



FROM BI TO APPLIED AI

Lior Sidi | Braincast.ai CEO
KBC conference | 14 Mar 2019

Agenda

1. Clean table for BI and AI
2. AI for business
3. AI challenges
4. Business for AI + Applied AI



AI Hype Alert

AI is a victim of its own success




Lack of education


Misconceptions
(sci-fi movies)


Extrapolate


Unrealistic
expectations

“

Five years ago, all the AI researchers were saying:
it's much more powerful than you think.

And now they're like:
it's not as powerful as you think

”

Nicholas Thompson, Wired

Why you need this talk?



Value

- Get value for the business

Education

- Separate hype from reality

Call for action

- You are a critical part of the revolution

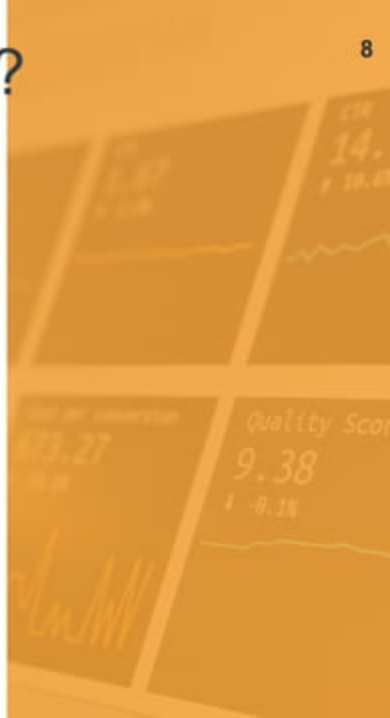
What is Business Intelligence?

Goal: Aid companies with decision-making

Means: Collecting, reporting and analyzing data

The key: Quality of data, questions and action

Outcome: Impact on core business operation



BI Challenges

Dashboards are not enough



People

Shortage of experts
Human are a bottleneck



Automation - insights in real time



Data

Big data overload
Static snapshot



Dynamic & Distributed

BI <- - > AI

Business Intelligence

Aid business decision-making

Data analytics
Data driven organization
Quality decision process



Automation
Self learning

Artificial Intelligence



What is Artificial Intelligence?



- “The science and engineering of making intelligent machines.” John McCarthy
- Emulating human cognition in pursuit of problem solving

AI is a goal or quest we striving to achieve

Applied AI – practical implementations of AI





Data

Availability, flood of
sources and labels

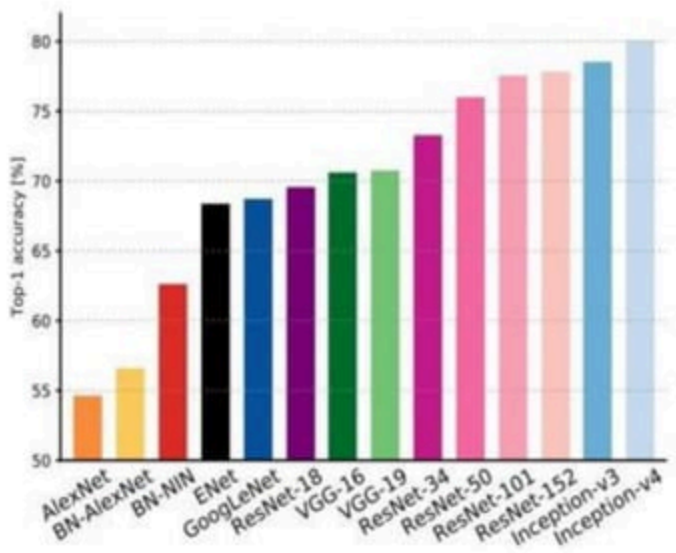


Why
Now?











GOOGLE DATACENTER



1,000 CPU Servers
2,000 CPUs • 16,000 cores

600 kWatts
\$5,000,000

STANFORD AI LAB



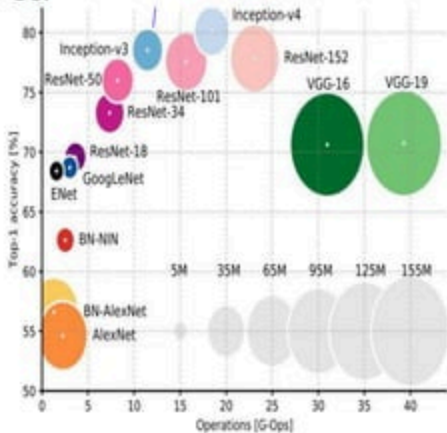
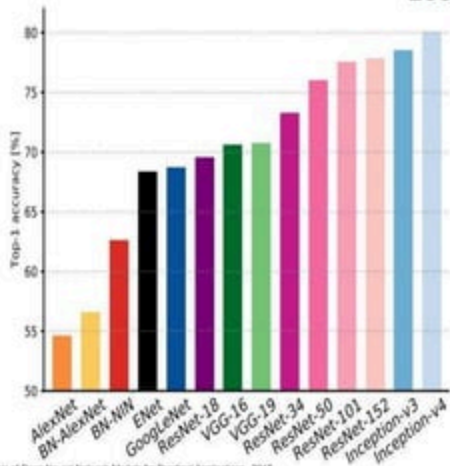
3 GPU-Accelerated Servers
12 GPUs • 18,432 cores

4 kWatts
\$33,000


<http://christopher5106.github.io/big/data/2015/07/31/deep-learning-machine-gpu-accelerated-computing-versus-cluster.html>

Facebook managed to reduce the training time of a ResNet-50 deep learning model on ImageNet from 29 hours to one hour

Instead of using batches of 256 images with eight GPUs they use batch sizes of 8,192 images **distributed** across 256 GPUs.







