Double your business/revenue by improving your customer experiences through AI/BD

By Mr. Eddie Chow

MATRIX CoWork

Agenda Style

01 **Limitation of BI**

Discuss about the limitation of business intelligence of existing large brand companies in fortune 500.
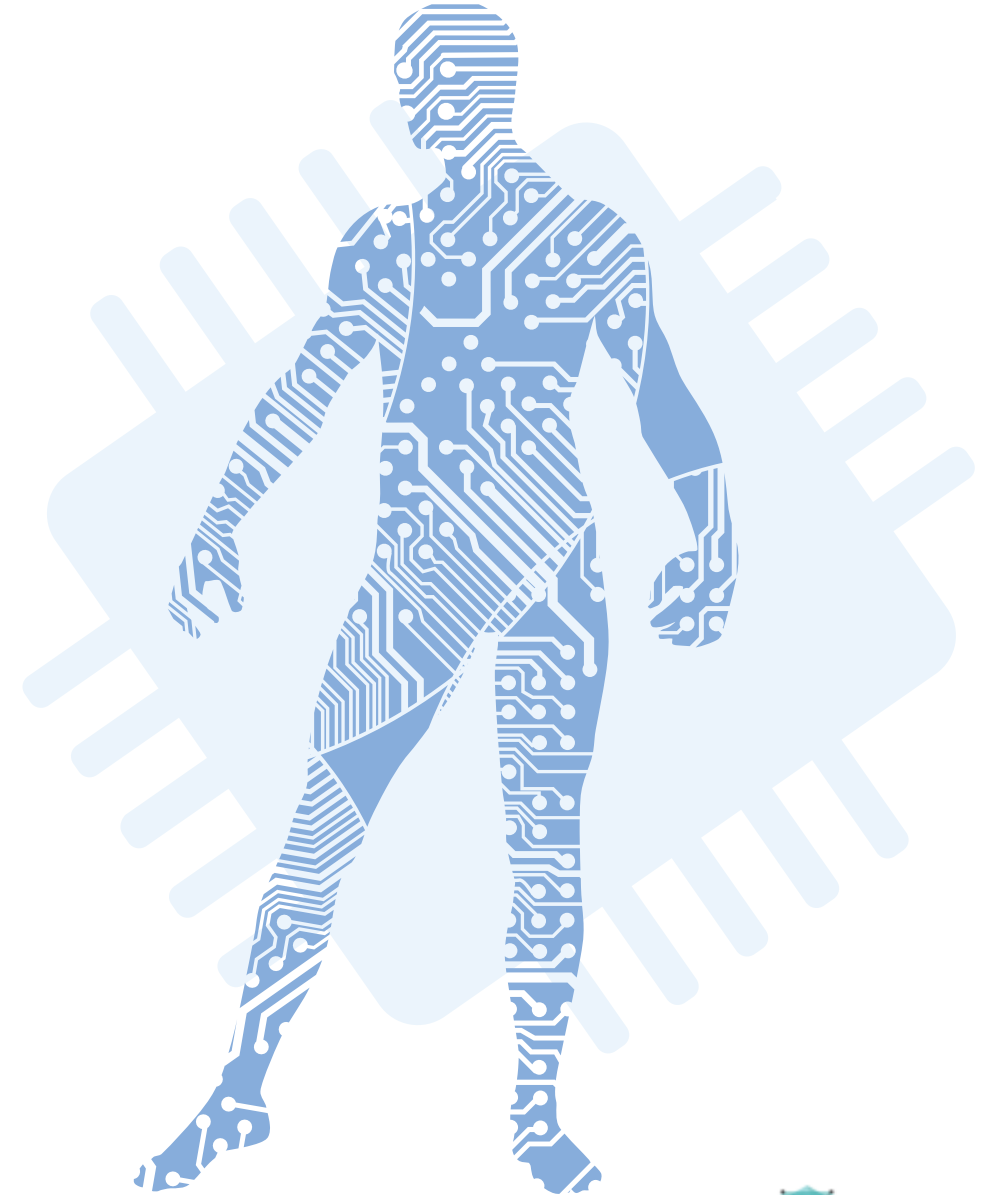
02 **Introduction to AI, ML/DL**

Briefly describe the concept of artificial intelligence including machine learning and deep learning modelling

03 **Customer Experience Strategy**

Briefly describe the concept of artificial intelligence including machine learning and deep learning modelling

04 **Cases Story**

Give how the retail and fashion industry do the sales prediction and improve customer experience

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Limitation of buiness intelligence (BI)

- Not many organization or company are focused on customer-centric strategy
- Business model also changing
- Surveying your customers and start listening to them is also indirect method for getting their information -> standardize
- Only Senior management want to understand the KPI and customer insight -> they only get different customer demographic segment
- Most of the business workflow process are standardized
- Not personalized prediction can be done using business intelligence

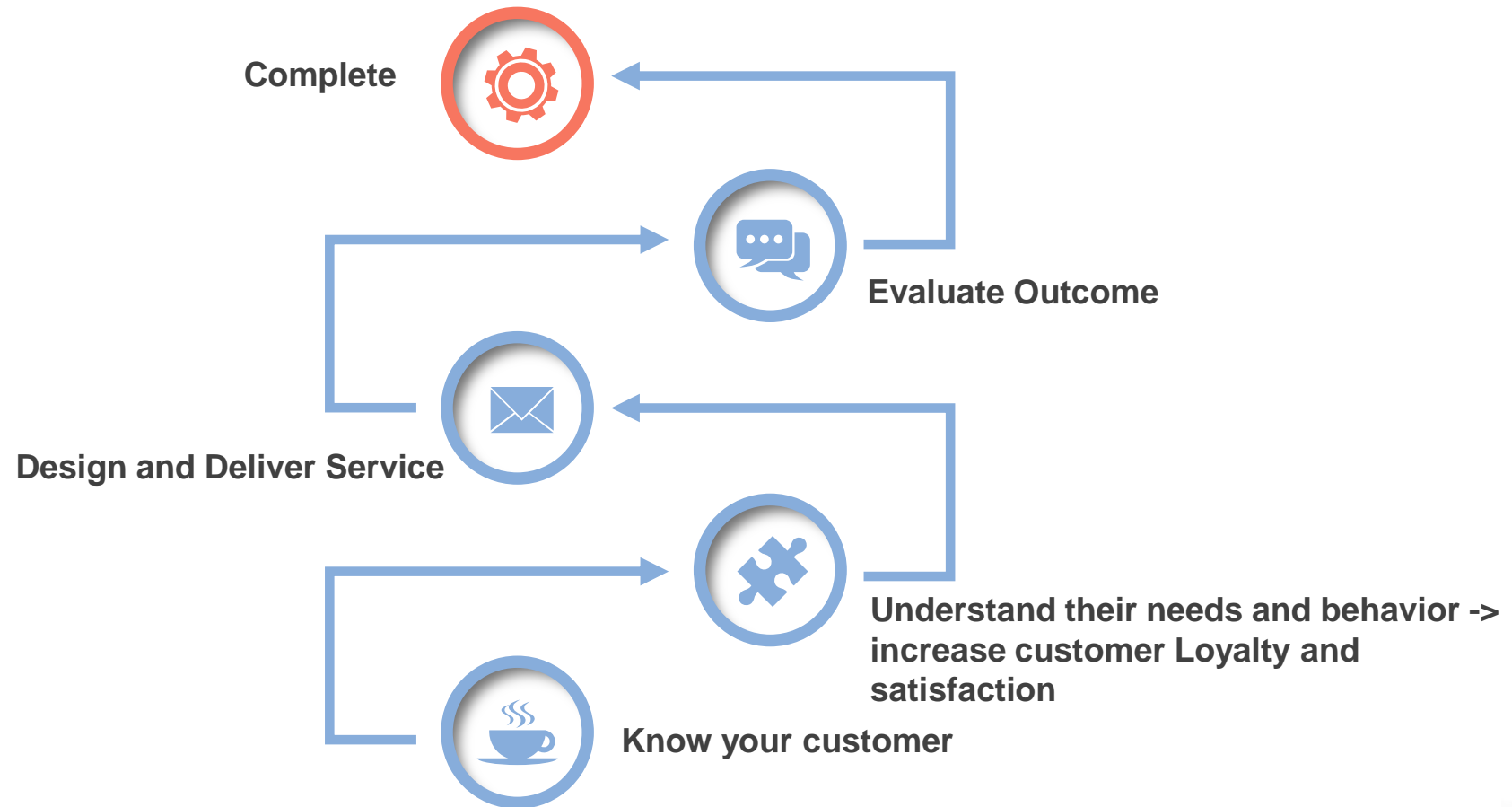https://lumoa.me/blog/customer-experience-challenges

How to solve the problem?

- Focus on customer-centric strategy instead business-centric strategy
- Make improvement on the customer experience (CX)
- Create better CX Strategy
  - Personalizing The User Experience
- Build the community and your brand
- Growing your brand awareness in a positive way
- Provide More business value
- Design better marketing strategy
- Use AI to improve customer experience

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Design better marketing strategy

Complete

Evaluate Outcome

Design and Deliver Service

Understand their needs and behavior -> increase customer Loyalty and satisfaction

Know your customer

https://www.gov.uk/government/publications/hmrc-digital-strategy-2014/hmrc-digital-strategy-2014

AI Market Trend

A Gartner study notes that "by 2020, 85% of customer interactions will be managed without a human" and that by 2040, "more than 40% of all data analytics projects will relate to an aspect of customer experience."

