



Direktorat Jenderal Pendidikan Tinggi, Riset, dan, Teknologi  
Kementerian Pendidikan, Kebudayaan, Riset, dan Teknologi  
Republik Indonesia



## MICROCREDENTIAL: ASSOCIATE DATA SCIENTIST

01 November – 10 Desember 2021

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Pertemuan ke-2

# Teknologi dan Aplikasi Artificial Intelligence



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<https://dikti.kemdikbud.go.id/>



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- S1: Prodi Teknik Elektro – Fakultas Teknik – UNUD
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- S3: Division of Electrical Engineering and Computer Science - Kanazawa University

**Riwayat/Pengalaman Pekerjaan:**

- Dosen (2003)
- Web designer CV.Synergy Interactive Marketing ([www.syn-i.com](http://www.syn-i.com)) (2002)
- Editor dan Web designer balifolder.com (2001)

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# SUMBER UTAMA MATERI

Sumber berupa slide materi:

1. Materi Kuliah Artificial Intelligence di Informatika ITB
2. Berbagai Pelatihan di Pusat AI ITB

Sumber berupa buku:

1. Stuart J Russell & Peter Norvig, "Artificial Intelligence: A Modern Approach", 3rd Edition, Prentice-Hall International, Inc, 2010
2. Ayu Purwarianti, Bambang Riyanto, Dessi Puji Lestari, Intan Muchtadi Alamsyah, Nugraha Priya Utama, Ridwan Sutriadi, Sapto Wahyu Indratno, Sophi Damayanti, "Artificial Intelligence di Masa Pandemi", ITB Press, 2021

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1. Dwi Hendratmo Widyatoro
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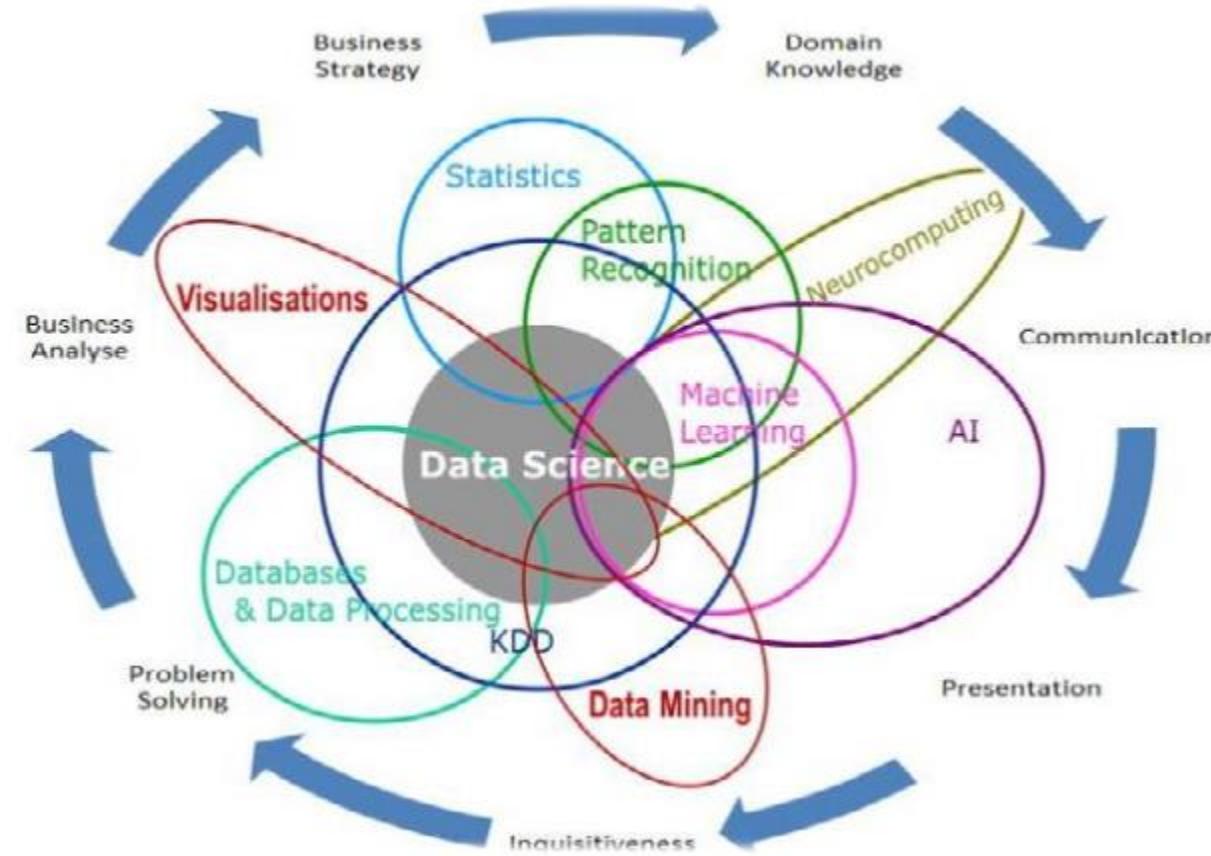
# Learning Objective

