

Inteligência Artificial (IA)

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Leitura pré-aula

<http://slideplayer.com/slide/8370515/>

“Are We There Yet? On Creating Intelligent
Behaviour”

Nello Cristianini

University of Bristol

Metáforas

Ernesto Costa e Anabela Simões, Inteligência Artificial, 2004

Computacional Newell e Simon, 1976

Inteligência= Processos+Estruturas Simbólicas

Conexionista McCullough e Pitts, 1943

Inteligência- propriedade emergente nas interacções de um número elevado de unidades elementares de processamento

Biológica Holland, 1975

Analogia com processos biológicos: algoritmos e programação genética; programação evolucionária

Ferramentas de IA

Sistemas periciais

Redes neuronais

Algoritmos genéticos

Reconhecimento de padrões

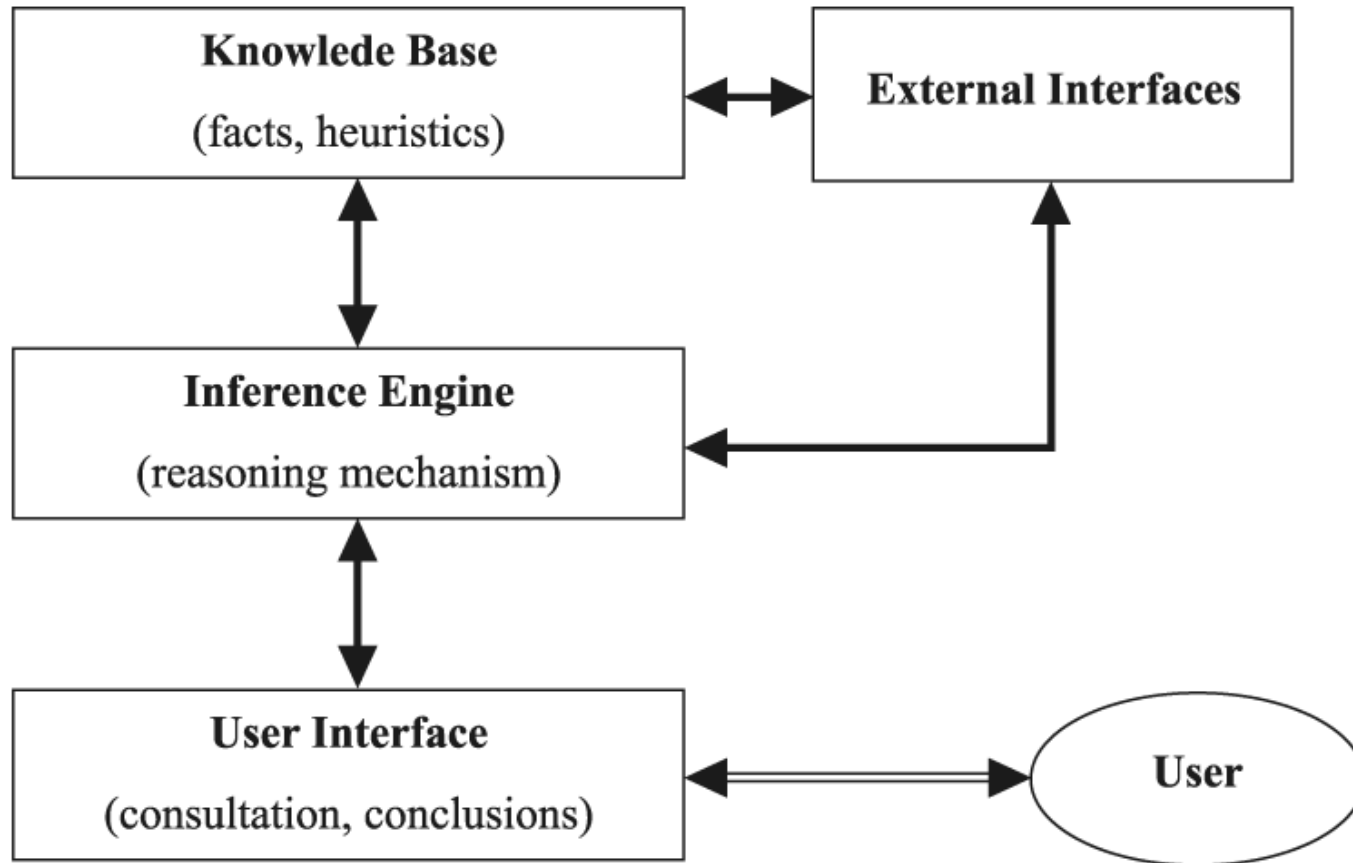
Modelação baseada em agentes

Chat bots

IA generativa

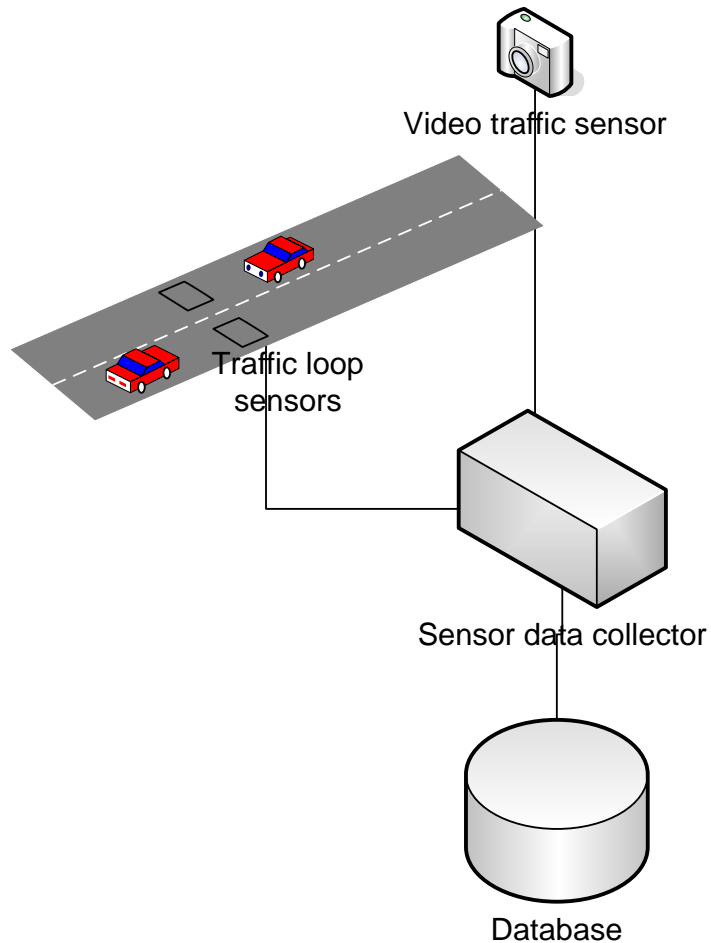
Sistemas periciais

Dendral, Mycin, Prospector et al.



Redes neuronais

m-Traffic



Recolhe as informação dos sensores

Velocidade média

Intensidade de tráfego

Independente do tipo de sensores

Sensores de chão

Sensores de video

Classifica a informação recolhida

Hora

Dia da semana

Dia do mês

Mês

Feriados

Variáveis meteorológicas

Redes neuronais

m-Traffic

Aplicação de algoritmos de inteligência artificial

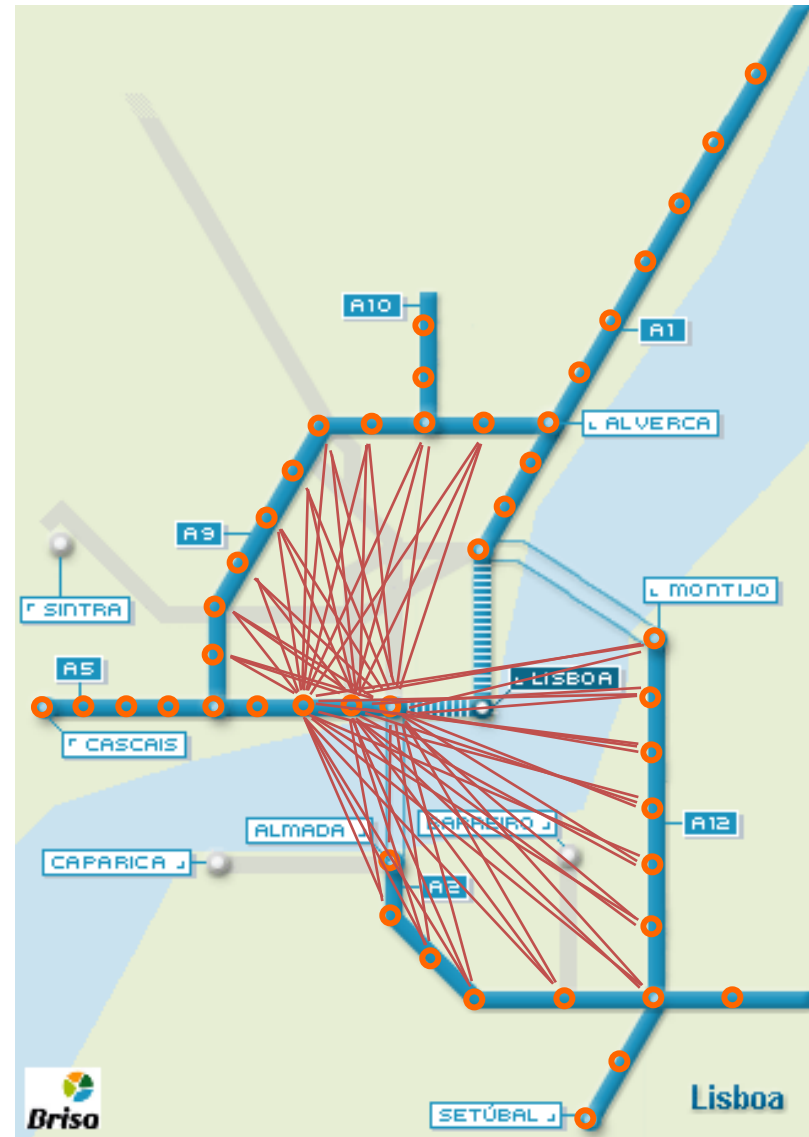
Usa a informação recolhida no passado

Inferir as relações entre a intensidade do tráfego
nos vários pontos ao longo do tempo