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AI
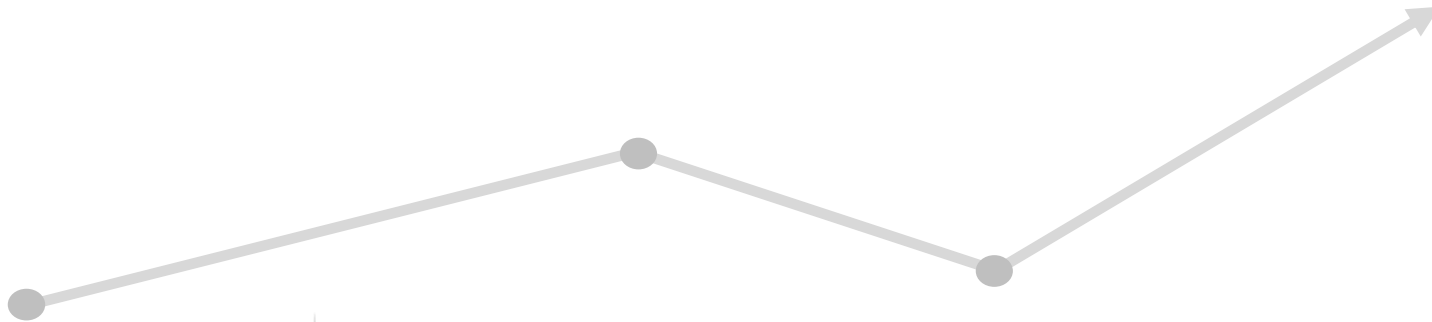
Introduction of Artificial Intelligence, Machine Learning and Deep learning

7 Decades of AI History

1950

Computer scientist Alan Tuning proposes a test for machine intelligence

1989

C.M.U pioneers the use of neural networks to steer autonomous vehicles

2017

AlghaGo beats world champion Ke Jie in Go, a difficult yet hugely popular board game

1964

A chatbot named Eliza is created at the MIT Artificial Intelligence Laboratory

2002

The debut of the Rooba, an antonomous robotic vacuum cleaner

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Types of Artificial Intelligence(AI)

- **Weak AI** – Simulating Thinking, limited in a specific or narrow area (Apple Siri, Facebook's news feed, Amazon's suggested purchases, Robots)
- **Strong AI** – Ability to reason, solve puzzles, make judgments, plan, learn and communicate.
    - Think like a human being.
    - have consciousness, objective thoughts, self-awareness, sentience, and sapience.
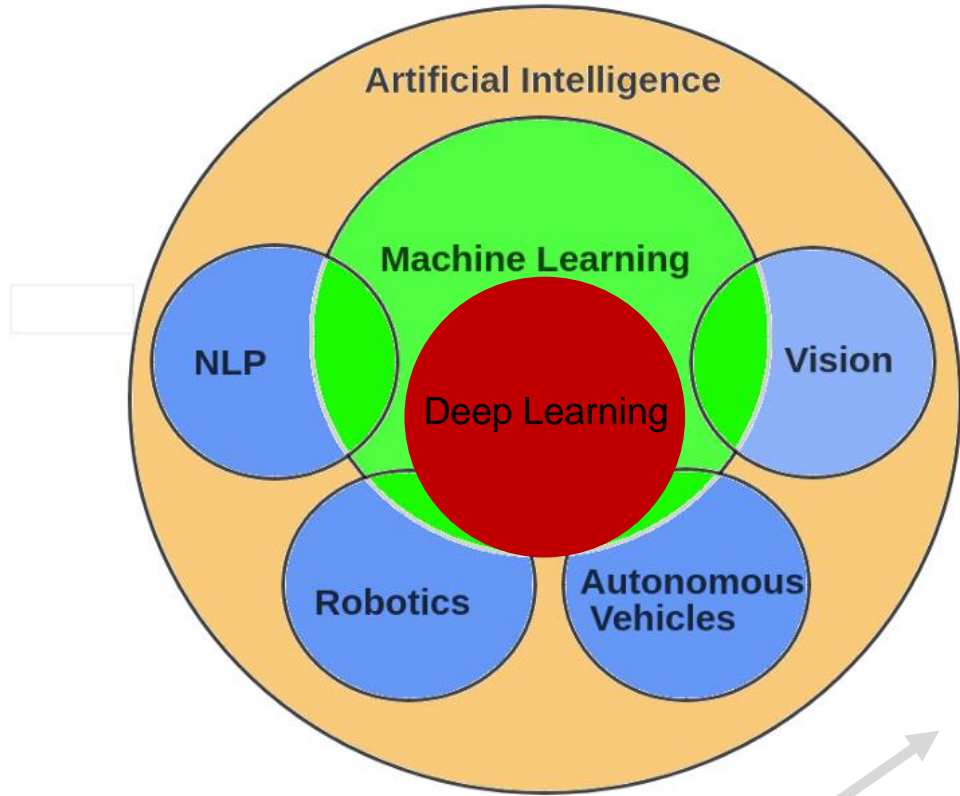   - Strong AI = Artificial General Intelligence (AGI).
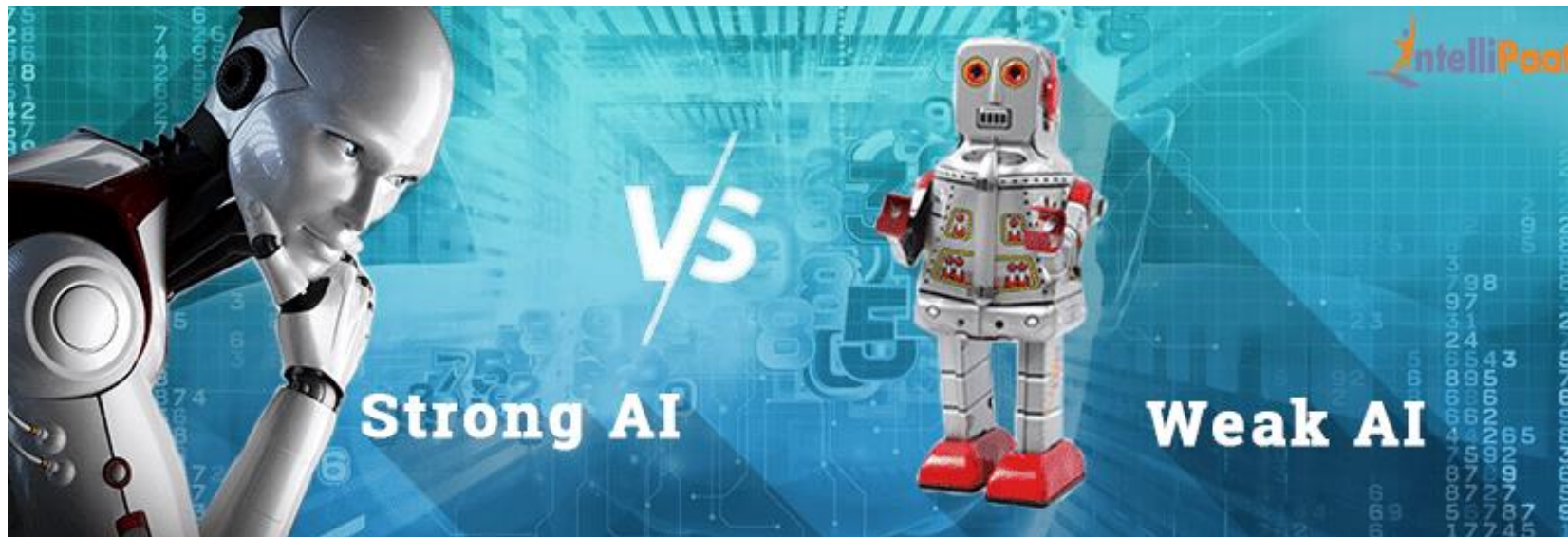
Types of Artificial Intelligence(AI)

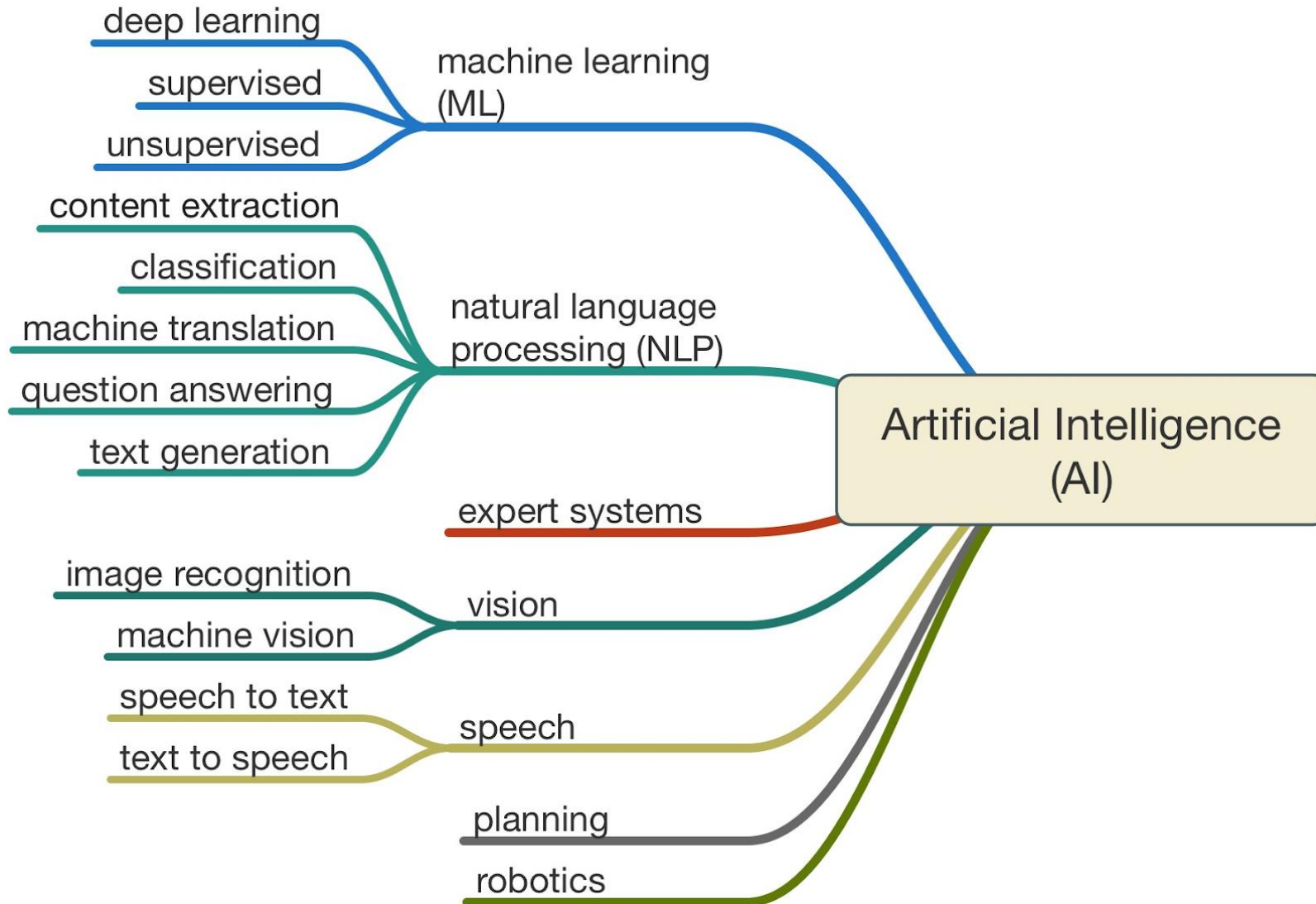|	Strong artificial intelligence	Weak artificial intelligence
Definition	• the form of artificial intelligence, which has the same intellectual abilities as human, or even surpasses him in it	• Weak AI is generally developed or used for specific application domains. • In a standard work on artificial intelligence, this is formulated as follows: "The assertion that machines could possibly act intelligently (called, weakness, act as if they are intelligent) is called the, weak AI 'hypothesis ...'"
Capabilities and Domains	• Logical thinking • Making decisions in case of uncertainty • To plan • To learn • Communication in natural language • Use all these abilities to achieve a common goal	• Expert systems • Navigation systems • Voice recognition • Character recognition • Suggestions for corrections in searches