Peserta mampu menjelaskan konsep dasar AI dengan benar dan mengidentifikasi pemanfaatan teknologi AI

## Course SubTopics

- Definisi Artificial Intelligence
- Perancangan Intelligent Agent
- Jenis Teknologi Artificial Intelligence
- Perkembangan Teknologi Artificial Intelligence
- Penerapan Teknologi Artificial Intelligence
- Tantangan dalam Pengembangan Teknologi Artificial Intelligence

# Data Science dan Artificial intelligence



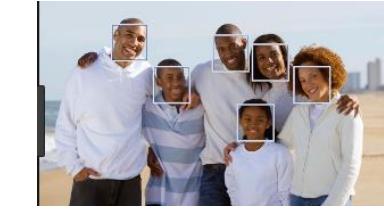


# ARTIFICIAL INTELLIGENCE, IS IT A HYPE?

## Text Processing

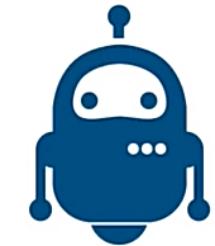


## Image Processing



Facebook Face Recognition

## Speech Processing

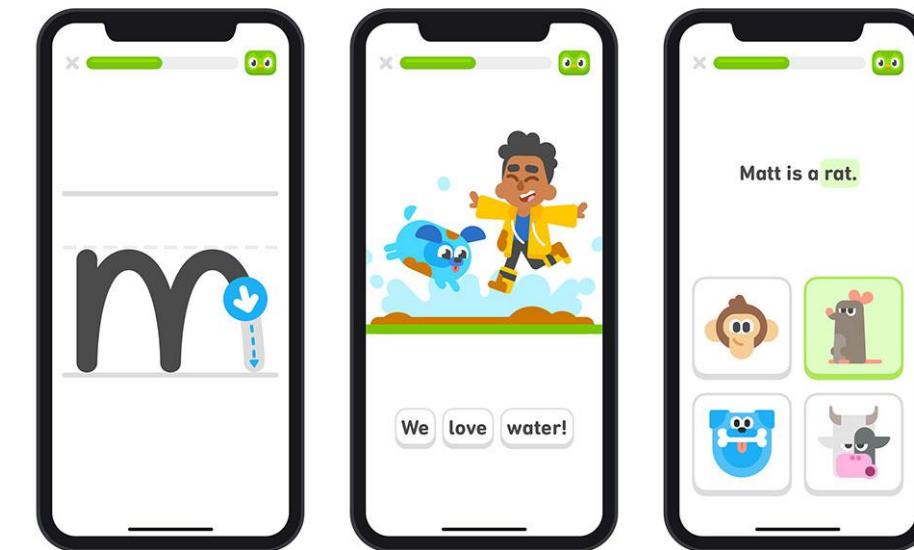


# AI di Dunia Nyata: Belajar Bahasa Dunia Duolingo

Belajar Bahasa meningkat saat pandemik

300 juta pengguna, 30 juta pengguna aktif/bulan

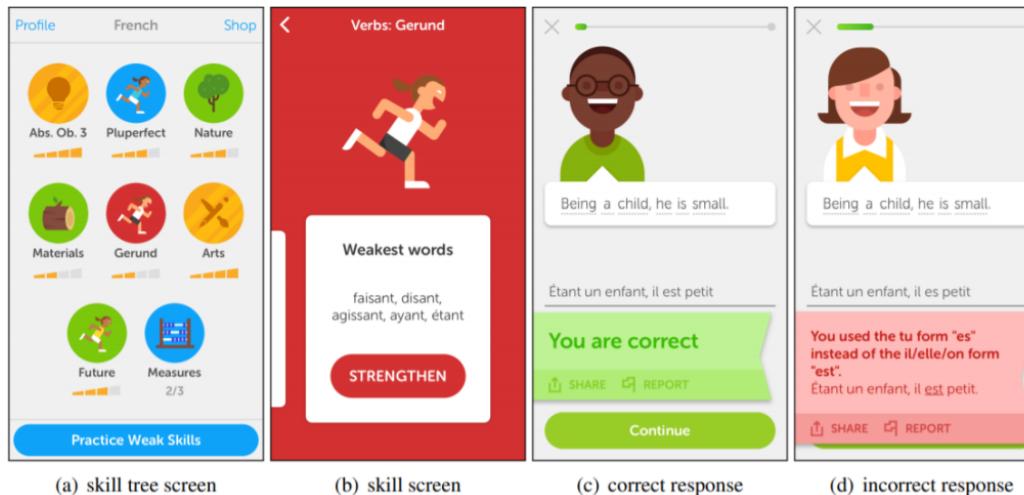
Belajar bahasa berbasis game



Ref: [How Duolingo uses AI in every part of its app \(venturebeat.com\)](https://venturebeat.com/how-duolingo-uses-ai-in-every-part-of-its-app/)

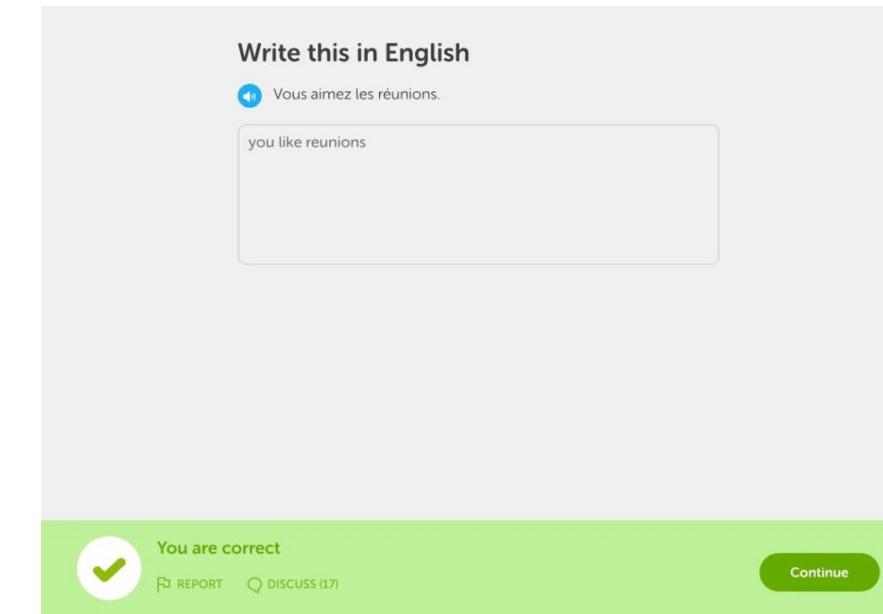
# AI di Dunia Nyata: Belajar Bahasa Dunia Duolingo

## Fitur Spaced Repetition



*Membangun profil yang sangat rinci berdasarkan apa yang Anda ketahui dan apa yang tidak Anda ketahui*