Redes neuronais

m-Traffic

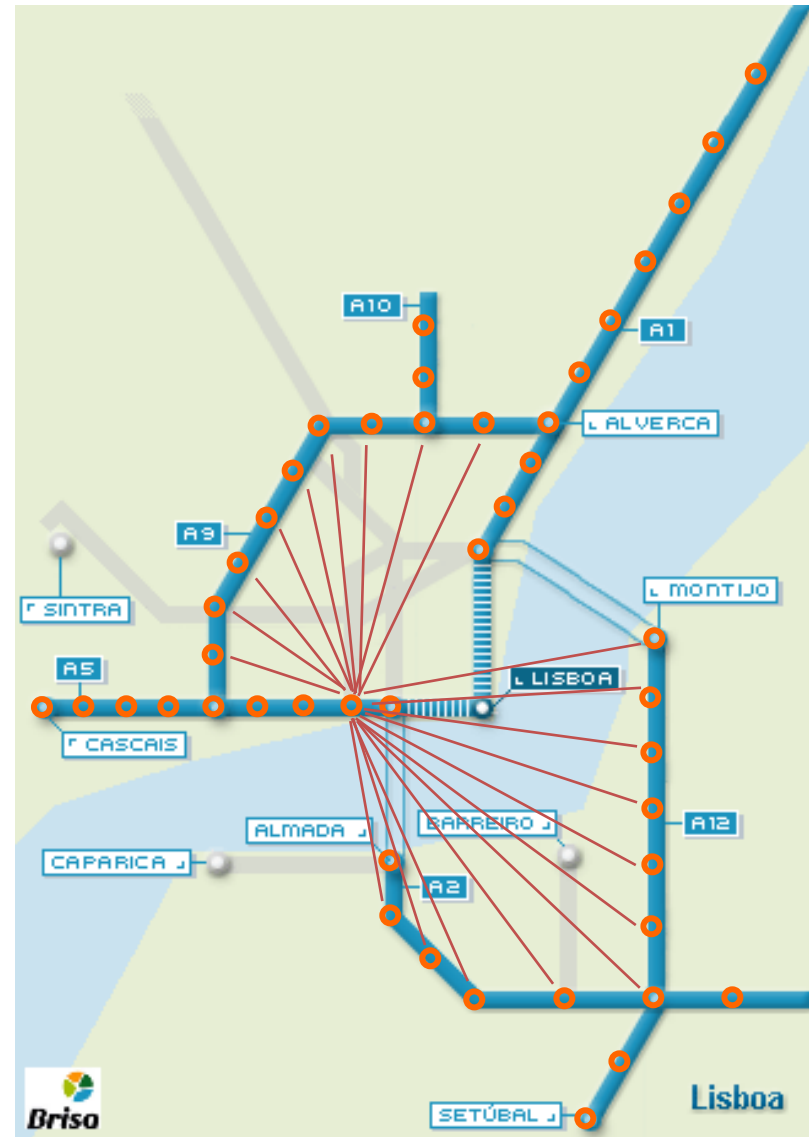
- Rede de sensores
- Aprendizagem
 - Feita periodicamente
 - Relaciona valores de cada sensor com todos os outros, desfasados no tempo
 - 5 minutos
 - 10 minutos
 - 20 minutos
 - Inclui classificação
 - Hora
 - Dia da semana
 - Dia do mês
 - Mês
 - Feriados
 - Variáveis meteorológicas