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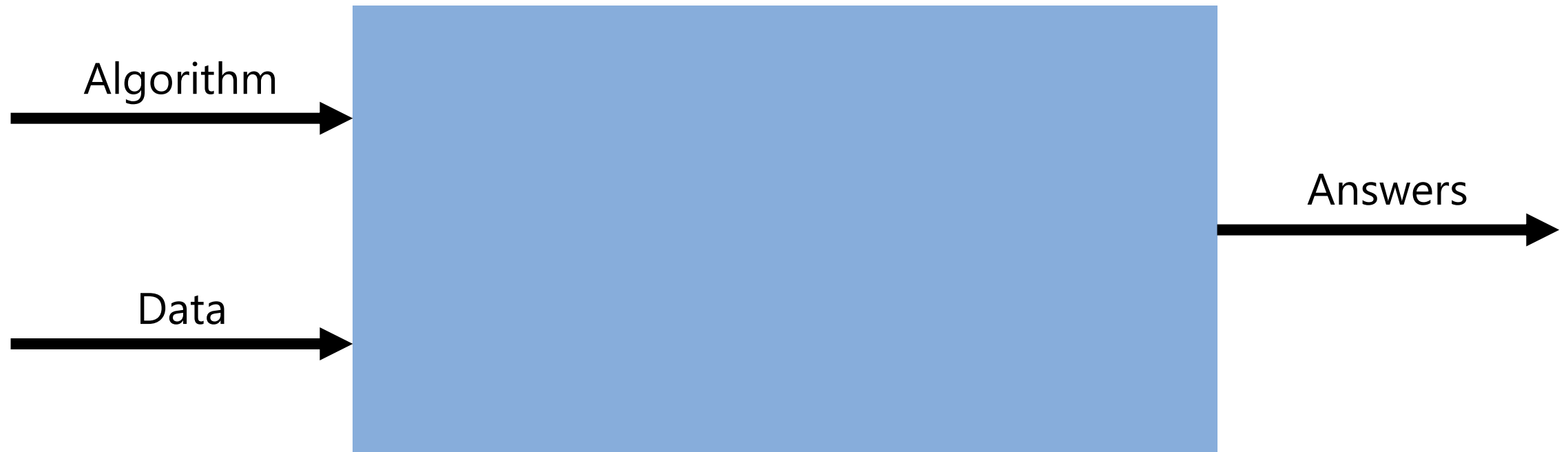# Ways of Artificial intelligence(AI)

- Machine Learning (ML)

- Deep Learning (DL)

- Natural Language Processing (NLP)

- Vision

- Robotics

- Autonomous Vehicles

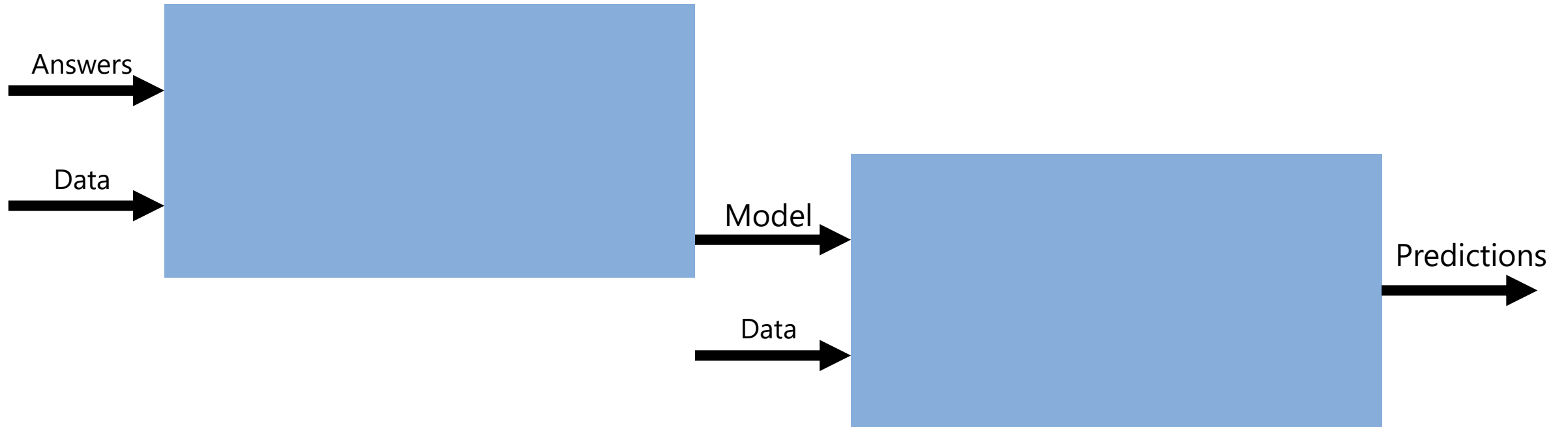# Ways of Artificial intelligence(AI)

Programming

Algorithm →

Data →

Answers →

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Machine Learning

Answers →

Data →

Algorithm →

Machine Learning

Answers →

Data →

→ Model

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Machine Learning

Answers ⟶

Data ⟶

Model ⟶

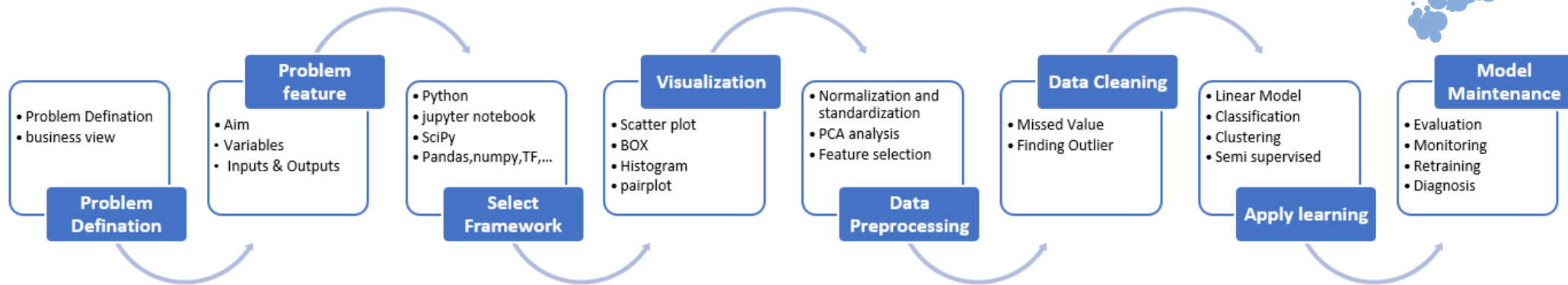# Machine Learning

Answers →

Data →

Model →

Data →

Predictions →

Machine Learning Categories

- Supervised Learning
  - Bayes' Theorem, Linear Regression, Polynomial Regression
  - Multivariate Regression
- Unsupervised Learning
  - K-Means Clustering, K-Nearest-Neighbors
- Reinforcement Learning
  - Deep Q Learning

Problem Defination
- Problem Defination
- business view

Problem feature
- Aim
- Variables
- Inputs & Outputs

Select Framework
- Python
- jupyter notebook
- SciPy
- Pandas,numpy,TF,...

