Starting your AI/ML projects right

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Does AI have a massive future? Sure! Please insert another coin.

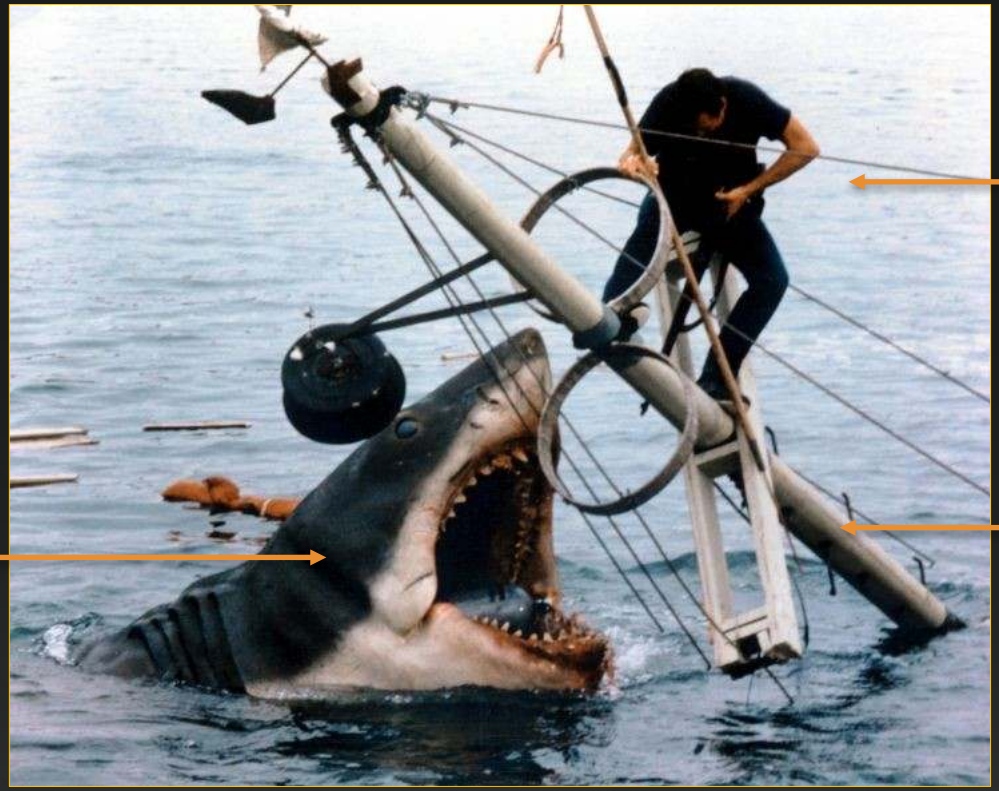
Do we (the builders) have a clear idea how to get there? Hmmmm.

« If you want to know the future, look at the past »

Albert Einstein

What’s our collective track record on understanding and implementing disruptive technologies?

2000



You

Your competitor

Your Web project

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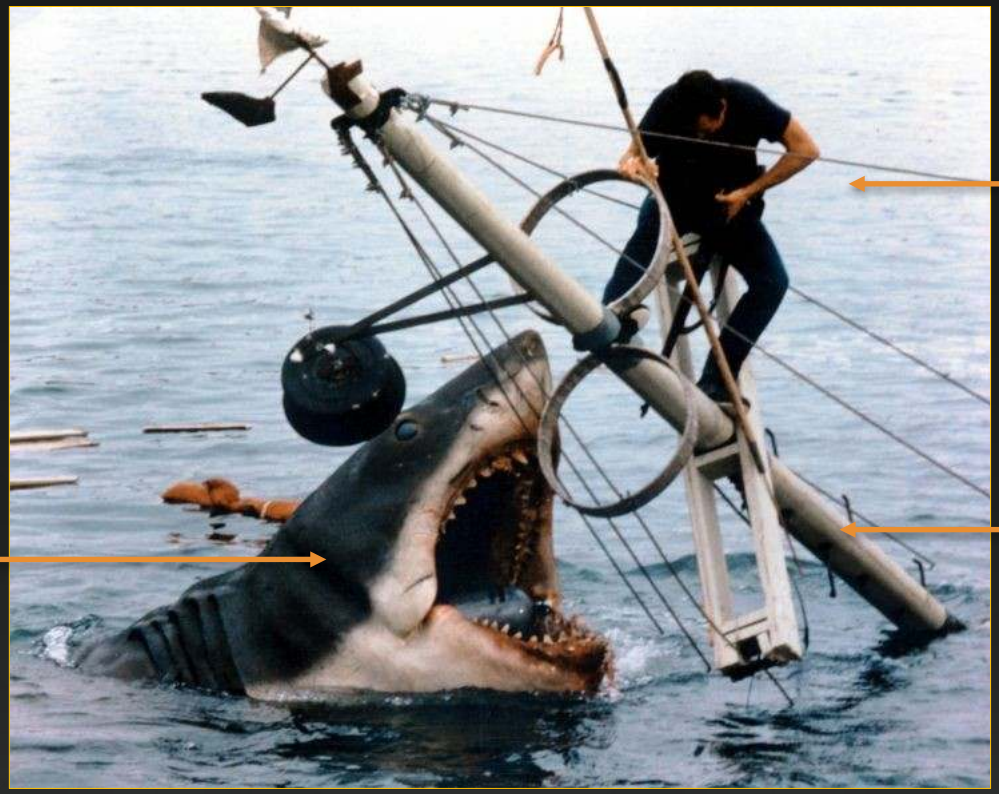
2005



