Artificial Intelligence

Real-World Applications

Alex Castrounis

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3-Part Online Training Series Overview

1. Artificial Intelligence - AI For Business
   - What, how, and why of AI
   - Organizational readiness, costs, risks, assumptions, considerations
   - Hype vs reality, and future of AI
2. Artificial Intelligence - An Overview of AI and Machine Learning
   - ML/AI definitions, types, algorithms, process, tradeoffs, considerations
3. Artificial Intelligence - Real-World Applications

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Course Overview

- Data Types
- Prediction
  - Regression
  - Classification
- Recommender Systems
- Recognition
- Computer Vision
- Clustering and Anomaly Detection
- Natural Language (NLP, NLG, NLU)
- Reinforcement Learning
- Hybrid and Miscellaneous

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Data Types

Labeled

Unlabeled

Date	Open	Vol	...	Close
01/01/18	0.87	10K		1.23
01/02/18	1.23	8K		1.65

Name	Age	Gen	Email	Zip
Sarah	28	F	s@...	99999
Joe	32	M	j@...	88888

F = Features (input data)
T = Target (label for prediction)

Unstructured

Image
Audio
Video
Text

Unstructured data can be labeled (e.g., recognition)

Semi-structured

XML
JSON

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Prediction - Regression

Labeled Data

Stock Closing Price = $35/share

Applications

- Customer lifetime value (net profit)
- Revenue and growth forecasting
- Dynamic pricing
- Stocks and algorithmic trading
- Predictive maintenance

Examples

- Earthquake magnitude (NARLabs)
- Zillow's Zestimate
- Nest's Predictive Temperature Optimization
- Uber's ETA
- Underwrite.ai credit risk
- Betterment, Wealthfront, …

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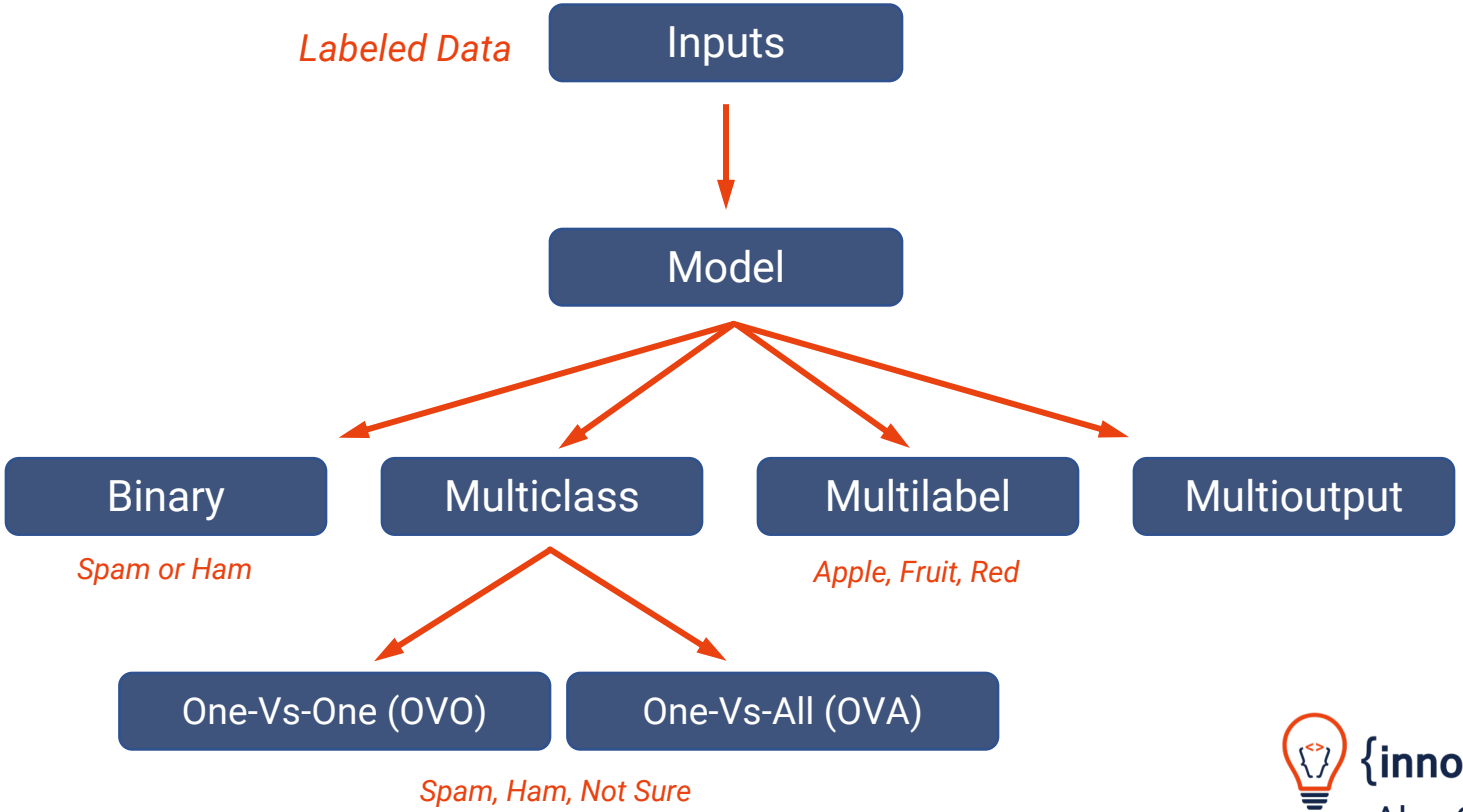
Prediction - Classification