Language



Self driving cars

“
Era Of
Implementation
”

~~~~~  
Kai-Fu Lee



Recommendation



Cancer Detection

# AI for Business



## Process Automation



**Automated  
decision making**  
Back-office  
administrative  
Financial activities

## Cognitive Insight



**Clarifying a messy  
picture**  
Customer segment  
Credit / insurance fraud  
Detection in real time

## Cognitive Engagement



**Value to your  
customers**  
Customer service  
Service recommendation

# AI Business Achievements



- Increase efficiency
- Reduce expenses
- Increase customer satisfaction
- Improve existing products and services
- Create new business opportunities



BI  $\leftrightarrow$  AI

## Business Intelligence

Aid business  
decision-making

Data analytics  
Data driven organization  
Quality decision process



Automation  
Self learning

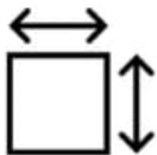
Automation  
Decision making



## Artificial Intelligence

Model human  
Intelligence





**What  
Breadth**

**AI  
Segmentation**

# Breadth of Intelligence



**Artificial Narrow  
Intelligence  
(ANI)**



**Present**  
Perform single  
task extremely  
well

**Artificial General  
Intelligence  
(AGI)**



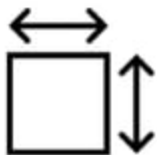
**Decades**  
Human-level intelligence  
across the range of  
cognitive tasks

**Artificial Super  
Intelligence  
(ASI)**



**Someday**  
Singularity  
Speculation





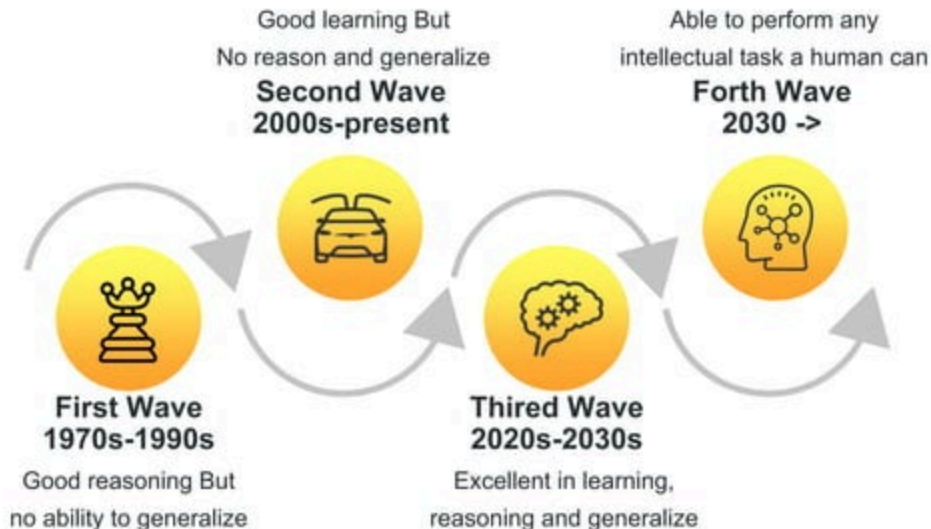
**What  
Breadth**

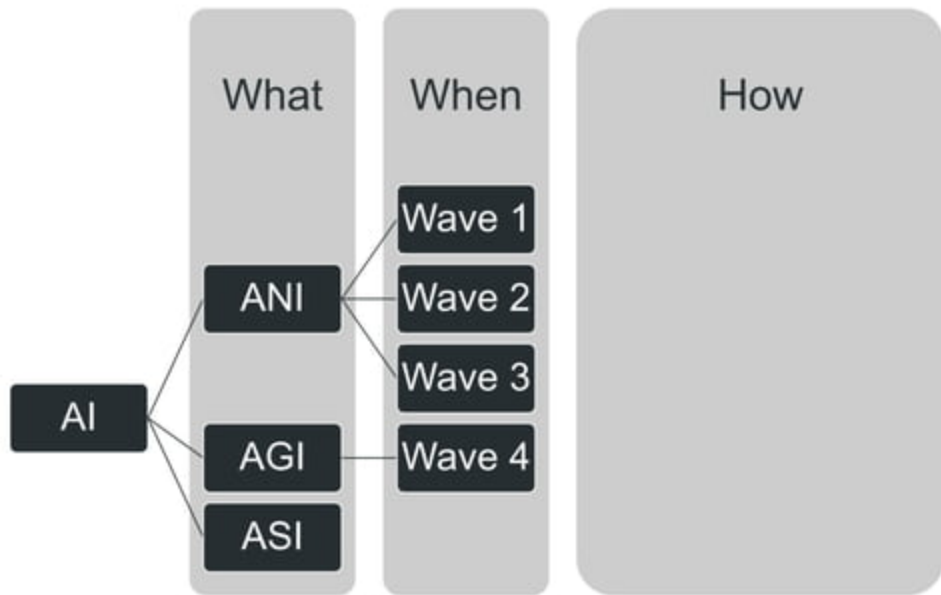
**When  
Waves**

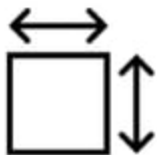


**AI  
Segmentation**

# Four Waves Of AI







**What  
Breadth**

**When  
Waves**



**AI**

**Segmentation**

**How  
Learning**



# Learning ability



## **Symbolic AI**

humans imparting knowledge descriptive rules

## **Sub symbolic**

execute a task without being explicitly programmed to do so, performance increases with experience

-> Machine learning, Search

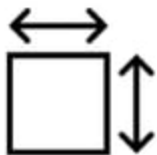


# Learning ability

## Learning Tasks

- Classification
- Continuous estimation
- Clustering
- Skill acquisition





**What  
Breadth**

**When  
Waves**



**AI**

**Segmentation**

**How  
Learning**

**Which  
Choose**



# Machine Learning



- The biggest impact on the world right now
- Enabling computers to learn on their own, iteratively
- Spot patterns that humans might miss or never think of in the first place.
- Can achieve performance comparable to that of humans without having to imitate human intelligence processes.





# Machine Learning



## Depends on:

- Large data
- Labels
- Structured inputs