Redes neuronais

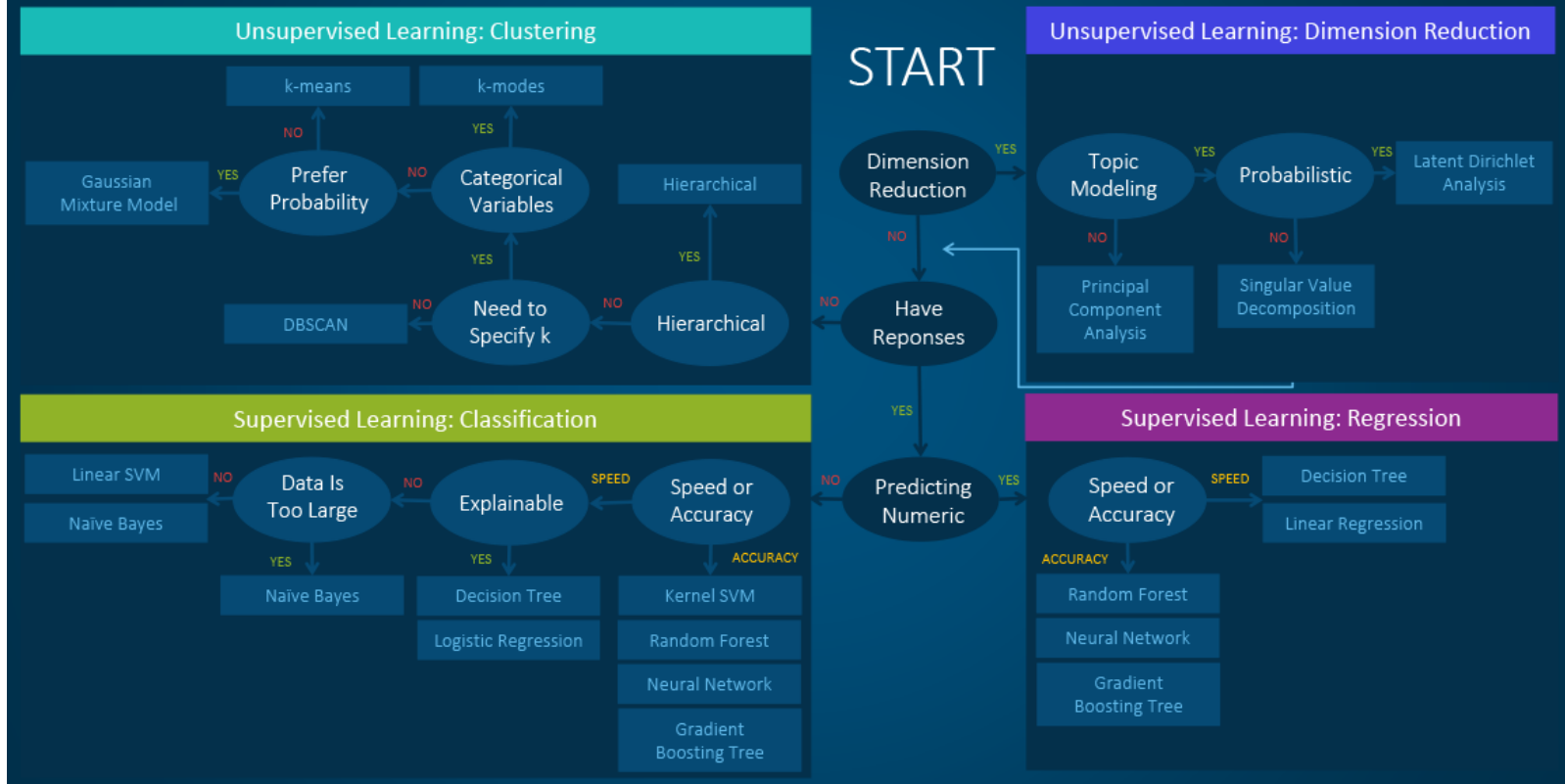
m-Traffic

- Dada a informação num dado momento é possível prever a intensidade do trânsito em cada ponto daí a:
 - 5 minutos
 - 10 minutos
 - 20 minutos



Redes neuronais

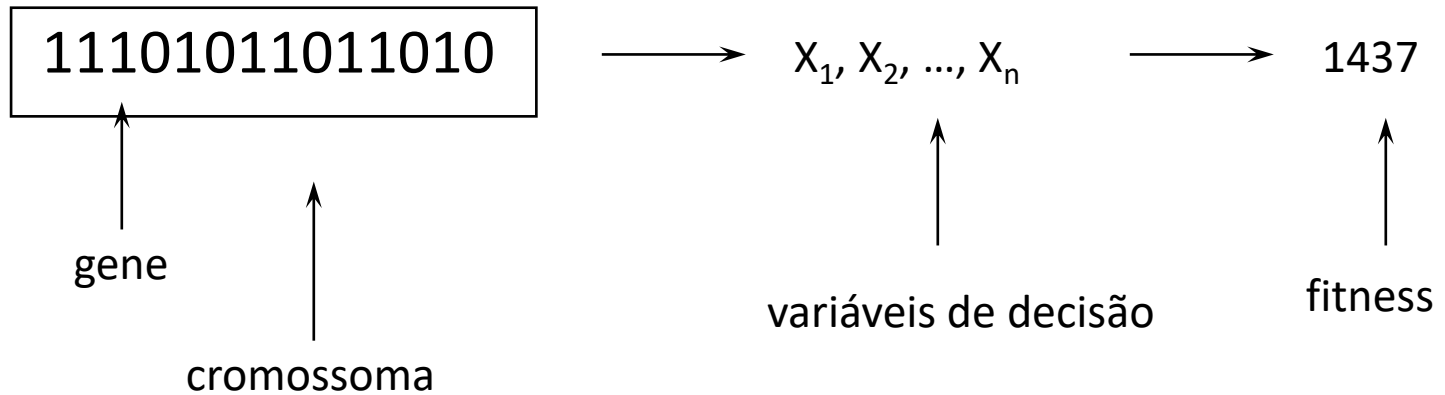
Machine Learning Algorithms Cheat Sheet



<https://tinyurl.com/y8jjajko>

<https://www.coursera.org/learn/neural-networks-deep-learning>

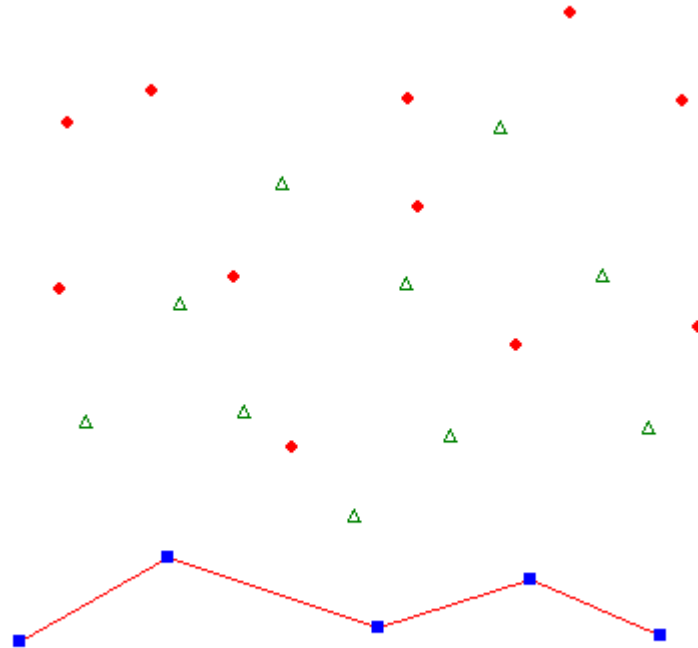
Algoritmos genéticos



Algoritmos genéticos

1. Inicializar aleatoriamente uma população com N indivíduos
2. Calcular fitness de todos os indivíduos da população
3. Criar uma nova população através do operador de selecção
4. Efectuar “crossing-over” entre cada par de indivíduos
5. Efectuar mutação em cada gene, com probabilidade P_m
6. Voltar ao passo 2