You

Your competitor

Your E-commerce project

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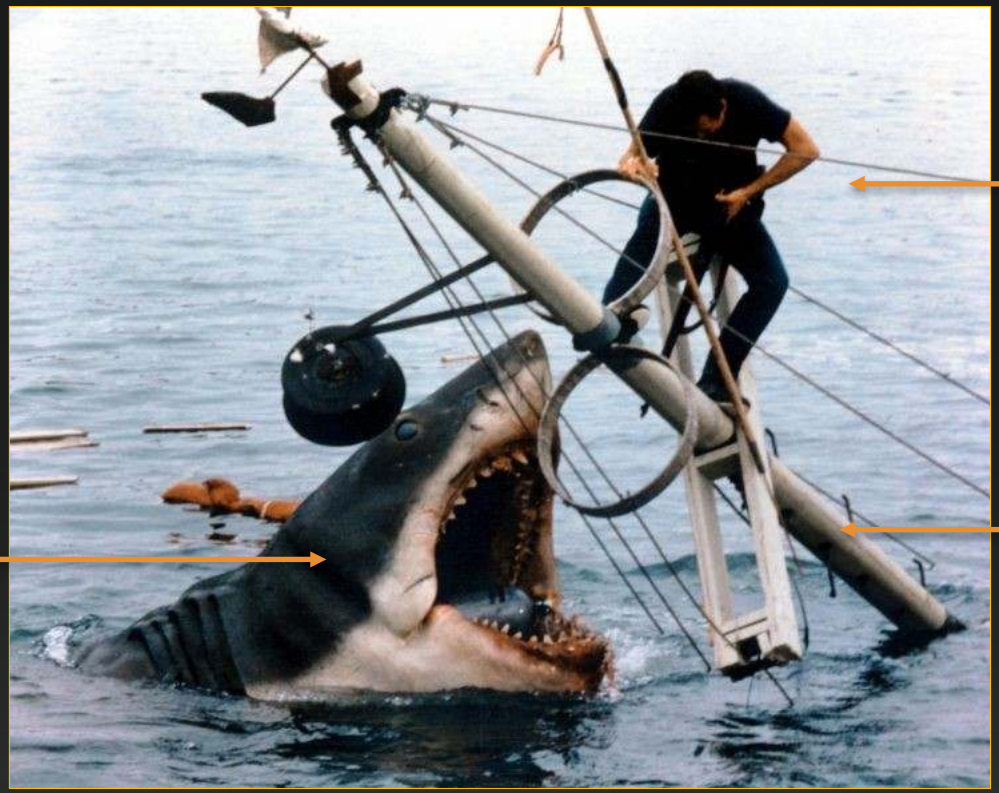
2010