```
self.file = None
self.fingerprints = {}
self.logdupes = True
self.debug = debug
self.logger = logging.getLogger(__name__)

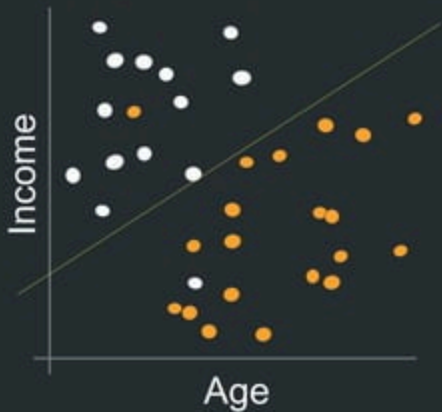
if path:
    self.file = open(path, 'w')
    self.file.seek(0)
    self.fingerprints = {}

    @classmethod
    def from_settings(cls, settings):
        debug = settings.getboolean('DEBUG')
        return cls(job_dir=settings.get('JOB_DIR'))

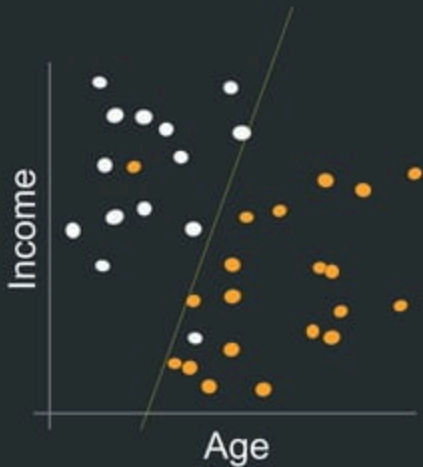
    def request_seen(self, request):
        fp = self.request_fingerprint(request)
        if fp in self.fingerprints:
            return True
        self.fingerprints.add(fp)
        if self.file:
            self.file.write(fp + '\n')

