ONES

INNOVATION

ITERATION

THE COPY CATS

THE INCUMBENTS

THE ENGINEERS

THE BUSINESS GUYS

COMMODITY

END OF LIFE
THE BEST DEALS ARE IN DISRUPTION ...

... BUT DISRUPTION OFTEN FAILS OR IS KILLED BY THE “BUSINESS GUYS”

(TRYING TO MAKE IT BEHAVE LIKE ITERATION)
MOST MONEY GOES INTO THE COPYCATS ...

BECAUSE IT IS EASY TO UNDERSTAND, ...

HAS A PROVEN BUSINESS MODEL ...

... AND MAKES THE REALIZATION OF HAVING IGNORED “THE AMBITIOUS ONES” LESS PAINFUL ...
SUCCESSFUL INVESTMENT INTO ITERATION NEEDS FANTASTIC “BUSINESS GUYS”
STRANGE THINGS INVESTORS DO
THEY TELL YOU THEY WANT DISRUPTION 
AND THEN ASK FOR AN EXACT 
PREDICTION AND TRACKABLE BUSINESS PLAN
THEY WANT TO INVEST EARLY IN DISRUPTION AND THEN ASK WHY YOU CAN’T SHOW THE COOKIE CUTTER
THEY GIVE WORSE VALUATIONS TO BUSINESSES THAT ACTUALLY MAKE MONEY
AND WORST OF ALL –
THEY WANT TO HAVE A HIGH TECH VALUATION
BUT CUT COST IN R&D TO INVEST IN SALES
STRANGE THINGS ENTREPRENEURS DO
PUT NETWORKING ABOVE PRODUCT
ASK FOR CRAZY VALUATIONS
BEFORE ANYTHING WORKS
ASK FOR CRAZY VALUATIONS ON PURELY LABOR BASED BUSINESS MODELS
SELL STUFF THAT DOES NOT EXIST
TO GET INVESTMENT
AND LOCK EVERYBODY INTO A VICIOUS CIRCLE
AND WORST OF ALL - BUILD UNSUSTAINABLE COMPANIES WITH NO TECH ADVANTAGE WHATSOEVER TO FOLLOW A HYPE
TO INVESTORS
SO, IF YOU WANT DISRUPTION, YOU HAVE TO LIVE WITH THE “AMBITIOUS ONES”, HIGHER RISK AND THEN LET IT PLAY OUT
IF YOU WANT A COMPANY THAT IMPROVES A KNOWN BUSINESS, YOU HAVE TO LOVE “THE ENGINEERS” AND “BUSINESS GUYS”
TO ENTREPRENEURS
IF YOUR ARE A GEEK, DON’T DO THE STUFF THAT HAS BEEN DONE BEFORE, “THE BUSINESS GUYS” ARE BETTER AT THAT
IF YOU REALLY WANT TO CHANGE THE WORLD, BE PREPARED: IT WILL TAKE A LONG TIME, IT IS A LOT OF WORK AND NO ONE WILL BELIEVE YOU UNTIL YOU HAVE IRREVERSIBLY CHANGED THE WORLD
IF YOUR ONLY PLAN IS TO GET RICH QUICKLY YOU WILL MOST LIKELY BE FORCED TO CHEAT, DON’T START A BUSINESS, PLAY THE LOTTERY
THANK YOU.