You

Your competitor

Your M-commerce project

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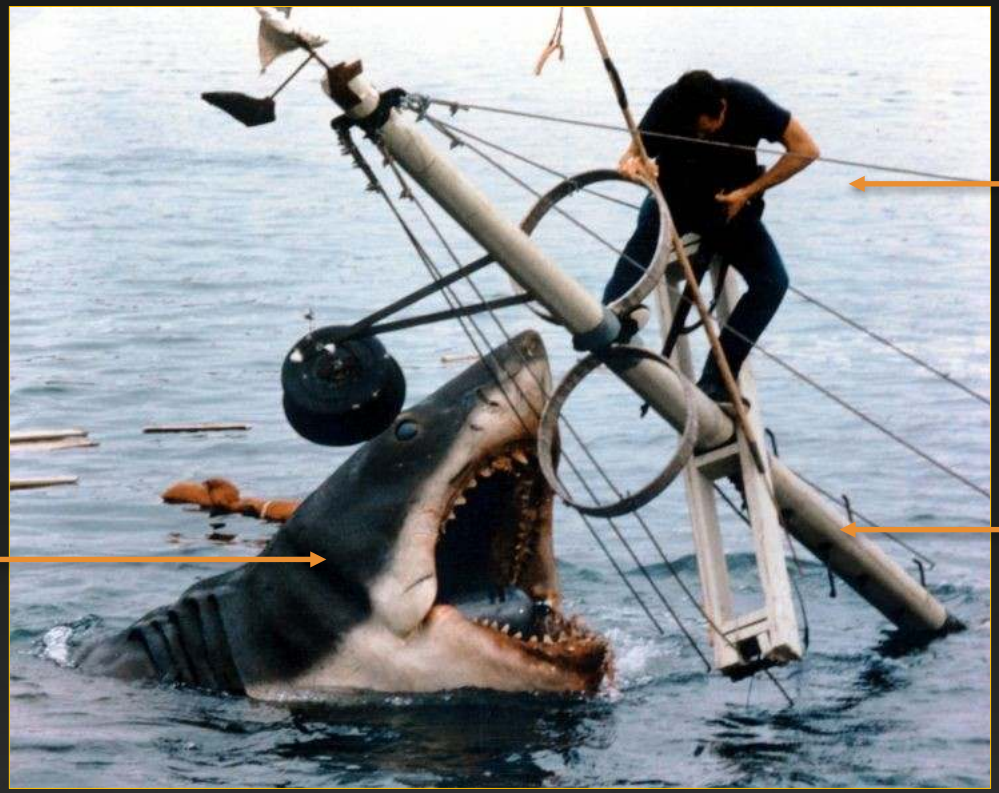
2015



You

Your competitor

Your Big Data project

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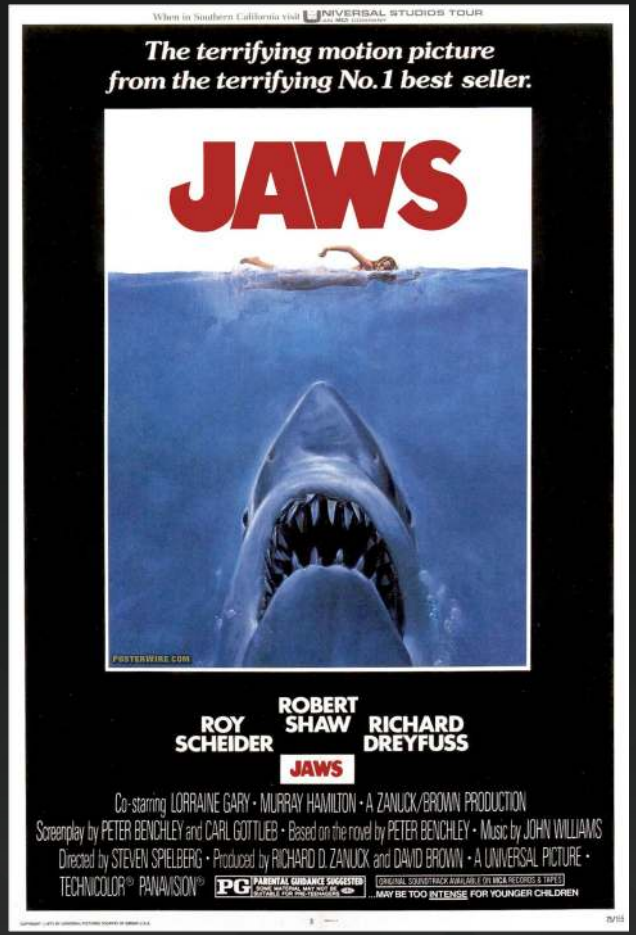

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The terrifying truth about tech projects

Confused stakeholders
Business pressure
Unprepared team
Inadequate tools
Improvised tactics
Random acts of bravery