    def request_fingerprint(self, request):
        return request_fingerprint(request)
```

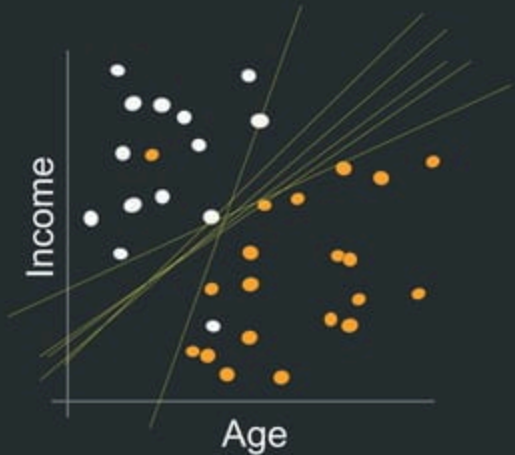
# HOW WOULD YOU CLASSIFY THIS DATA?



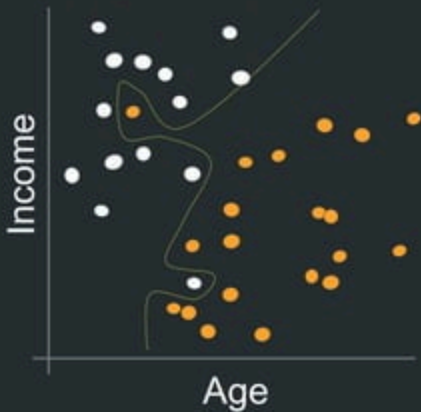
# HOW WOULD YOU CLASSIFY THIS DATA?

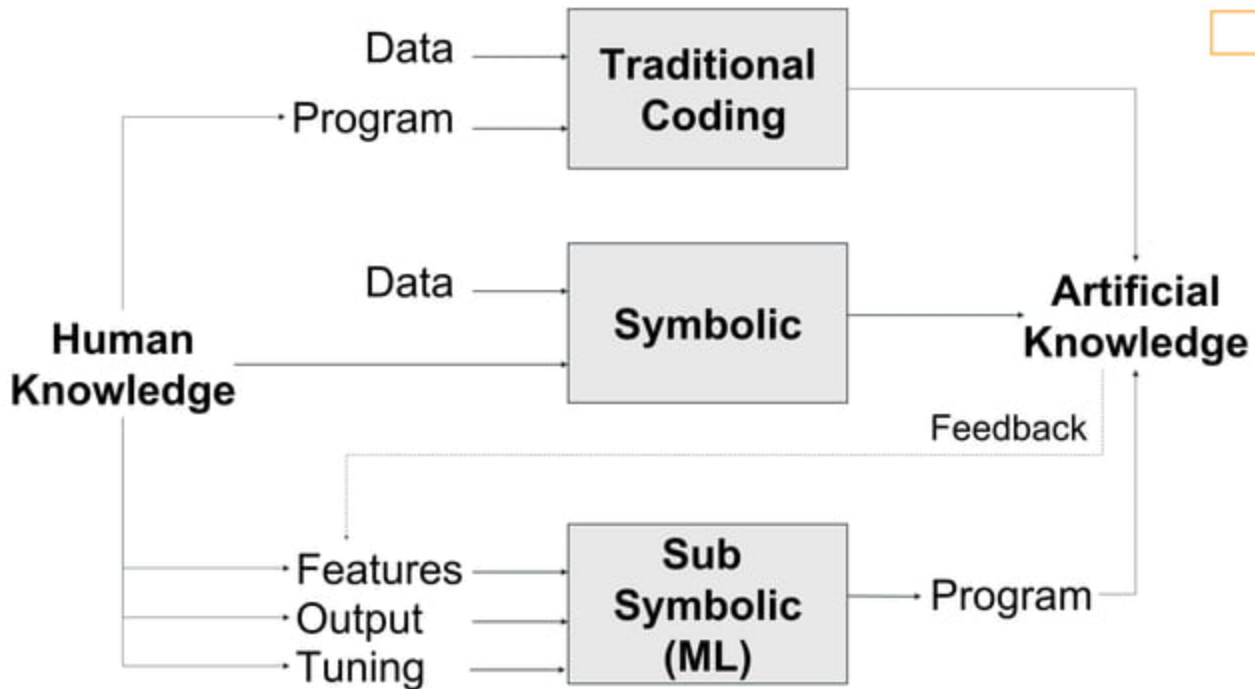


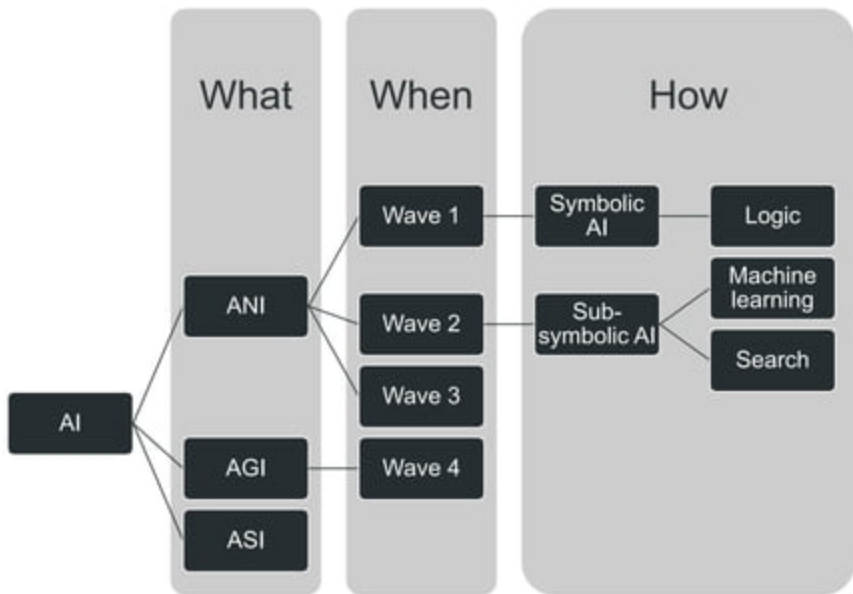
# HOW WOULD YOU CLASSIFY THIS DATA?



# HOW WOULD YOU CLASSIFY THIS DATA?







BI  $\leftrightarrow$  AI

## Business Intelligence

Aid business  
decision-making

Data analytics  
Data driven organization  
Quality decision process



Automation  
Self learning

Automation  
Decision making



## Artificial Intelligence

Model human  
Intelligence

Learn from experience  
Implicit learning  
Automated



?



# AI Challenges

## Trouble in paradise



### Erroneous

Overfitting, Imbalance,  
Concept drift, Dimensionality  
Black swan, Data integrity



### Impact

Business Communication  
Lack of impact,  
Late go to market



### Humanity

Fairness, Labor,  
Security & Privacy

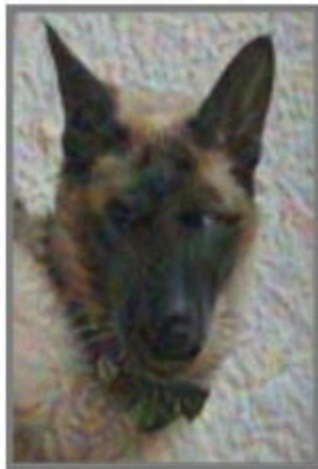


Experience   Tools/Tech   Explainability   Awareness   Education   Reduce data-dependent

# Explainability is hard



Good luck explaining this



By Google brain

# Explainability is hard

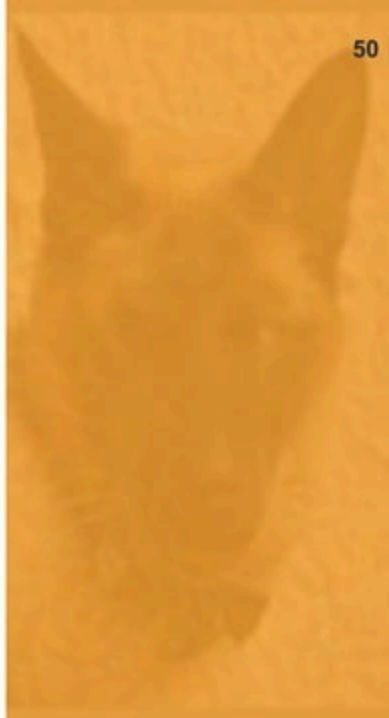