Visualization
- Scatter plot
- BOX
- Histogram
- pairplot

Data Preprocessing
- Normalization and standardization
- PCA analysis
- Feature selection

Data Cleaning
- Missed Value
- Finding Outlier

Apply learning
- Linear Model
- Classification
- Clustering
- Semi supervised

Model Maintenance
- Evaluation
- Monitoring
- Retraining
- Diagnosis

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Machine Learning Workflow

- Use algorithms and statistical models to make predictions or decisions
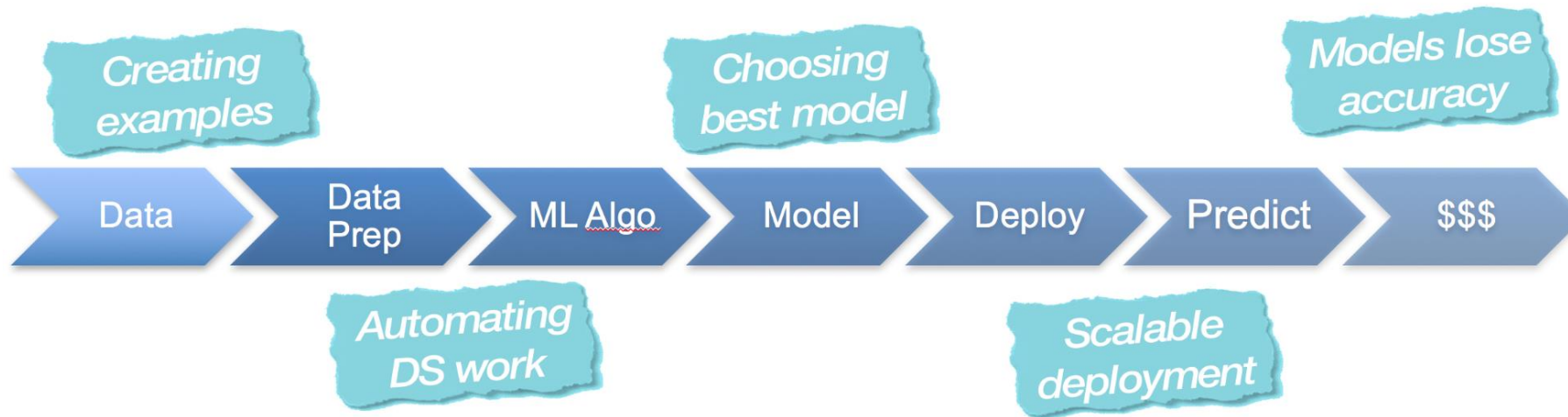
Deep Learning Modelling - CNN

- **Convolutional neural network (CNN)** is one of the main categories to do images recognition, images classifications. Objects detections, recognition faces etc., are some of the areas where CNNs are widely used.
- Architecture : AlexNet, VGGNet, GoogLeNet and ResNet

CONVOLUTIONAL NEURAL NETWORK (CNN)

LEARNED FEATURES

95%
3%
⋮
2%

CAR ✔
TRUCK ✗
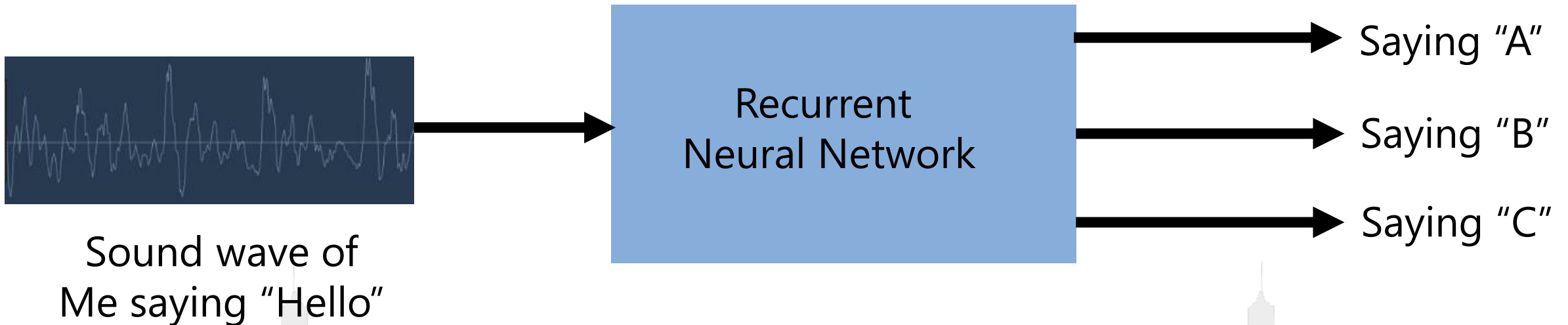⋮
BICYCLE ✗

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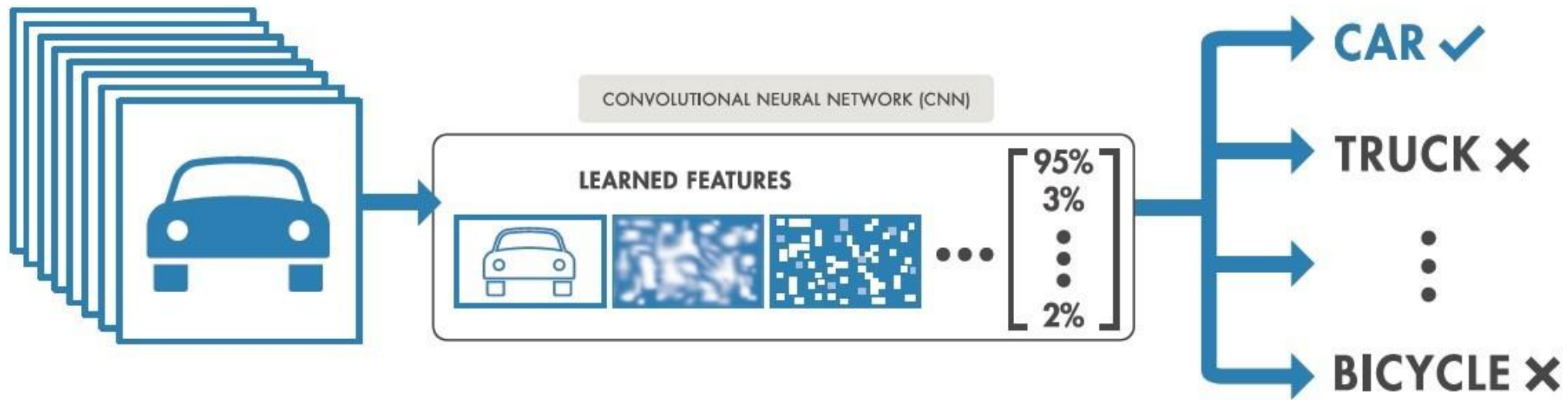
Deep Learning Modelling - RNN

- A recurrent neural network (RNN) can break down the signal like sound and transmitting them through a machine and output an answer and it can used in the sound classification.
- LSTMs have taken over the field of Natural Language Processing (NLP).

Input   Output

Recurrent Neural Network

→ Saying "A"

→ Saying "B"

→ Saying "C"

Sound wave of
Me saying "Hello"

https://www.analyticsindiamag.com/using-deep-learning-for-sound-classification-an-in-depth-analysis/

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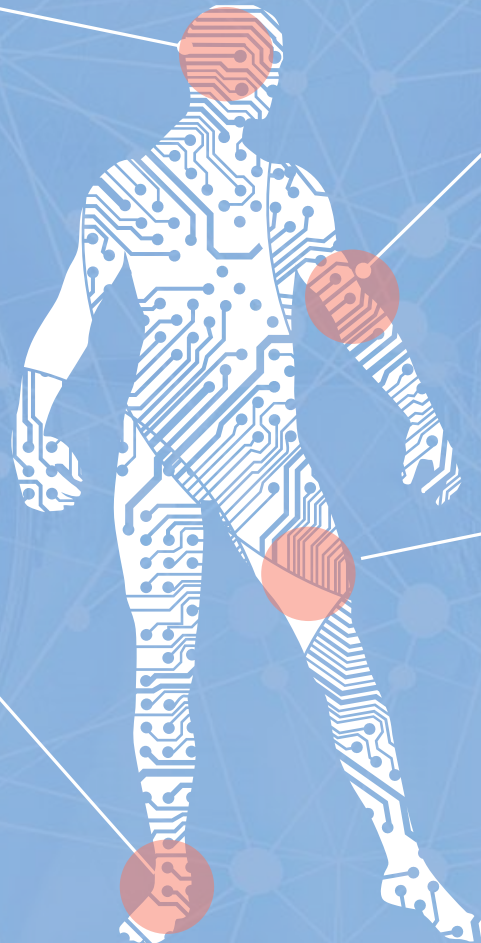
Artificial intelligence(AI) area

Machine Learning Use Cases

| Industry	Supervised	Unsupervised Learning	Reinforcement Learning
Banking	Predict credit worthiness of credit card holders : Build a machine learning model to look for delinquency attributes by providing it with data on delinquent and non-delinquent customers	Segment customers by behavior characteristics : Survey prospects and customers to develop multiple segments using clustering	Create a "next best offer" model for the call center group : Build a predictive model that learns over time as users accept or reject offers made by the sales staff
HealthCare	Predict patient readmission rates : Build a regression model by providing data on the patients treatment regime and readmissions to show variables that best correlate with readmissions	Categorize MRI data by normal or abnormal images : Use deep learning techniques to build a model that learns different features of images to recognize different patterns	Allocate scarce medical resources to handle different type of ER cases : Build a Markov Decision Process that learns treatment strategies for each type of ER case

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Machine Learning Use Cases

Industry	Supervised	Unsupervised Learning	Reinforcement Learning
Retail	Analyze product customers buy together : Build to identify frequent item sets and association rules from transactional data	Recommend products to customers based on a past purchase : Build a collaborative filtering model based on past-purchases by "customers like them"	Reduce excess stock with dynamic pricing : Build a dynamic pricing model that adjusts the price based on customer response to offers

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Modelling Techniques

NLP	Machine Learning	Deep Learning
Word2vec	Linear Regression	Deep Neural Network - DNN
Fasttext	Neural Network - NN	Convolutional Neural Network - CNN
Bert	SVM	Region CNN - R-CNN
elmo	Xgboost	Long-short term memory - LSTM
BoW	Random forest	Recurrent neural networks - RNN
Flair	Artificial Neural Network - ANN	Autoregressive integrated moving average - arima

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RNN, LSTN Usage

- RNN, LSTN -> Stock Market Prediction including market price
- Can predict Bitcoin and Ethereum price