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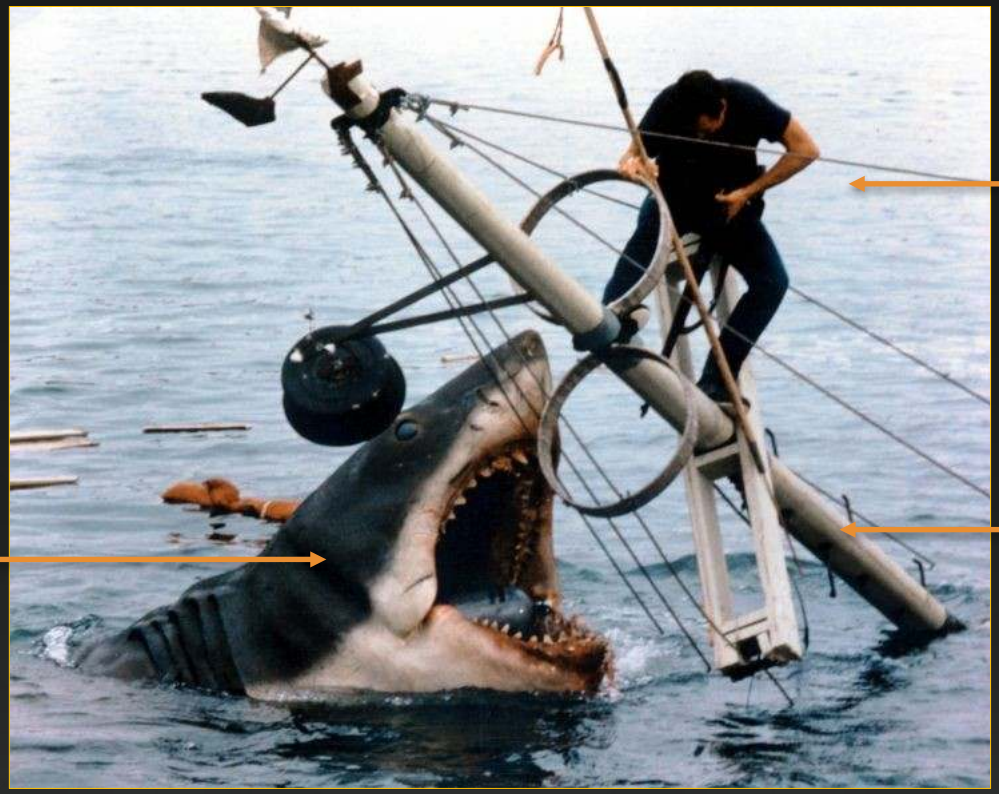
« It's different this time!
The AI revolution is here!
Blah blah blah »

You know who

2020-



You

Your competitor

Your AI / ML project ?

Universal Pictures

« Insanity is doing the same thing over and over again and expecting different results »

Whoever said it first

Tired of being shark food?

Confused stakeholders
Business pressure
Unprepared team
Inadequate tools
Improvised tactics
Random acts of bravery

Set expectations
Define clear metrics
Assess your skills
Pick the best tool for the job
Use best practices
Iterate, iterate , iterate

1 - Set expectations

- What is the business question you're trying to answer?
  - One sentence on the whiteboard
  - Must be quantifiable
- Do you have (enough) data?
  - What's the cost of getting more?
- Involve everyone and reach a common understanding
  - Business stakeholders, domain experts, IT, Data Science, etc.

« We want to see what this technology can do for us »
« We have tons of relational data, surely we can do something with it »
« I read this cool article about FooBar ML, we ought to try it »

2 - Define clear metrics

- What is the business metric showing success?
- What's the baseline (human, IT)?
- What would be a significant and reasonable improvement?
- What would be reasonable further improvements?

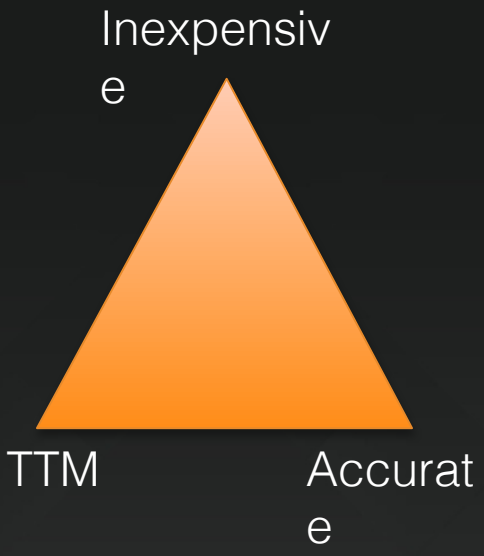
« The confusion matrix for our support ticket classifier has significantly improved ». Huh?
« P90 time-to-resolution is now under 24 hours ». Err….
« Misclassified emails have gone down 5.3% using the latest model ». So?
« The latest support survey shows that 'very happy' customers are up 9.2% ». Woohoo!

3 - Assess needs (not wants) vs. skills

- Building a data set describing the problem?
- Writing and tuning ML algorithms?
- Managing ML infrastructure?