## **Current solutions**

Informative features

Retrain simpler model

Decision boundary visualization

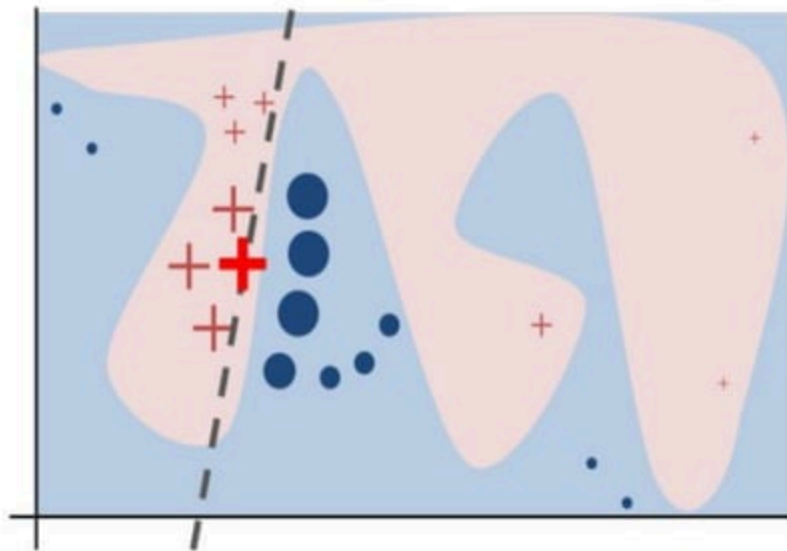


Gen 34 species 14 genome 14 (37%)

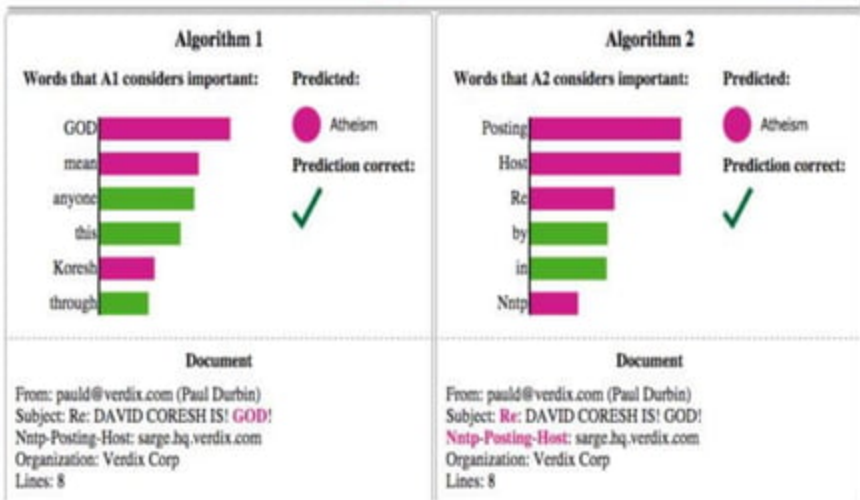
Fitness: 3393 Max Fitness: 4322



SethBling, MarI/O: Machine Learning for Video Games; 13 June 2015.



Ribeiro, M. T., Guestrin, C. (2016). "Why Should I Trust You?" Explaining the Predictions of Any Classifier.



Goodman, B., & Flaxman, S. (n.d.). European Union regulations on algorithmic and a “right to explanation.”

# Explainability is hard

## Current solutions

Informative features

Retrain simpler model

Decision boundary visualization

## Needed solution

Must be loyal to the original model

Exact answer with reasoning

Human interactive



Symbolic?



---

Person: "Why is image J labelled as a Spider instead of a Beetle?"

ExplAgent: "Because the arthropod in image J has eight legs, consistent with those in the category Spider, while those in Beetle have six legs."

Person: "Why did you infer that the arthropod in image J had eight legs instead of six?"

ExplAgent: "I counted the eight legs that I found, as I have just highlighted on the image now." (ExplAgent shows the image with the eight legs counted).

Person: "How do you know that spiders have eight legs?"