AMZN Historical and Predicted Stock Price
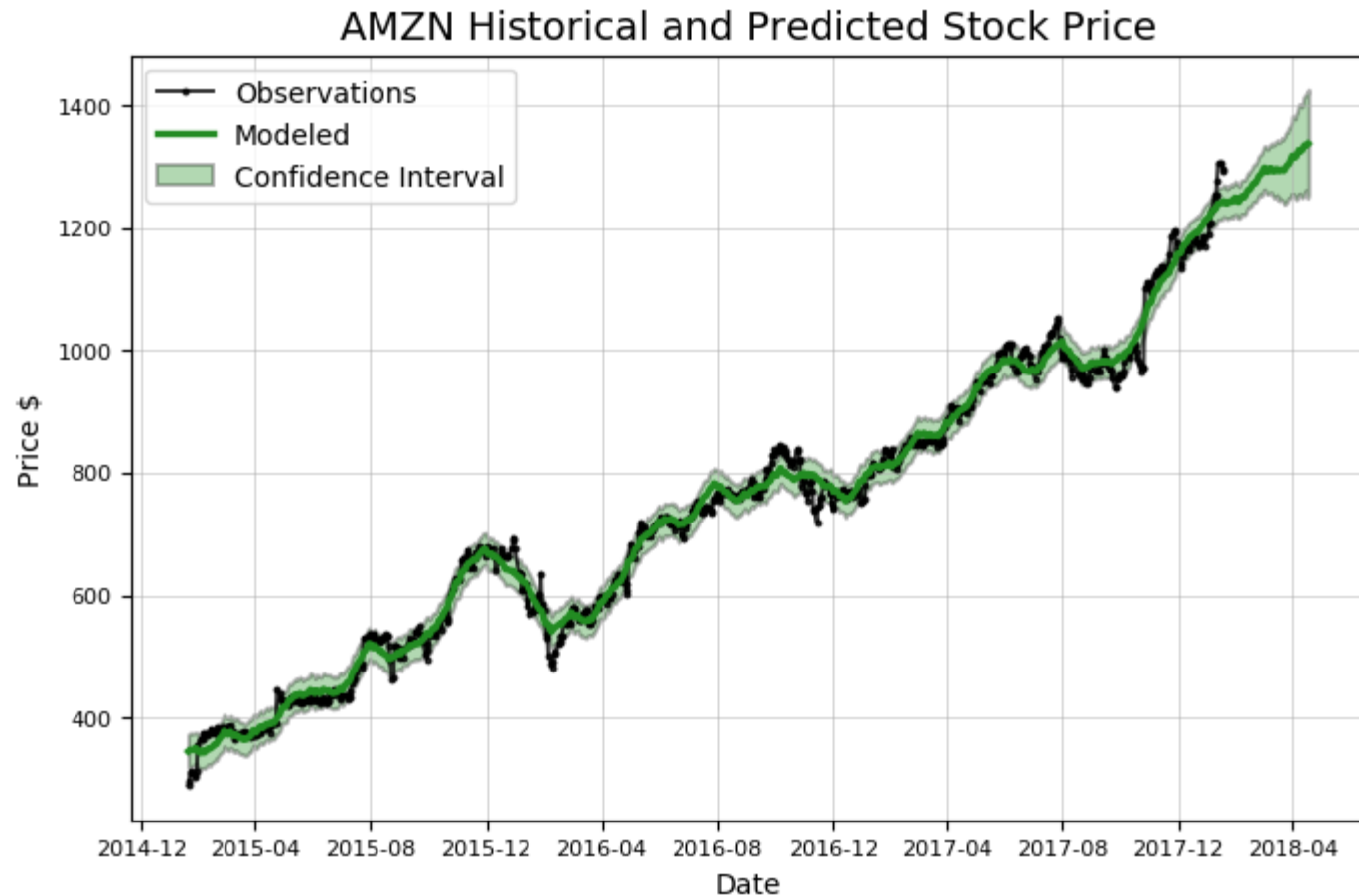
AI Customer Experience (CX) Strategy

What is customer experience (CX)

- Customer experience (CX) is defined by interactions between a customer and an organization throughout their business relationship.

- The interaction include

  - Awareness

  - Discovery

  - Cultivation

  - Advocacy

  - Purchases

  - Service

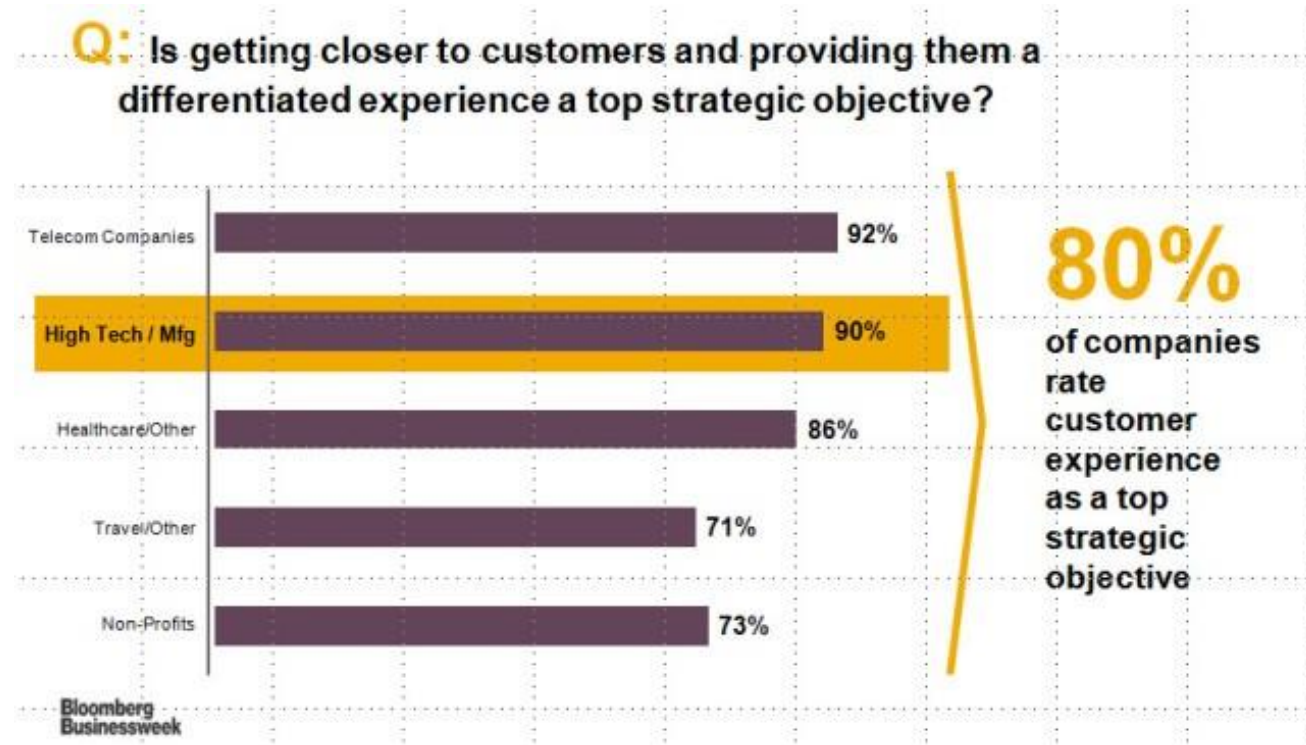MATRIX [CoWork]

Why improve customer experience (CX)

- In fact, a study by Oracle found that 74% of senior executives believe that customer experience impacts the willingness of a customer to be a loyal advocate. And the customer experience statistics don't stop there. If you want your customers to stay loyal, you have to invest in their experience!

Customer Experience and Loyalty

|	
Customer experience impacts willingness to be loyal	74%
Customers have more power today than 3 years ago	60%
Customers switch brands due to poor experience	59%
Customers are willing to pay for better experience	40%

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Why improve customer experience (CX)

- Retrain existed customers
- Deliver a great customer experience has become a top strategic objective. – by Bloomberg Businessweek Bloomberg
- A recent Customer Management IQ survey found that 75% of customer experience management executives and leaders rated customer experience a '5' on a scale of 1-5 (5 being of the highest importance).

Q: Is getting closer to customers and providing them a differentiated experience a top strategic objective?

Telecom Companies	92%
High Tech / Mfg	90%
Healthcare/Other	86%
Travel/Other	71%
Non-Profits	73%

Bloomberg Businessweek

80% of companies rate customer experience as a top strategic objective

https://blogs.sap.com/2011/10/28/the-customer-experience-edge/
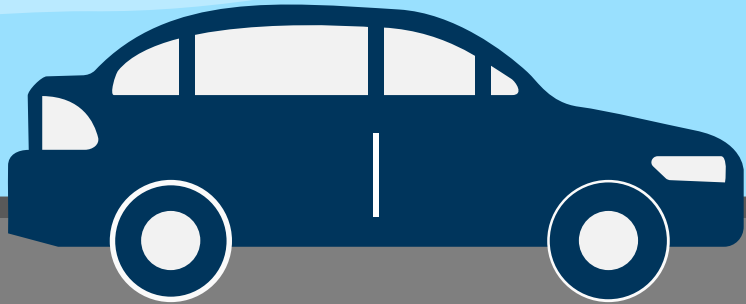
Why we improve customer experience?

1. Grow more customer -> Maximising revenue
2. Remember and retain your Existing Customers
3. Increase customer loyalty and understand why they leave
4. More new Clients and fixed existing clients -> More Revenue -> Increase sales volume.

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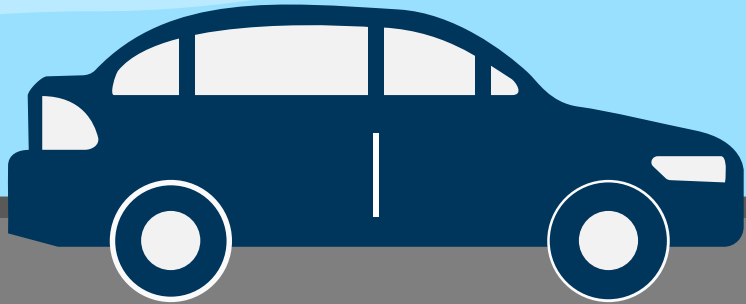
Why we improve customer experience?