Prediction - Classification

Applications

- Spam vs ham
- Medical diagnosis
- Image classification
- Recognition and computer vision
- Smart email categorization
- Credit risk
- Loan approval
- Customer churn

Examples

- Gmail spam filter
- Google eye scan for heart disease *
- Freenome cancer screening and diagnostics
- Ultromics cardiovascular diagnosis
- Optellum early cancer detection/treatment (lung)
- Underwrite.ai credit risk

** In Development*

Recommender Systems & Personalization

Applications

- Product recommendations
- Movie and music recommendations
- Personalized content, feeds, and news
- Targeted programmatic advertising

Examples

- Amazon and Netflix
- Spotify's Daily Mix & Discover Weekly
- Pandora's recommendations
- Facebook feed
- Twitter trends and follow
- Vue.ai personalized shopping

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Recognition

Unstructured Data

Image (object, ID)
Speech
Video
Text / OCR / Hand
Audio

Applications

- Image and Video
  - Object recognition, detection, identification
  - Medical diagnosis
  - Facial recognition, expression, and sentiment
  - Motion detection and gestures
- Audio and speech
  - Speech-to-text
  - Speaker identification
  - Sentiment analysis
- Text, OCR, handwriting
  - Text-to-speech

Examples

- Facebook's Facial Recognition
- Pinterest's Lens
- Affectiva's emotion recognition
- Clarifai image and video recognition (API)
- Vivino / Delectable wine labels
- Shazam music

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Computer Vision

Image
Video still image
Sequence of images

Detection
Recognition
Identification
Motion analysis

Applications

- Image recognition
- Motion detection and analysis
- Autonomous vehicles and drones
- Machine vision
- Robotics and control systems
- Public safety, security, surveillance
- Customer in-store paths

Examples

- Autonomous vehicles: Tesla, Google, ...
- Amazon Go
- Shield AI
- Syte.ai visual search and shopping
- ViSenze visual search

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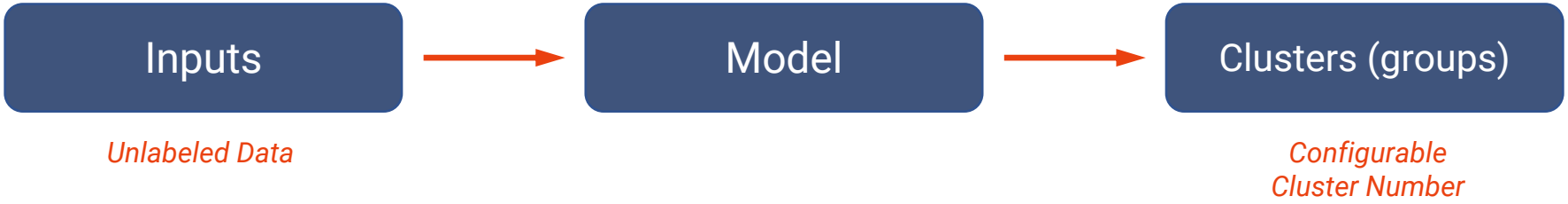
Clustering



Applications

- Market segmentation
- Recommendation engines
- Medical imaging
- Product grouping (shopping)
- Social network analysis
- Crime analysis
- Anomaly detection

Examples

- AgilOne CRM
- Infinite Analytics – Infinite Target
- Acxiom Personicx (segmentation)
- Law enforcement stationing

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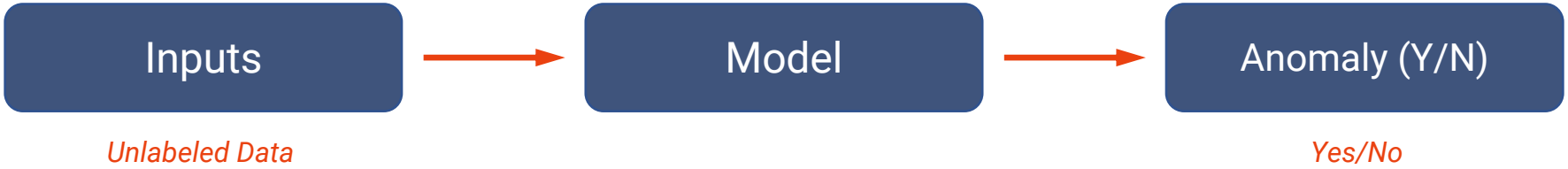
Anomaly Detection