ExplAgent: "Because in the training set I was trained on, almost all animals with eight legs were labelled as Spider."

Person: "But an octopus can have eight legs too. Why did you not classify image J as an octopus?"

ExplAgent: "Because my function is only to classify arthropods."

---

Figure 1: Example Explanation Dialogue between a Person and an Explanation Agent



# How you can help AI

Product



Value  
Management

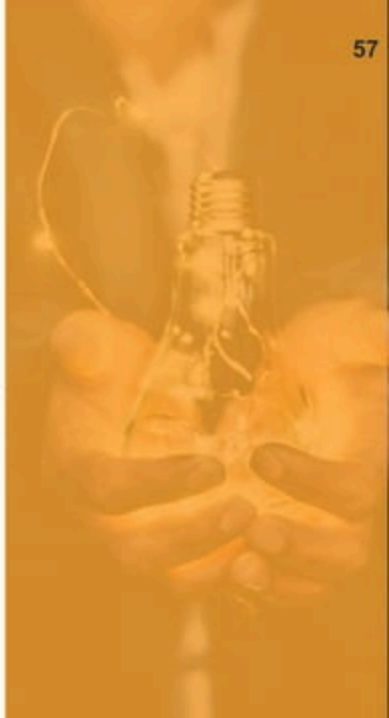
# Focus on Value



Delivering extraordinary customer value requires deep understanding of the existing business process

Customer centricity - Satisfaction, retention, and interaction

You create value. Not only communicate value.  
You don't define "value" Your customer do.



# AI Product Management



## **Mistakes to avoid**

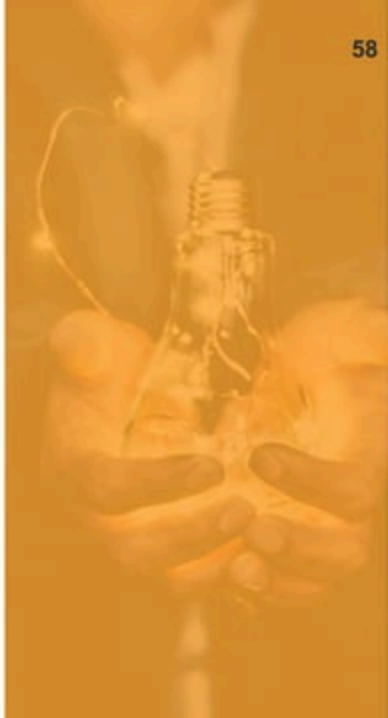
Too specific product

Too many pivots

Obsession with metrics and analytics

Too Generalize

Too many POCs



# How you can help AI

Product



Value  
Management

Development



Data  
Applied AI

# Talk Data



Data > Algorithm

Garbage in Garbage out

Make sure the data is accurate

Ask to see and analyze the data

# Applied AI

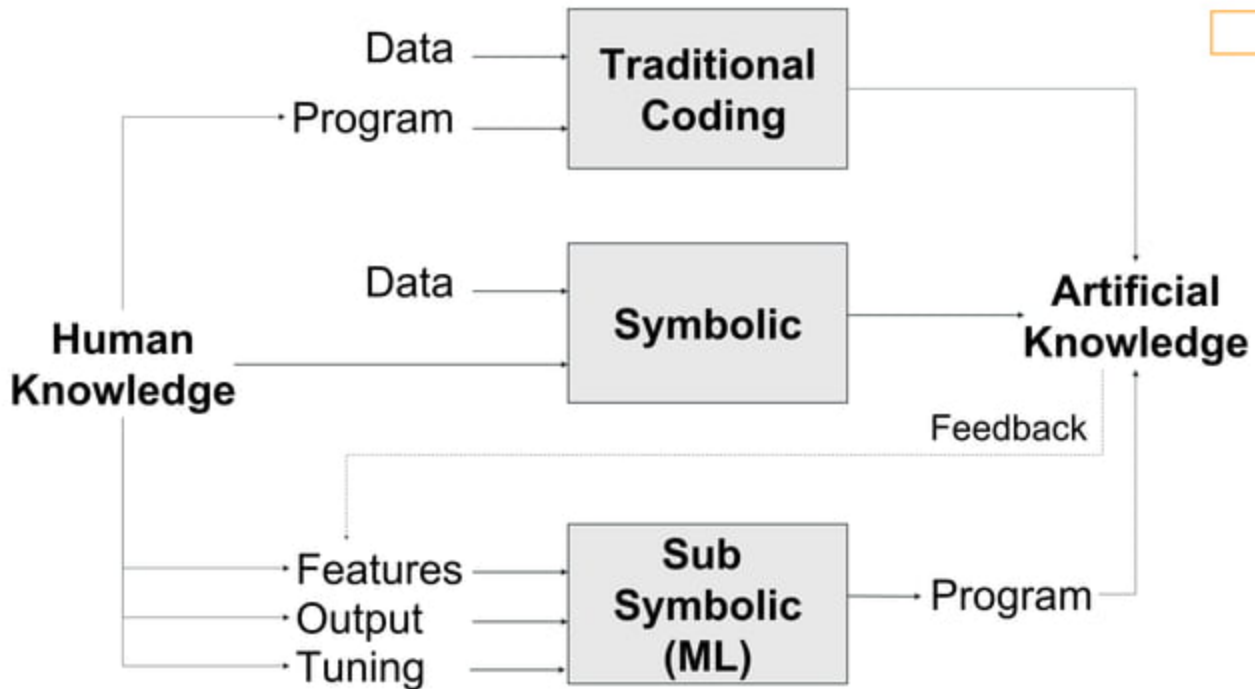


AI is becoming more accessible to domain experts  