5. Find opportunities to Cross-Sell, Upsells and Add-Ons.

6. Reduce Fixed Costs and gain more profits

7. Raise Prices to Increase Gross Margins and gain more profit margin

8. Improve the products and services you offer

9. Make better business decisions

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Customer Experience Strategy

Objective	CX Strategy	AI Strategy
Grow your customer	• Marketing content Campaign Customization • Design better marketing strategies	• Feature Extraction • Purchasing Recommendation • AI-enabled Customer Analytics (Facial recognition, Report)
Remember and retain your Existing Customers	• Improve measurement, analysis and optimization • Understand who your customer are • Create an emotional connection with your customers	• Product recommendation • Personality Analysis • Emotion Analysis and intelligence • Facial Recognition • Demographic Segmentation Analysis
Increase customer loyalty and understand why they leave	• Provide personalized responses 24/7 • Capture customer feedback in real time	• Chatbot (NLP) • Virtual Assistant / agents

Customer Experience Strategy

Objective	CX Strategy	AI Strategy
Increase Sales Volume and find opportunities to Cross-Sell, Upsells and Add-Ons.	Create a customer-centric strategy => Help CMO deliver better ROMI	Customer Purchase Prediction Product Recommendation
Reduce Fixed Costs and gain more profits	Manage costs	Inventory Management
Raise Prices to Increase Gross Margins and gain more profit margin	Create more business value Build better brand	Market Trend Prediction Ideal Price Point Recommendation
Improve the products and services you offer	Product Improvement	Visual Recognition Categories Classification Predictive Analysis
Make better business decisions	Measure the ROI from delivering great customer experience	Business Insight Analysis

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AI Features in Retail

- Chatbots, Virtual Assistants
- Facial Recognition
- Demographic Segmentation
- Facial Personality Analytics
- AI-enabled Customer Analytics
- Real-time insights
- Personalization
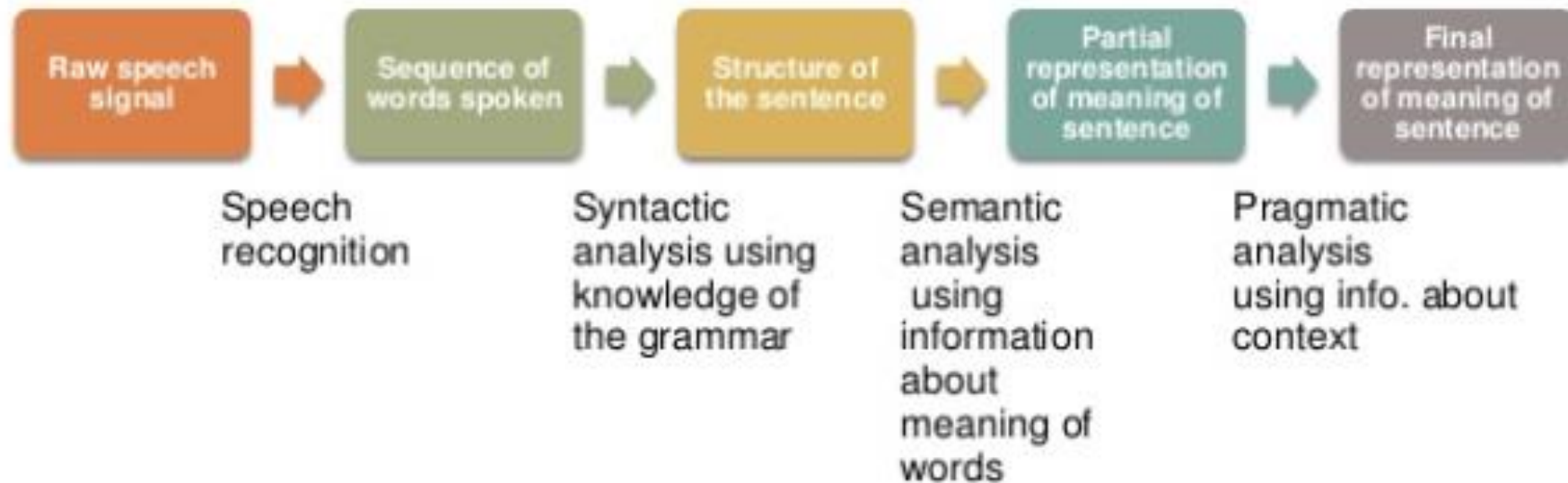- Inventory Management

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AI Features in Retail

- Visual Recognition
- Customer Purchase Prediction
- Trend Prediction
- Purchasing Recommendation
- Ideal Price Point Recommendation
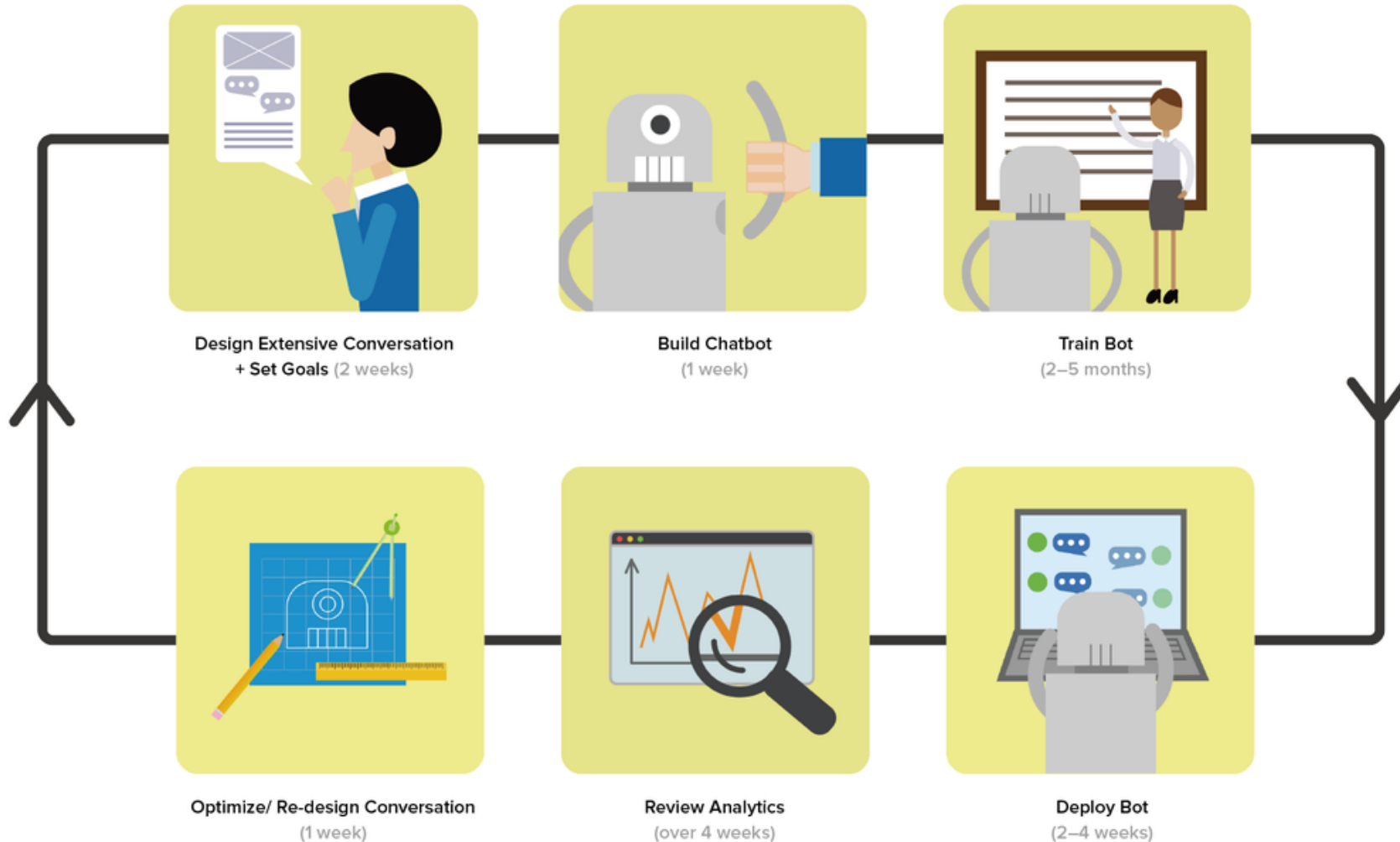- Predict the trends in Fashion, e-commerce, etc
- Predictive Analysis
- Predictive Personalization

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Natural Language Understanding (NLP) Concept

Chatbot Workflow

Design Extensive Conversation + Set Goals (2 weeks)

Build Chatbot (1 week)

Train Bot (2–5 months)

Optimize/ Re-design Conversation (1 week)

Review Analytics (over 4 weeks)

Deploy Bot (2–4 weeks)

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NLP in real life

- Machine Translation
  - Google Translate translates language from one language to another.
- Text Simplification
  - Rewordify simplifies the meaning of sentences.
- Sentiment Analysis
  - Hater News gives us the sentiment of the user.
- Text Summarization
  - Smmry or Reddit's autotldr gives a summary of sentences.
- Auto-Predict
  - Google Search predicts user search results.
- Auto-Correct
  - Google Keyboard and Grammarly correct words otherwise spelled wrong.
- Speech Recognition
  - Google WebSpeech or Vocalware.
- Question Answering
  - IBM Watson's answers to a query.
- Natural Language Generation
  - Generation of text from image or video data.