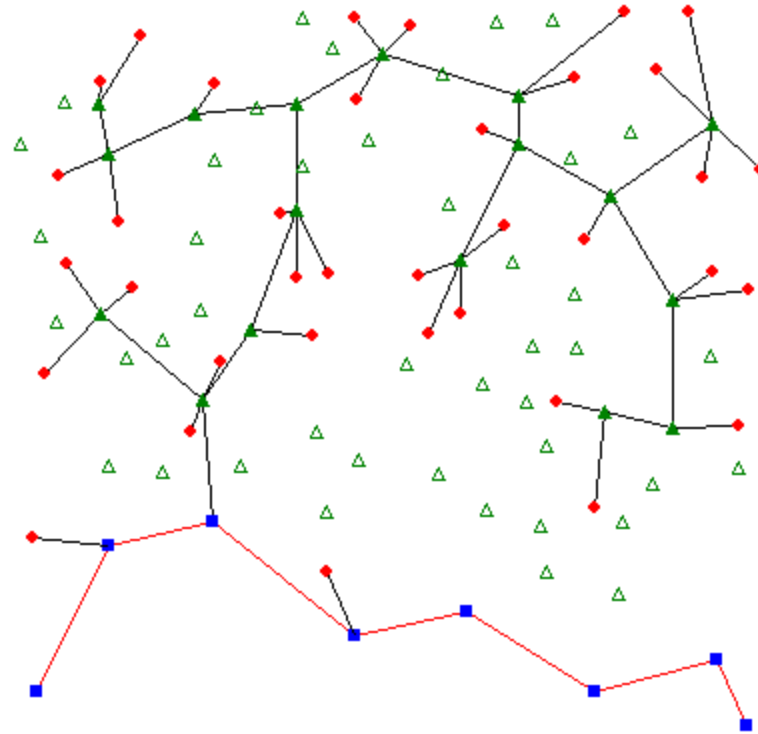
Algoritmos genéticos



10 variáveis de decisão binárias (10 triângulos).

Pretende-se expandir a rede elétrica de modo a abastecer as casas (círculos vermelhos). As casas podem ser ligadas directamente a fontes de energia (quadrados azuis), ou podem ser ligadas primeiro a transformadores (triângulos). O objectivo é expandir a rede da maneira mais económica possível.

Algoritmos genéticos



Algoritmo genético descobriu esta solução passado algumas gerações

Um exemplo com 60 variáveis de decisão binárias.

$2^{60} \approx 1000000000000000000$ de hipóteses possíveis!

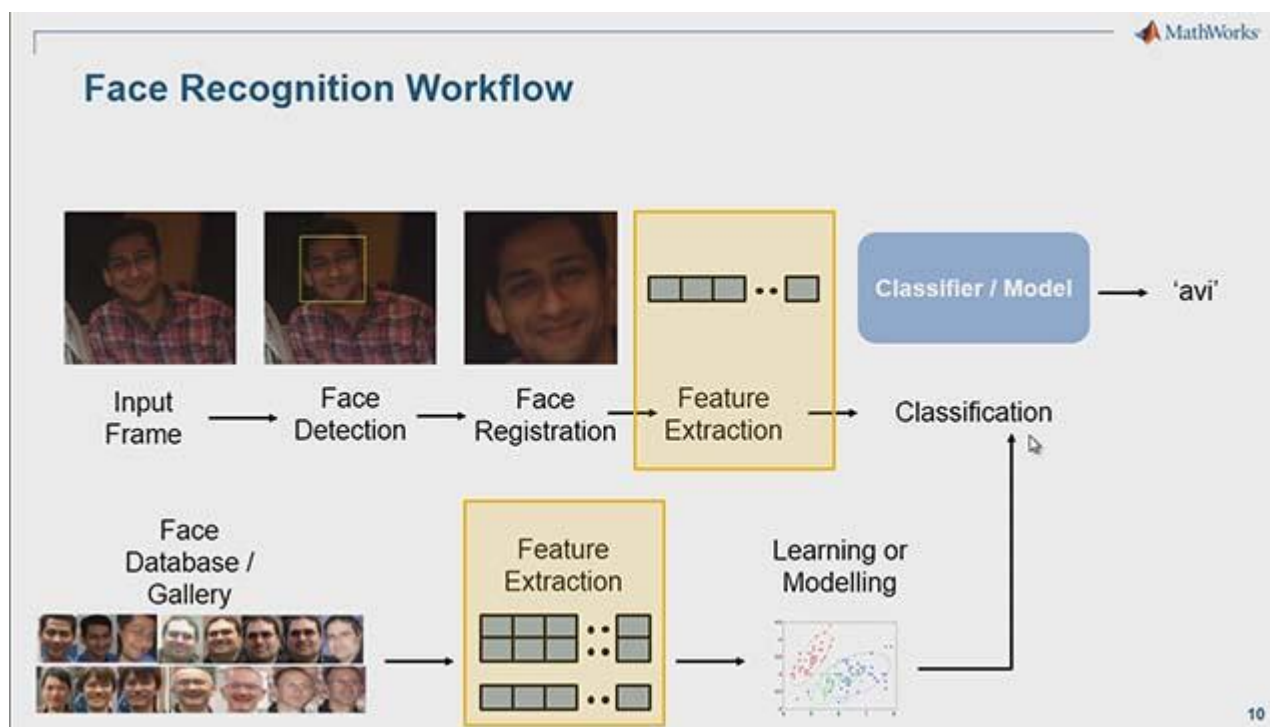
Programação genética

Karl Sims



<https://www.youtube.com/watch?v=bBt0imn77Zg>

Reconhecimento de padrões



Classificação de objectos em categorias ou classes
Utilização em reconhecimento de imagens, escrita, voz

Modelação baseada em agentes



<https://www.youtube.com/watch?v=UaC0UoakO7k>

Inteligência artificial

Design

Busca

Planeamento

Segurança

Computação

“Human augmentation” (bots et al.)