Data scientists will focus on services and advanced stuff

Define and understand the features, training, production  
Feedback the model – adaptive learning

Model and incorporate human knowledge  
less data-dependent AI technology





# Handling feedback

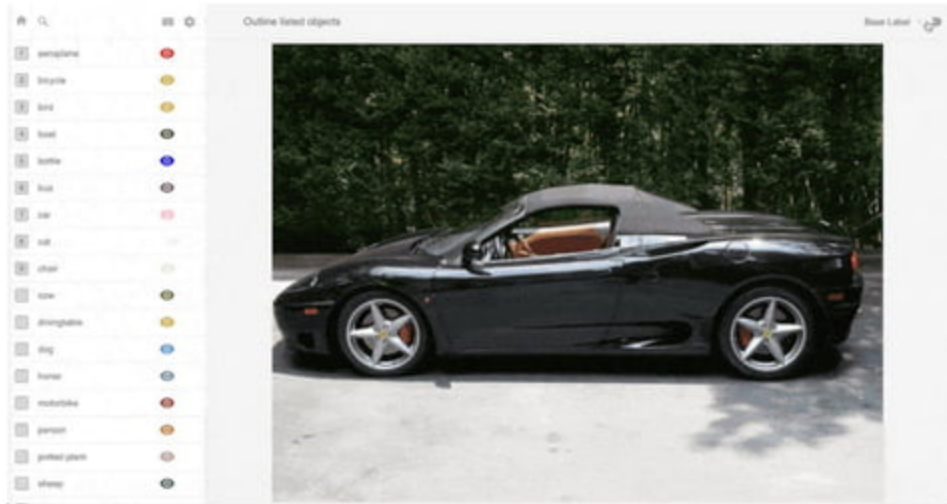


## Easy Labeling

- Education
- Invest in GUI







<https://labelbox.com/product>

# Handling feedback



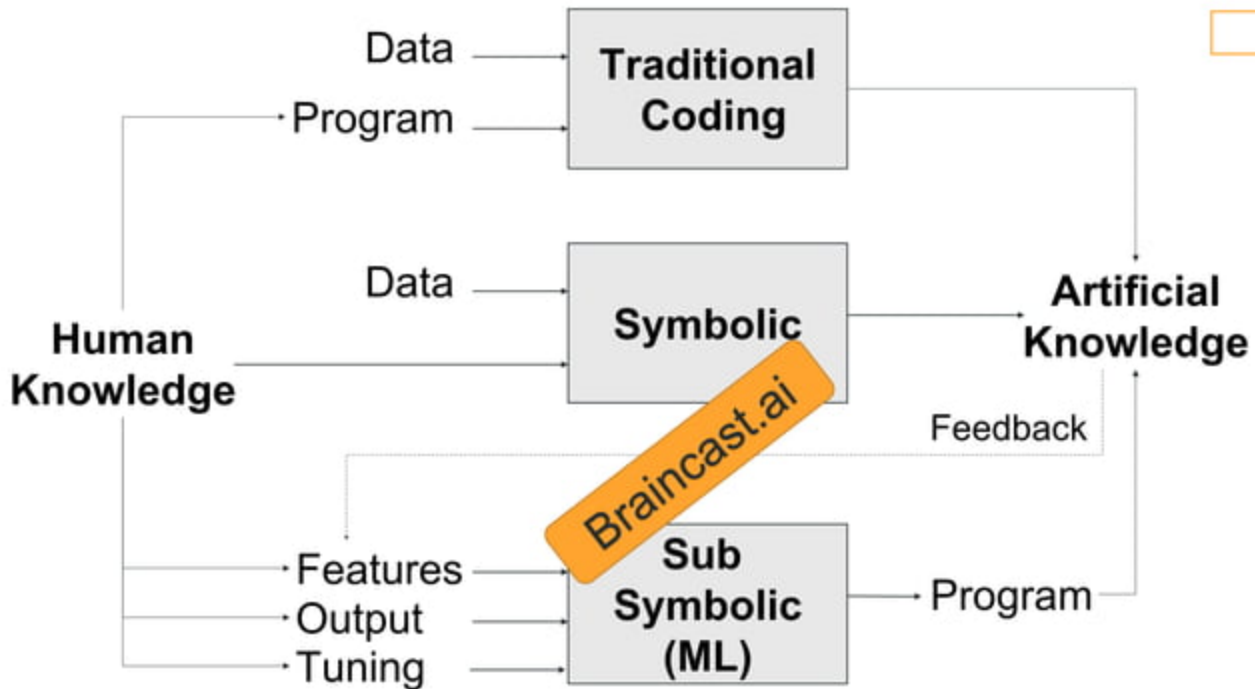
## Easy Labeling

- Education
- Invest in GUI

## Model versioning

- Capture previous knowledge
- stack model
- Combine deductive rules / patterns





# Applied AI



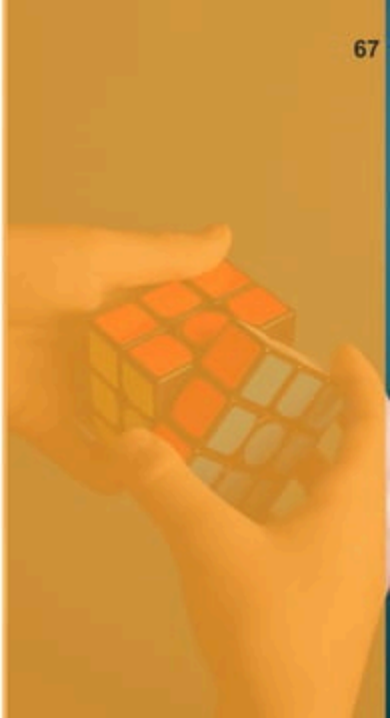
## Braincast.ai

- Capture expert knowledge using sequential patterns
- Model free method – no training
- Good at dynamic complex problems
- Handle Temporal, Sparse and multi-stream data
- Put the expert within the decision process



**Fast development cycle**

**Explainable & Accountable Results**





### AI Is Cool

Automate decision  
Efficiency  
customer satisfaction  
Improve existing  
products and services

### AI is challenging

It's not magic  
Many places to fail  
Lack of impact

### Focus on Data & Value

Customer centric  
Create new business  
opportunities  
Ask the right questions

### Get ready to Applied AI

Connect to the data  