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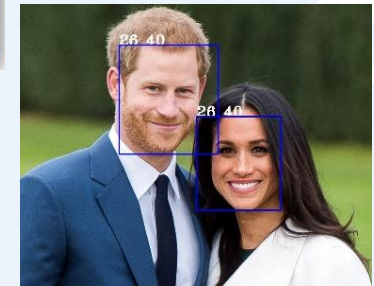# Video Analysis in Retail (Facial Recognition)

Facial Recognition Function

01 **People Counting**

Get a modern PowerPoint Presentation that is beautifully designed. I hope and I believe that this Template will your Time.
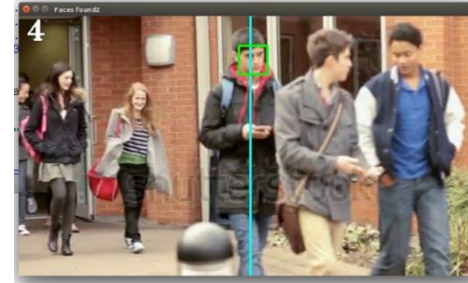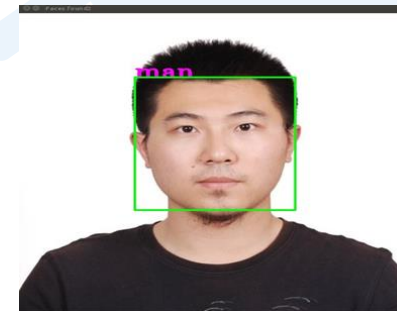
02 **Detect Age Group**

Get a modern PowerPoint Presentation that is beautifully designed. I hope and I believe that this Template will your Time.
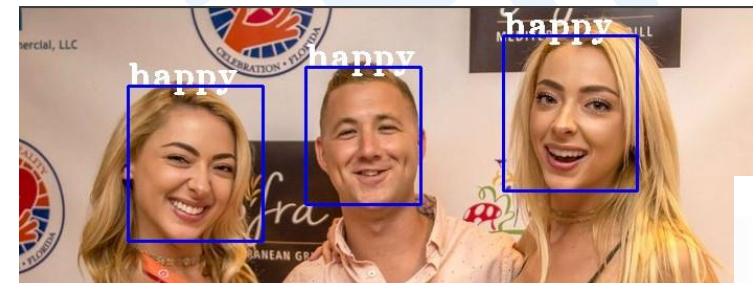
03 **Detect Gender**

Get a modern PowerPoint Presentation that is beautifully designed. I hope and I believe that this Template will your Time.
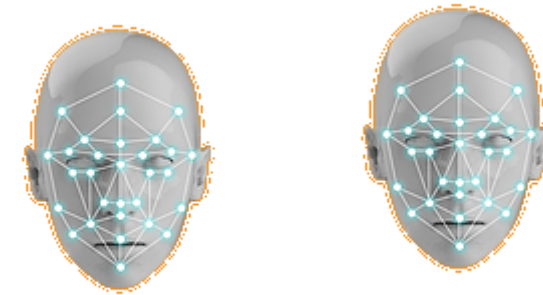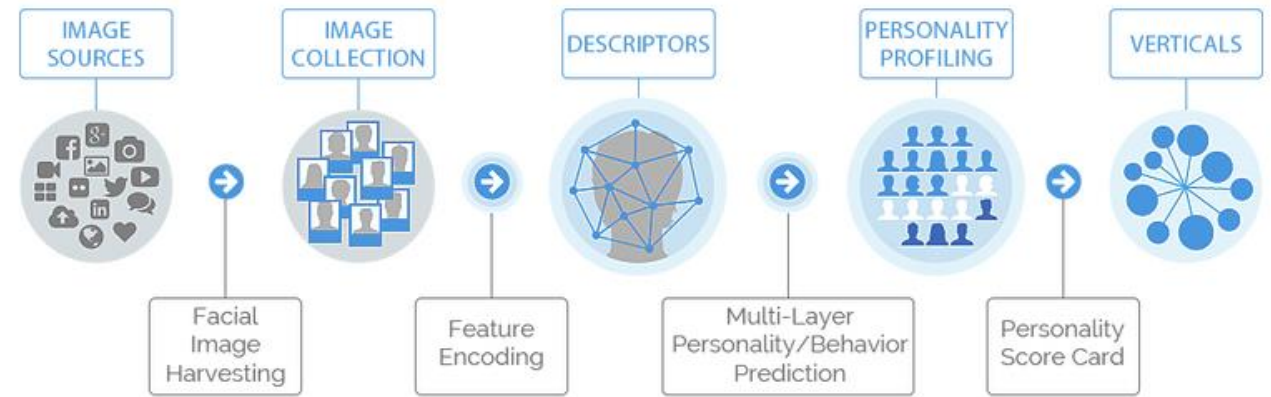
04 **Detect Emotion**

Get a modern PowerPoint Presentation that is beautifully designed. I hope and I believe that this Template will your Time.

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Cases : Facial Personality Analytics

- Proprietary computer vision and machine learning algorithms
- Analyzes facial images from any source
- Conduct Image quality analysis and filtering
- Provides scores and confidence levels for various personality traits and types
- Scalable and real-time
- Available as a SaaS solution, on a local machine, on camera,
- Can integrate with complementary solutions such as facial recognition systems

IMAGE SOURCES → IMAGE COLLECTION → DESCRIPTORS → PERSONALITY PROFILING → VERTICALS

Facial Image Harvesting — Feature Encoding — Multi-Layer Personality/Behavior Prediction — Personality Score Card

https://www.faception.com/our-technology

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Cases for computer vision personality

- **CLASSIFIERS**
  - High IQ
  - Academic Researcher
  - Professional Poken Player
 - Bingo Player
  - Brand Promotor
  - Terrorist

Openness
Conscientiousness
Extraversion
Agreeableness
Neuroticism

https://www.faception.com/our-technology

Cases : Customer Analytics

Features :
- Most advanced 3D Face analysis technology
- Gender and Age Analysis of all visitors, window-shoppers
- Understanding of Top 10 most visiting customers
- Low-cost and easy installation and integration into current
- Online statistical functional reporting in pdf, xls and cvs
- Virtual graphics for each gender and age group
- Hourly/Daily/Weekly/Monthly reporting in graphics

https://ayonix.com/products/ayonix-customer-analytics/

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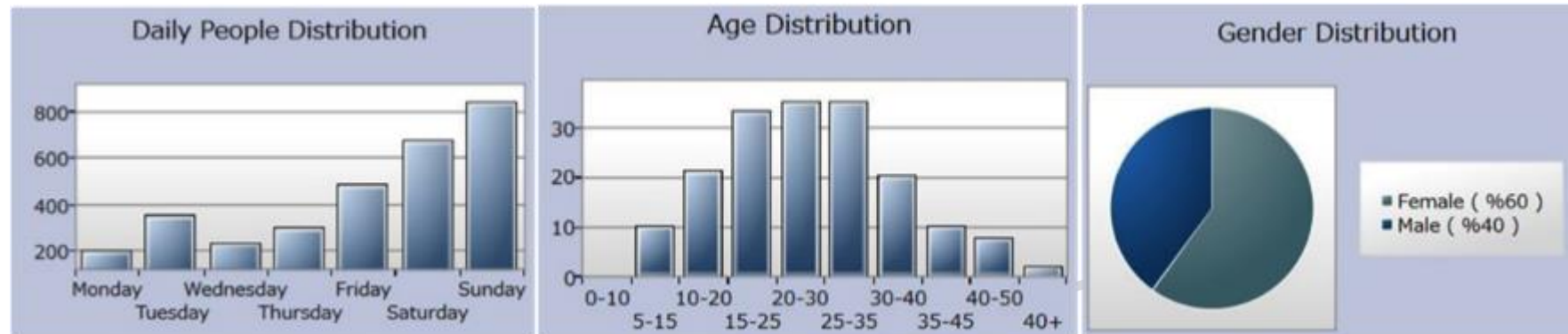
Cases : Facial recognition for customer analytics

Face Detection

Reliably detect human faces in a photo, along with their coordinates and sizes.

Emotions, Gender, Age

Recognize people's facial expressions and detects primary and secondary emotions. Also detects age and gender

https://findface.pro/en/solutions/face-recognition-for-customer-analytics.html

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AI

The impact of AI in Online Fashion Retail

The impact of AI in Online Fashion Retail

- The ever increasing scale and granularity of personalization in online fashion retail is impossible to manage without the assistance of AI and related automated processes.
- Gartner predicts that by 2020, customers will manage 85% of their relationships with an enterprise without interacting with a human.
- A growing number of companies who have adopted these new technologies are raising the bar on service and personalization, which customers have learned to expect.

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The impact of AI in Online Fashion Retail

- McKinsey says that the top 20 percent of fashion businesses generated 144 % of the industry economic profit and unless you become one of these top performing companies, you are highly unlikely to make any profit. That's why finding ways to implement AI is crucial as it helps companies streamline their costs and provide a better customer experience.
- This helps in becoming competitive and being placed among the TOP 20 percent of fashion businesses which actually turn a profit.

Currently, 44% of UK fashion retailers are facing bankruptcy and AI could be one of the many factors that attributed to it as companies who didn't find a way to properly implement it, are struggling to be competitive with the ones that did.