Inteligência artificial

bots (www.conversable.com)

MESSAGING IS THE NEW APP PLATFORM

Consumers and brands will now connect directly through one to one conversations in whichever channel the consumer prefers.



— 20 YEARS AGO —

websites & email



— 5 YEARS AGO —

mobile apps



— PRESENT DAY —

interactive messaging



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EVOLUTION OF CUSTOMER INTERACTION



PHONE

Customer calls in by phone to speak to a customer service rep. Long wait times, bad IVRs, and constant holds often yield a frustrating and bad experiences.



WEB/MOBILE

Customer uses web and mobile apps to achieve goals. Data and functionality not always available and sometimes difficult or impossible to reach.



MESSAGING

Customer communicates via messaging platforms for instant access to enterprise systems for commerce, care, and content.

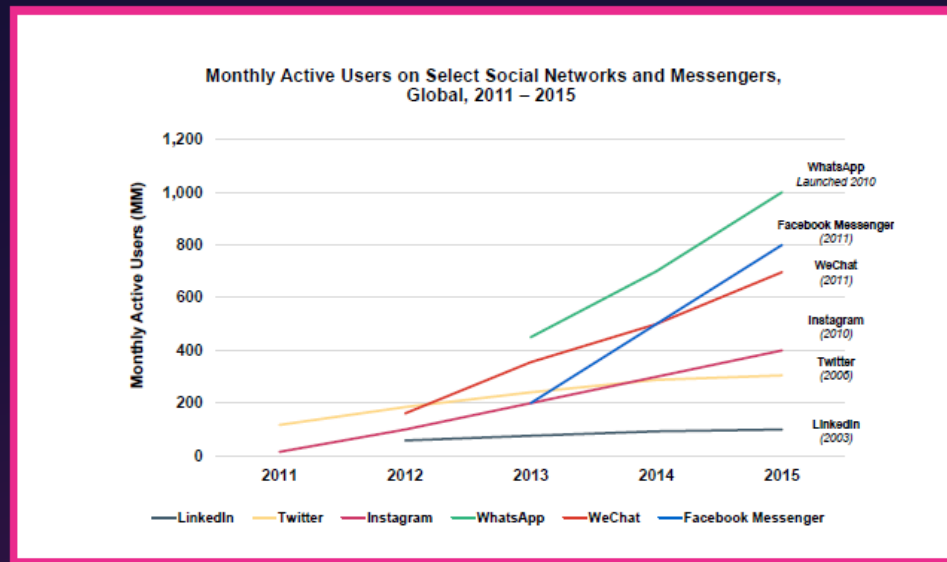


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AND MESSAGING USE IS EXPLODING

Mary Meeker's 2016 internet trends reports shows the continued rapid growth of messaging apps.



Source: 2016 Internet Trends Report - KPCB Mary Meeker



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WHILE APP FATIGUE CONTINUES

Day in Life of a Mobile User, 2016

	Average # Apps Installed on Device*	Average Number of Apps Used Daily	Average Number of Apps Accounting for 80%+ of App Usage	Time Spent on Phone (per Day)	Most Commonly Used Apps
USA	37	12	3	5 Hours	Facebook Chrome YouTube
Worldwide	33	12	3	4 Hours	Facebook WhatsApp Chrome

Source: 2016 Internet Trends Report - KPCB Mary Meeker

Average Global Mobile User = ~33 Apps

80% of Time Spent in 3 Apps
12 Apps Used Daily

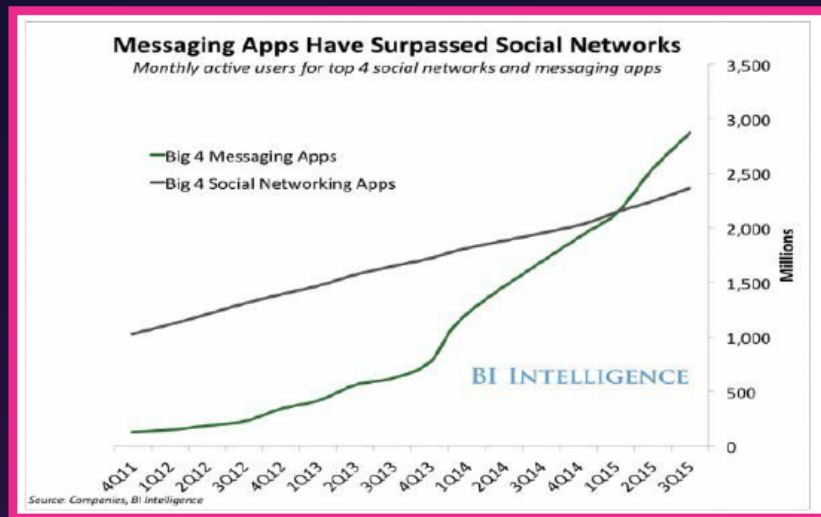


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MESSAGING IS ALREADY BIGGER THAN SOCIAL MEDIA

A 2015 study notes the combined user base of the top chat apps (including WhatsApp, WeChat, and Viber) and noted that these applications surpassed the user base of the top four social media platforms (Facebook, Twitter, LinkedIn, and Instagram) - at roughly 2.125 billion users.