4 - Pick the best tool for the job

- Cost, time to market, accuracy: pick two
- The least expensive and fastest option won't probably be the most accurate.
  - Maybe enough to get started, and learn more about the problem.
- Improving accuracy will take increasingly more time and money.
  - Diminishing returns! Know when to stop.
- Keep an eye on actionable state of the art advances, ignore the rest
  - Transfer learning with pretrained models
  - AutoML



5 - Use best practices

- No, things are not different this time.
- AI / ML is software engineering
  - Dev, test, QA, documentation, Agile, versioning, etc.
  - Standardize your workflows
  - Onboard all teams
- Sandbox tests are nice, but truth is in production
  - Get there fast, as often as needed
  - CI / CD and automation are required
  - Devops for ML aka « MLOps »

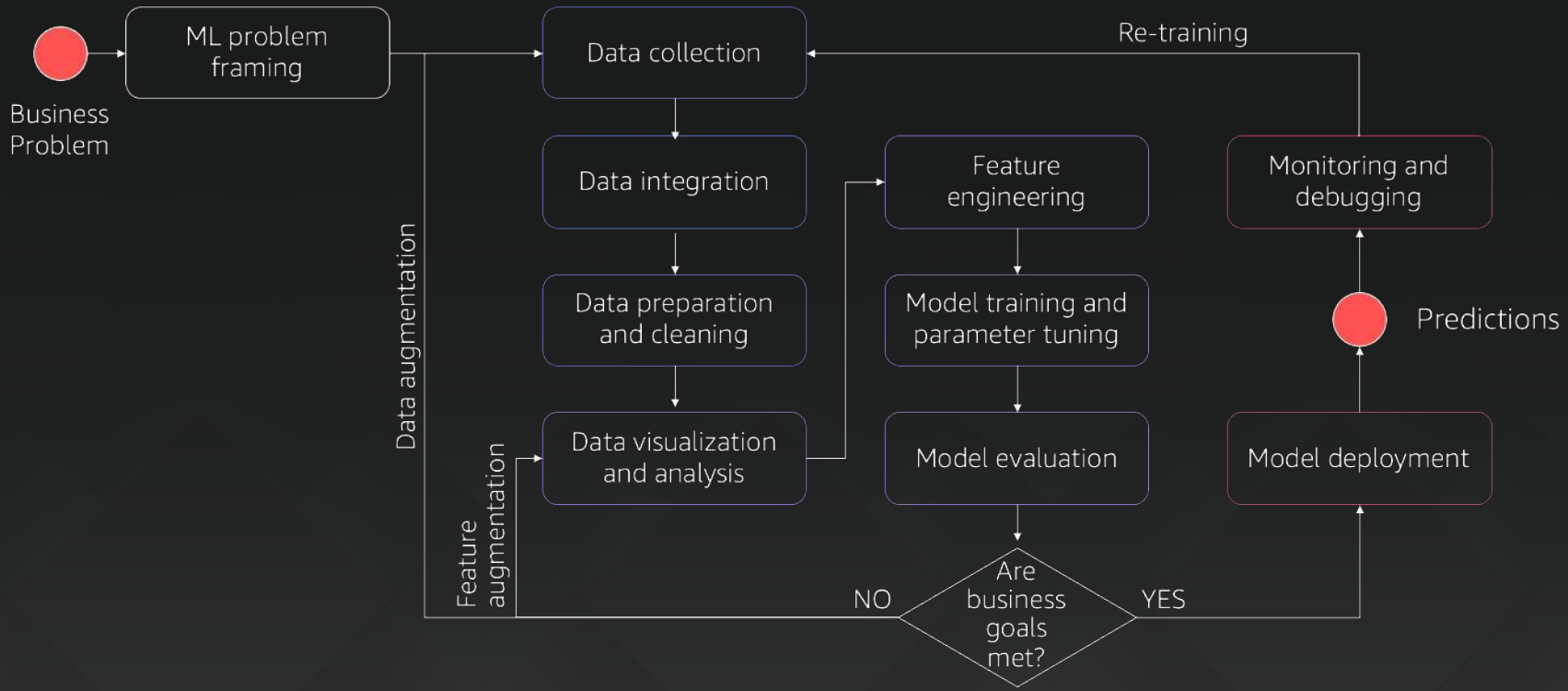
Universal Pictures

6 - Iterate, iterate, iterate

aka Boyd's Law (1960): « Speed of iteration beats quality of iteration »

- Start small
- Try the simple things first
- Go to production quickly
- Observe prediction errors
- Act: fix data set? Add more data? Tweak the algo? Try another algo?
- Repeat until accuracy gains become irrelevant
- Move to the next project

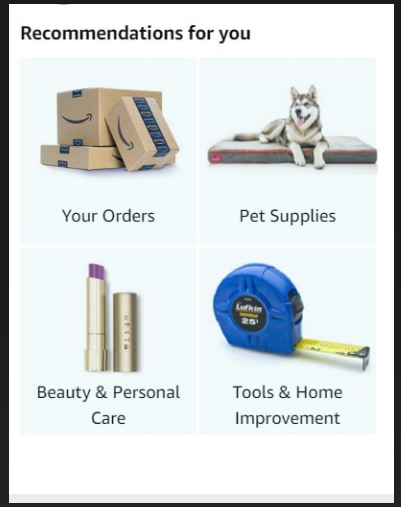
6 – Machine Learning *is* an iterative process