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Fashion AI Features

- Fashion Intelligence
- Fashion Tag Classification
- Clothes Image analysis
- Tailed made product
- Consumer/Customer buying behavior
- Personalization style recommendation
- Fashion Forecasting
- Fashion Design
- Fashion Intelligence

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Cases : Fine-Grained Clothing Style Detection And Retrieval

Retrieve Clothing with similar Style

https://www.slideshare.net/weidipurdue/stylefinder-finegrained-clothing-style-detection-and-retrieval

Cases : Motivation - Style

https://www.slideshare.net/weidipurdue/stylefinder-finegrained-clothing-style-detection-and-retrieval

Cases : Human Annotation of Attributes

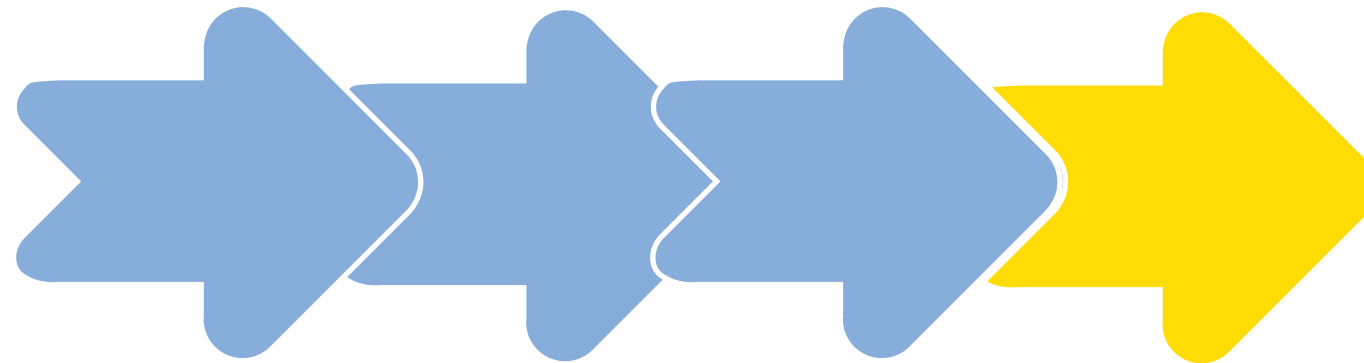
Human Annotation of Attributes

Human Annotation of Attributes

Attribute Type	Attribute
Materials	Fur, Denim, Leather/is leather-like, Shiny, Wool/is woolen or felt-like
Fastener	Zip, Button, Open, Has belt
Fastener style	Symmetrical (single-breasted), Asymmetrical (single-breasted), Asymmetrical (double-breasted)
Length	Short, Medium, Long
Cut	Fitted, Loose
Pocket	Chest pocket, Side pocket

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Cases : Query Retrieval Example

Cases : Query Retrieval Example

Infographic Style

01

Content Here

You can simply impress your audience and add a unique zing and appeal to your Presentations. Easy to change colors, photos and Text.

02

Video Analysis (Facial Recognition)

You can simply impress your audience and add a unique zing and appeal to your Presentations. Easy to change colors, photos and Text.

03

The impact of AI in Online Fashion Retail

You can simply impress your audience and add a unique zing and appeal to your Presentations. Easy to change colors, photos and Text.

04

Cases Story : Retail, Fashion Retail, Beauty

You can simply impress your audience and add a unique zing and appeal to your Presentations. Easy to change colors, photos and Text.

Industry of Artificial Intelligence

Retail, Fashion, beauty

Smart Living, Smart Driving

HealthCare

Logistics

Cases Story of AI

Salesforce's AI technology "Einstein" uses ML to analyze customer conversations to deliver a connected customer experience

Cases Story of AI

- Big tech giant like google, put AI more
- **Fortune 500 CEOs See A.I. as a Big Challenge -** http://fortune.com/2017/06/08/fortune-500-ceos-survey-ai/
- Know Your Customers and Reach Them in the Moment- https://theblog.adobe.com/know-customers-reach-moment-help-ai/
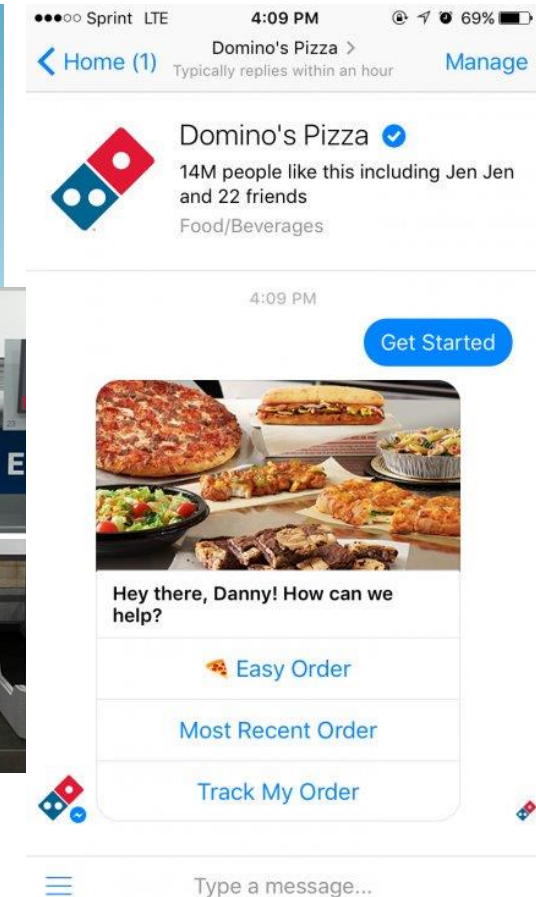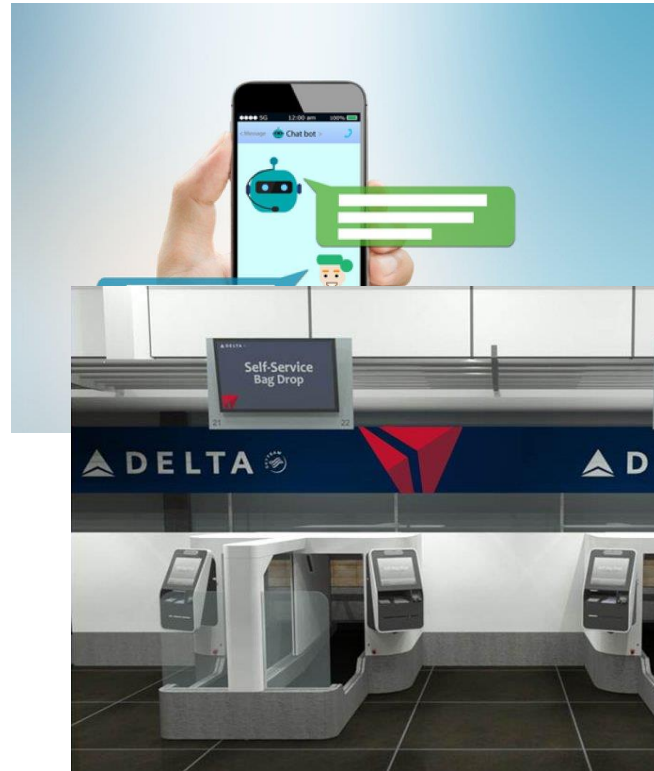- T&H brands connect and deliver one-to-one personalization.

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Cases Story of AI

- Spotify Uses Artificial Intelligence To Tailor Music According To Preference
- China Merchant Bank Uses WeChat Messenger to Handle Millions of Customers
- KFC Uses Artificially Intelligent Facial Recognition Software To Predict Orders

https://www.forbes.com/sites/blakemorgan/2018/02/08/10-customer-experience-implementations-of-artificial-intelligence/#7a772f222721

Cases Story of AI

- Detroit-based Feldman Automotive Group chatbot combines AI and natural language processing (NLP) to help create leads, increase consumer engagement, dealership traffic and sales.

- In 2017, Delta Airlines introduced four self-service bag drop machines at Minneapolis-St. Paul International Airport.

- Domino's Pizza allows customers to order pies through Facebook Messenger using only one word — 'pizza' — or the pizza emoji

https://www.cmswire.com/customer-experience/how-5-companies-successfully-introduced-ai-into-the-customer-experience/

Cases Story of AI

Dencity is a traffic analysis solution for shopping malls and retailers.
- Detect demographic criteria (age/gender) and people counting
- Provide information about people flow (footprint, heat maps)
- Visualize the data on reporting platform

https://medium.com/wassa/when-computer-vision-improves-customer-experience-f9f60586d362

Cases Story of AI (Beauty)

Skin tech brands are increasingly incorporating AI and other technologies for personalized skincare recommendations.

- **Function of Beauty** ($9.6M in total disclosed funding)

- **Prose** ($7.6M) have gained attention for their personalized shampoos and conditioners, skin tech brands are increasingly

- **Proven** ($4.7M) uses data from the world's largest beauty database and machine learning algorithms to personalize skincare products

- **HelloAva** ($300K) has launched a chatbot to guide users through a quiz to determine user-specific skincare recommendations

- **Curology** ($19.1M) offers a telemedicine-based approach to dermatology by sending custom prescriptions and relying on patient photos to measure progress over time.

BEFORE | AFTER

Results may vary

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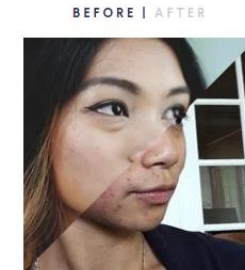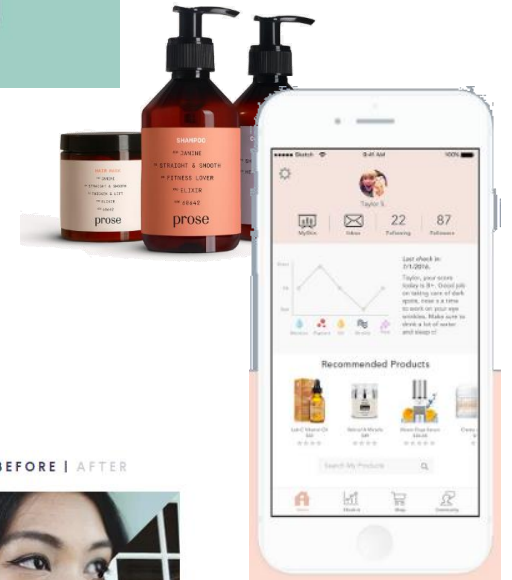
Cases Story of AI (Fashion)

Traditional and FastFashion tech brands are increasingly incorporating AI and other technologies for personalized fashion recommendations.

- Truefit provides an online fit recommendation engine that helps consumers to find brands and new styles on the market.

- Stylumia is a fashion intelligence startup that analyses and derives actionable intelligence.

- Hook is an AI-driven search & discovery platform for fashion products. You can search specific keywords, navigation patterns, price points, etc.

- Heuritech is an artificial intelligence platform that can predict fashion trends.

- Vue.ai is a retail industry's artificial intelligence platform that promises Intelligent Retail Automation.

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