feedback loop  
Express your knowledge

# Links

<https://www.theverge.com/2019/1/28/18197520/ai-artificial-intelligence-machine-learning-computational-science>  
<https://www.forbes.com/sites/cognitiveworld/2018/11/01/artificial-intelligence-is-not-a-technology/#4deab7dc5dcb>  
<https://edgy.app/ai-101-why-ai-will-bring-on-the-next-revolution>  
<https://www.forbes.com/sites/cognitiveworld/2018/08/22/ai-knowledge-map-how-to-classify-ai-technologies/#2f9772027773>  
<https://www.sharper.ai/taxonomy-ai/>  
<https://www.jetglobal.com/blog/ai-vs-bi-for-business-what-do-you-need/>  
<https://dataconomy.com/2018/02/ai-transforming-business-intelligence/>  
<https://www.forbes.com/sites/ciocentral/2019/02/25/ai-bi-and-data-whos-going-to-win-by-2020/#6cdb26aa15ff>  
<https://www.toptal.com/insights/innovation/ai-vs-bi-differences-and-synergies>  
<https://www.infoworld.com/article/3280233/practical-ai-or-why-everything-that-says-it-is-isn-t.html>  
<https://hbr.org/2018/01/artificial-intelligence-for-the-real-world>  
<https://www.cio.com/article/3268965/new-ai-tools-make-bi-smarter-and-more-useful.html>  
<https://www.wired.com/story/will-artificial-intelligence-enhance-hack-humanity/>  
<https://edgy.app/machine-learning-vs-machine-reasoning-know-the-difference>