« *Does this work?* »

Everyone in this room

Amazon's machine learning innovation at scale



4,000 products per minute sold on Amazon.com

1.6M packages every day

Billions of Alexa interactions each week

First Prime Air Delivery on **Dec. 7, 2016**

The **AWS ML stack**

Broadest and most complete set of machine learning capabilities

AI SERVICES

Vision
Rekognition

Chatbots
Lex

Business tools
Personalize,
Forecast
Fraud Detector
Lookout for Metrics

Search
Kendra

Healthcare
HealthLake
Comprehend Medical
Transcribe Medical

Speech
Polly
Transcribe

Text
Comprehend
Translate
Textract

Contact centers
Contact Lens
Connect Voice ID

Code + DevOps
CodeGuru
DevOps Guru

Industrial
Panorama Appliance and SDK,
Monitron, Lookout for
Equipment, Lookout for Vision

AMAZON SAGEMAKER

SAGEMAKER STUDIO IDE

Label data

Data collection prep

Store features

Detect bias and explain predictions

Visualize in notebooks

Pick algorithm

Train models faster

Tune parameters

Deploy in production

Manage & monitor

Manage edge devices

CI/CD

ML FRAMEWORKS & INFRASTRUCTURE

TensorFlow, PyTorch, Apache MXNet

Deep learning AMIs & containers

GPUs

Inferentia

Elastic inference

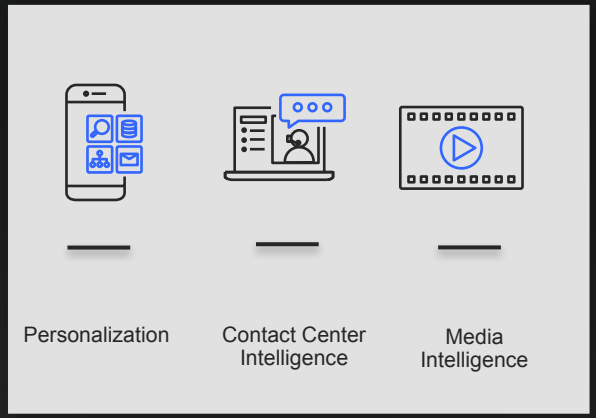
FPGA

Over 100,000 customers use AWS for machine learning

Getting started: common machine learning use cases

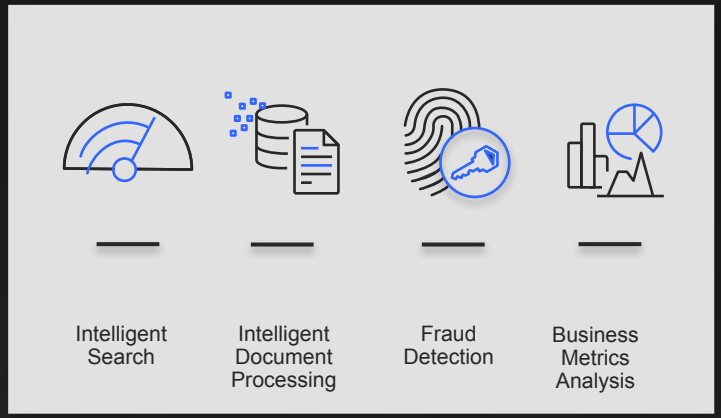
Solve real-world problems with machine learning

Enhance the customer experience



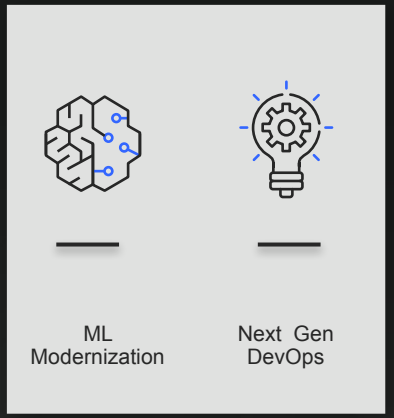
Delight customers while reducing operational costs

Optimize the business



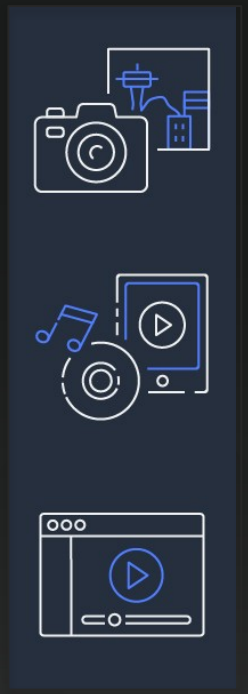
Improve productivity and optimize business processes