Source: Business Insider Intelligence

These discernible market trends point towards conversational commerce as a more seamless option for businesses to integrate and personalize the entire B2C user experience – from technology enhancements and tailored content to the commerce experience and overall customer service.



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MILLENNIALS PREFER MESSAGING

Popularity of Business Contact Channels, by Age

Which channels are most popular with your age-profiled customers?
(% of contact centers)

	% of Centers Reporting Most Popular Contact Channels by Generation				
	Internet / Web Chat	Social Media	Electronic Messaging (e.g. email, SMS)	Smartphone Application	Telephone
Generation Y (born 1981-1999)	24% (1 st choice)	24% (1 st choice)	21% (3 rd choice)	19% (4 th choice)	12% (5 th choice)
Generation X (born 1961-1980)	21% (3 rd choice)	12% (4 th choice)	28% (2 nd choice)	11% (5 th choice)	29% (1 st choice)
Baby Boomers (born 1945-1960)	7% (3 rd choice)	2% (5 th choice)	24% (2 nd choice)	3% (4 th choice)	64% (1 st choice)
Silent Generation (born before 1944)	2% (3 rd choice)	1% (4 th choice)	6% (2 nd choice)	1% (5 th choice)	90% (1 st choice)

No age group picked mobile apps in their top 3.

Best Ways for Businesses to Contact Millennials = Social Media & Chat / Worst Way = Telephone

Source: 2016 Internet Trends Report - KPCB Mary Meeker

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HIGH LEVEL USE CASES

Consumers and brands can **connect directly** through **one-to-one conversations** in a variety of use cases including content, customer service, commerce, and internal.

CONTENT

Deliver the right content to the end user when they ask for it.

CARE

Answer questions quickly to efficiently deliver next generation customer service.

INTERNAL

Replace your outdated intranet portal with something that is modern, snappy and useful.

COMMERCE

Help your customer find what they are looking for and complete a purchase.

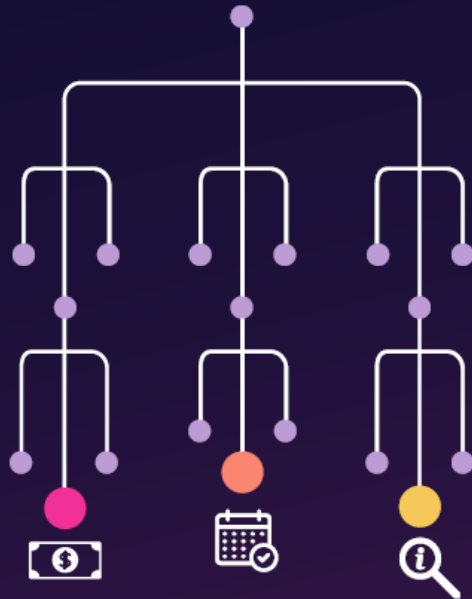


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USING CONVERSATIONAL FLOWS

The Conversable platform focuses on building *conversational flows*.



The purpose of a conversational flow is to *guide a user to a desired outcome*:



PLACE AN ORDER



FIX AN ISSUE

(reset route, schedule service call, etc.)



FIND INFORMATION

(which terminal, store location, etc.)

Conversational flows can have many branches and outcomes.

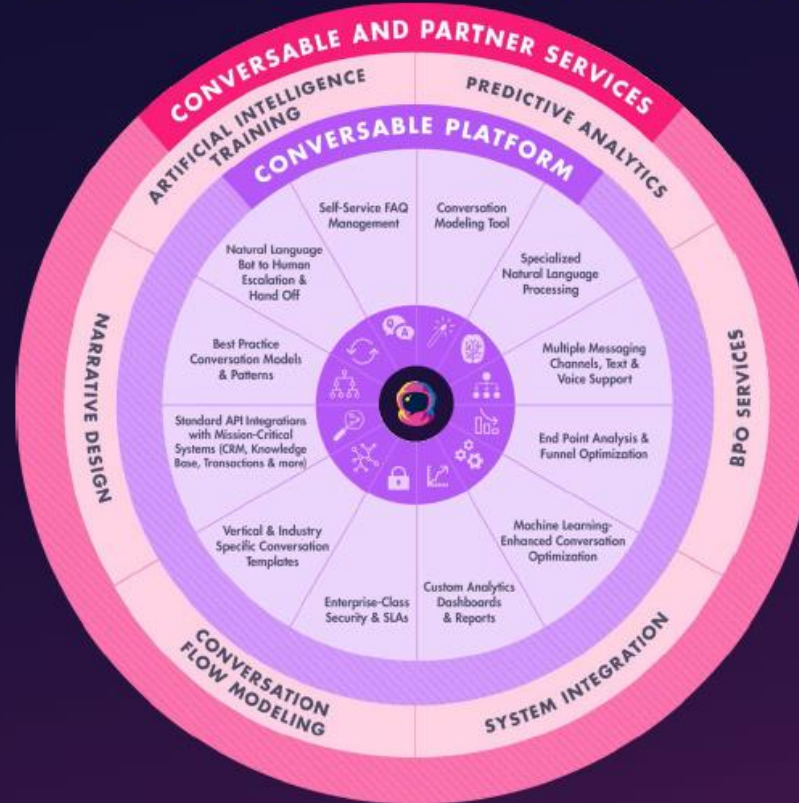
The conversation flow can be tuned over time by humans and/or machine learning.