Applications

- Fraud (e.g., credit card, bank)
- Cybersecurity and network security
- Manufacturing (defects)
- System health
- Fault detection
- Identity theft
- Error detection

Examples

- Cylance cybersecurity
- Darktrace cybersecurity
- Anodot automated anomaly detection

Natural Language Processing (NLP)

Text
Speech-to-Text
Handwriting-to-Text

Structured Data

Applications

- Text analytics and information extraction
- Speech recognition
- Text/topic classification
- Sentiment analysis
- Entity detection and named recognition
- Semantic relatedness
- Machine translation

Examples

- Chorus.ai meeting analytics
- Textio job posts
- Google and Amazon translate
- Google Cloud Natural Language
- Amazon Comprehend

Note: NLP often considered a superset of NLG and NLU

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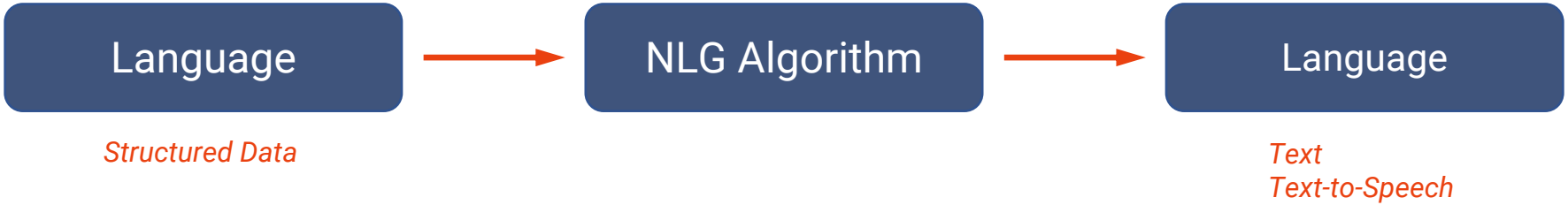
Natural Language Generation (NLG)



Applications

- General text
- Summarization
- Narratives and reports
- Recaps: news and sports
- Story telling
- Insights

Examples

- Wordsmith for GA and AdWords
- Narrative Science Quill
  - Intelligent Narratives
- Arria NLG Engine
  - NLG reports

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Natural Language Understanding (NLU)

Applications

- Personal and virtual assistants
- Chatbots
- Customer service
- Sales
- Conversational intelligence
- Question answering

Examples

- Personal Assistants
  - Alexa
  - Siri
  - Google Assistant
- Facebook chatbots (1-800 Flowers)
- MindMeld voice and chat assistant
- DigitalGenius Customer Service
- Conversable Conv. Intelligence

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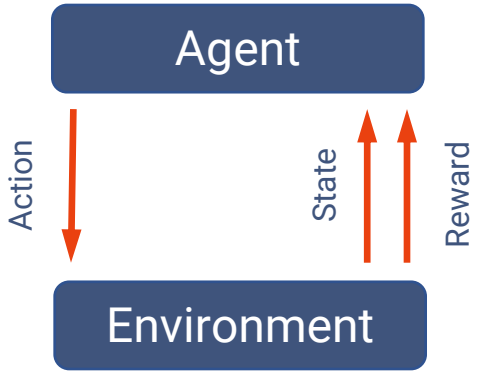
Reinforcement Learning



Applications

- Gaming
- Neural network training
- Robotics
- Learning
- Health and medicine
- Autonomous vehicles
- Fleet logistics
- Warehouse picking optimization
- Automation

Examples

- AlphaGo
- DeepBlue
- Google’s neural architecture search
- Medical dosing
- Salesforce’s abstractive summarization

Hybrid and Misc. Applications

Applications

- Autonomous vehicles
- Robotics
- VR, AR, and gaming
- IIoT / IoT
- Smart cities and homes
- Search (inc'g voice and visual)
- Generative
  - Image, text, video, music, voice, code
  - Style transfer
  - Super resolution
- Customer service, support, and sales

Examples

- Amazon Go
- Amazon Robotics
- Wibbitz video from text
- Presearch transparent/decentralized search
- Boston Dynamics Robots (e.g., SpotMini)
- Baidu's Deep Voice (text-to-speech)
- Jukedeck
- Autonomous vehicles
  - Nauto intelligent cameras
  - nuTonomy driverless software
  - Zoox autonomous mobility as-a-service

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Summary and Next Steps

- Continue learning about AI
  - Artificial Intelligence: AI For Business
  - Artificial Intelligence: An Overview of AI and Machine Learning
- Identify business and use cases for your business
- Develop a strategy for incorporating AI into your business
- Implement AI solutions to generate value and drive results

Q&A

AI: An Overview For Executives created by Alex Castrounis

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