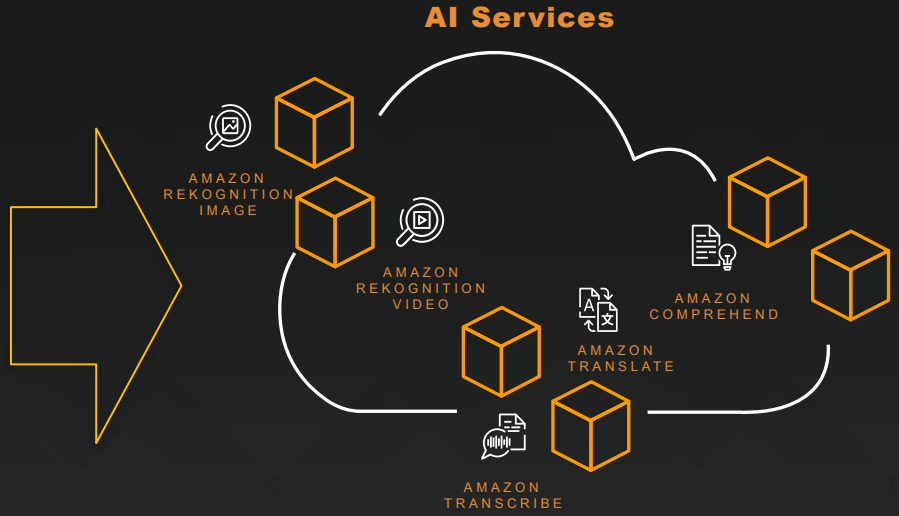
Accelerate innovation



Speed up and scale up innovation with machine learning

Media Intelligence





Possible Outputs

Millisecond metatagging for audio, video, images

Topic modelling, entity extraction

Automated captions & translated subtitles

Scene and black frame detection

Custom vocabulary, face, and object libraries

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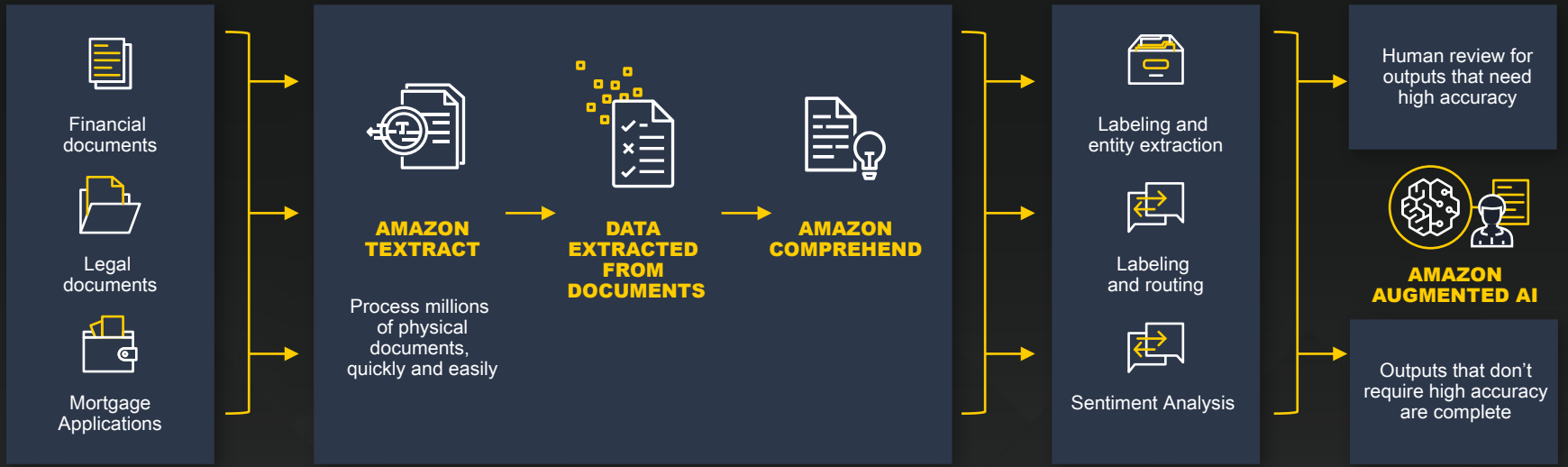
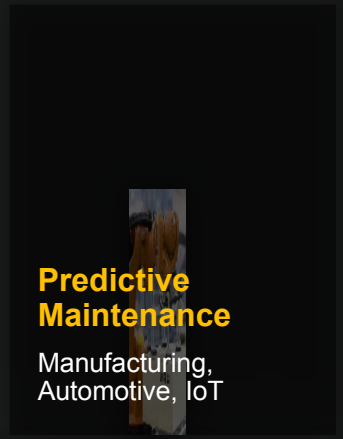
Intelligent Document Processing