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CONVERSABLE PLATFORM & SERVICES

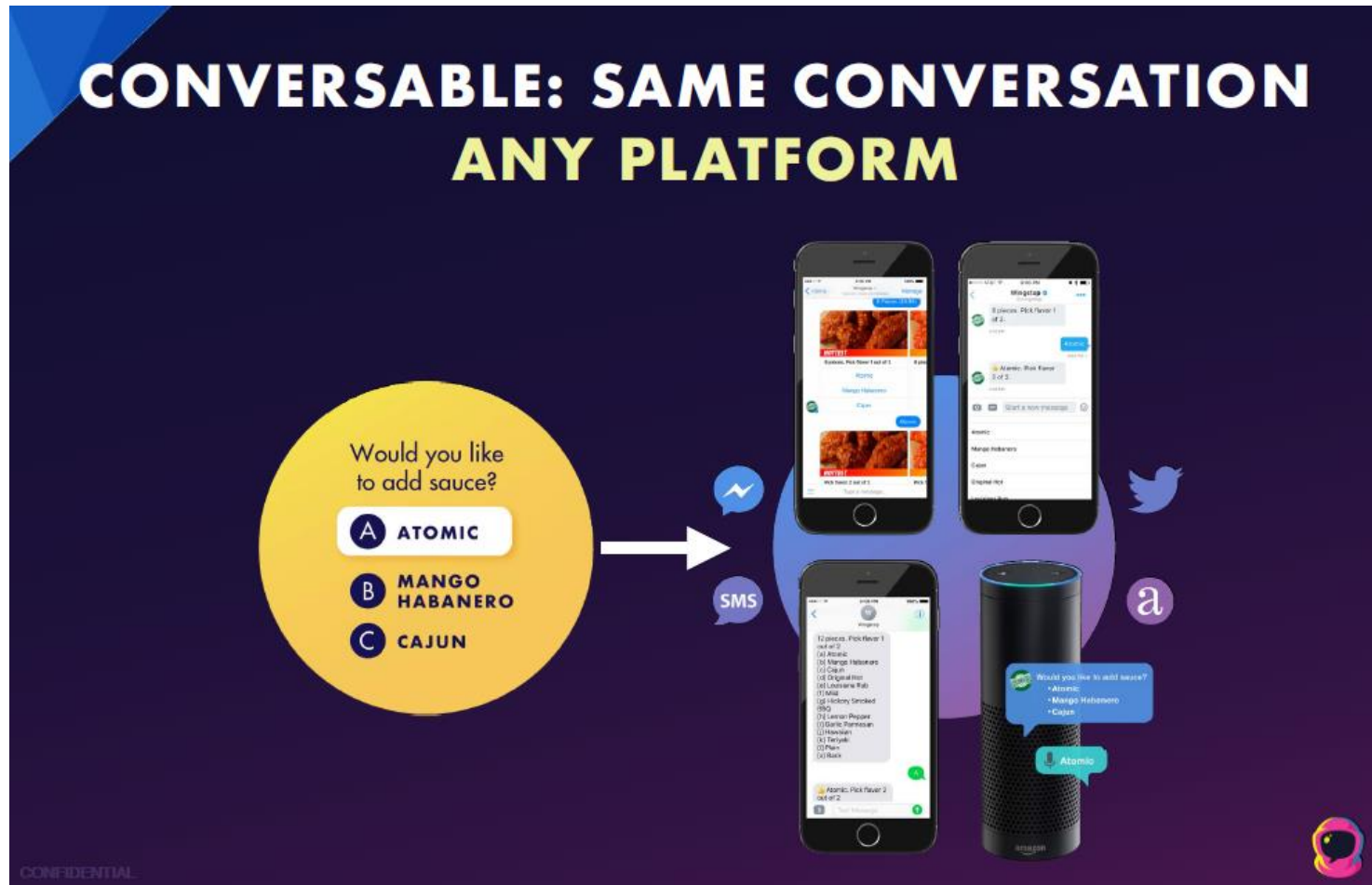


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Robótica

ver <https://www.slideshare.net/articacc/workshop-iniciacao-a-robotica-farrusco>

Autónomos ou controlados por seres humanos

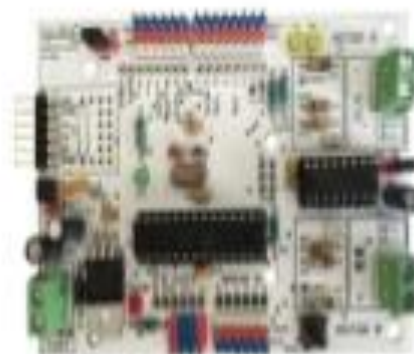
Generalistas ou para fins específicos

Sistema de controle

Sensores-actuadores

Componentes do Farrusco

CPU Motorino 1



Servo Motor



LED Multicor



IR sensor



Sensores de Colisão



Roda Omnidirecional



Chassis



Motores DC



Rodas



Sensores de Luminosidade



CPU



Sensores



Actuadores



Robótica



<https://www.youtube.com/watch?v=bzDIJ6TTc6w>

Robótica

Transporte

Cirurgia

Fabricação

Armazenamento

Limpeza

Manuseamento de objectos perigosos e bombas

Telepresença

IA Generativa

<https://unchartedterritories.tomaspueyo.com/p/generative-ai-everything-you-need>