ML with Amazon Sagemaker

Common use cases

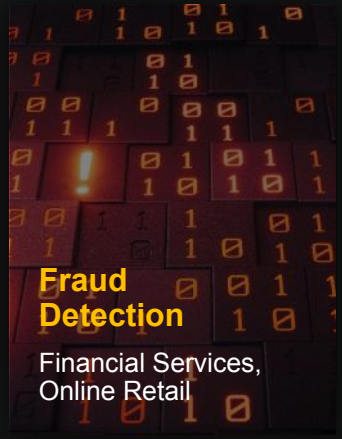


Predictive Maintenance

Manufacturing, Automotive, IoT

Demand Forecasting

Retail, Consumer Goods, Manufacturing



Fraud Detection

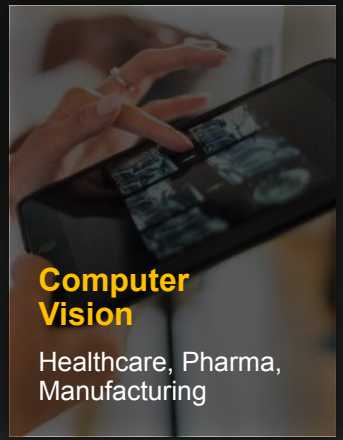
Financial Services, Online Retail

Credit Risk Prediction

Financial Services, Retail

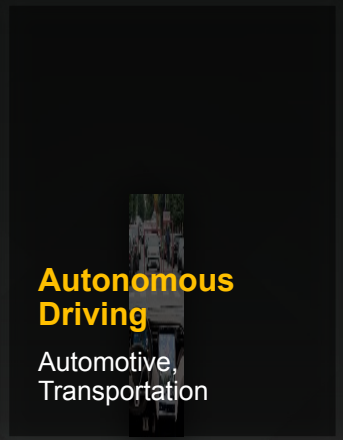
Extract and Analyze Data from Documents

Healthcare, Legal, Media/Ent, Education



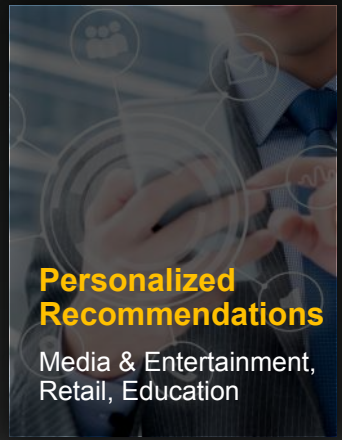
Computer Vision

Healthcare, Pharma, Manufacturing



Autonomous Driving

Automotive, Transportation



Personalized Recommendations

Media & Entertainment, Retail, Education

Churn Prediction

Retail, Education, Software & Internet

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Coinbase uses Amazon SageMaker to fight fraud

coinbase

“ Machine learning helps us balance risks for Coinbase, with flexibility for customers where we want them to have the best experience possible. ”

Soups Ranjan
Director of Data Science
Coinbase

Company

Coinbase a digital wallet and exchange platform.

Over 20 million merchants and consumers have traded more than $150 billion in cryptocurrencies since its founding in 2012.

SageMaker

Coinbase uses SageMaker to develop machine learning algorithms for image analysis to defeat scammers.

Using SageMaker reduced the model training time from 20 hours to 10 minutes.

Use Case

Use case: ID Authentication

Scammers often use the same photo for multiple IDs. A face-similarity algorithm can quickly extracts faces from uploaded IDs and compare it with faces across all other IDs to quickly detect the forgery.

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PayU uses Amazon SageMaker to generate credit scores

PayU

“ AWS has given us a flexible, dynamic, cost-effective platform to launch new services and support client growth."

”

Spokesperson
Data Science Team, PayU India

Company

PayU India is one of the top-three payment gateway providers in the country with more than 30% market share, comprising more than 300,000 merchants, more than 50 million customers, and over 30 million transactions per month.

SageMaker

PayU India uses Amazon SageMaker to determine whether to provide credit to Indian residents who do not have credit ratings, cards, or bank accounts.

This will enhance penetration into the digital consumer base and provide instant, short-term credit at checkout and in turn, enable faster and convenient transactions.

Use Case

Use case: credit scoring

PayU India aggregates and processes data—such as how much a resident spends, what that resident purchases, the residents’ digital footprints and how much they are engaged with digital platforms—inputs it into a machine learning algorithm, and generates a credit score for that resident.

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