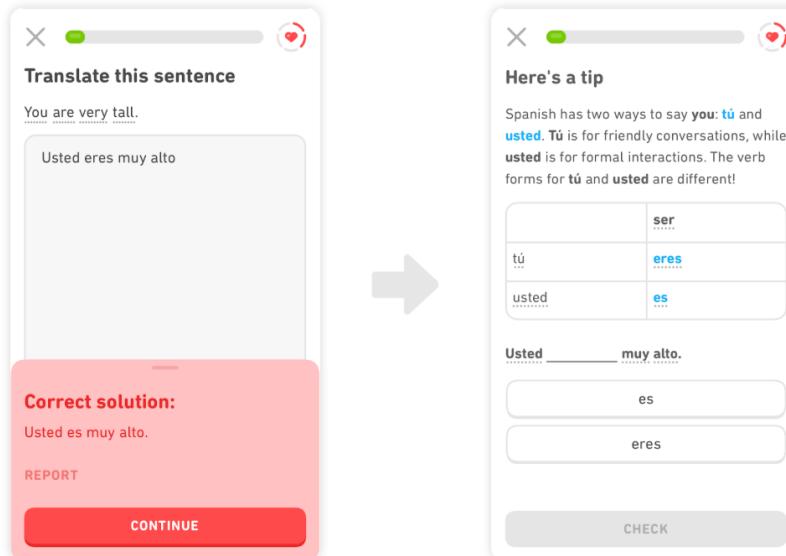
## Fitur Birdbrain: Machine Learning based



Model ini dapat memprediksi kapan Anda lupa sesuatu karena Anda belum sering melihatnya, atau baru-baru saja melihatnya. Ini untuk membantu memilih tantangan mana yang akan dimasukkan ke dalam sesi latihan user.

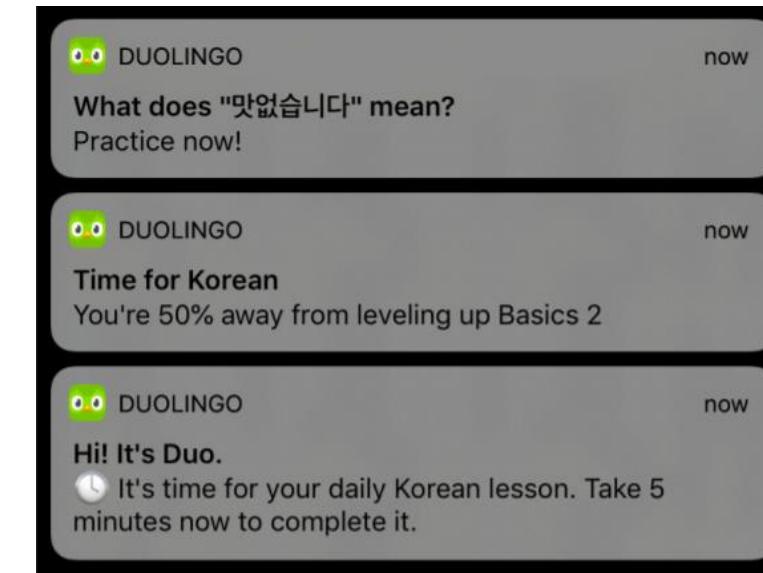
# AI di Dunia Nyata: Belajar Bahasa Dunia Duolingo

Fitur Active Learning: NLP based



*Misalnya, jika Duolingo memperhatikan bahwa Anda memasukkan kata-kata yang tepat tetapi dalam urutan yang salah, itu dapat memberi Anda tip tata bahasa korektif tepat setelah meludah bahwa input Anda salah.*

Fitur Bandit Algorithm



Melatih seluruh sistem mencoba untuk mencari tahu kapan waktu terbaik untuk mengirim pemberitahuan berdasarkan aktivitas Anda sendiri

# AI di Dunia Nyata: Belajar Bahasa Dunia Duolingo

## Fitur Logistic Regression

别为成绩担心，你已经很努力了。

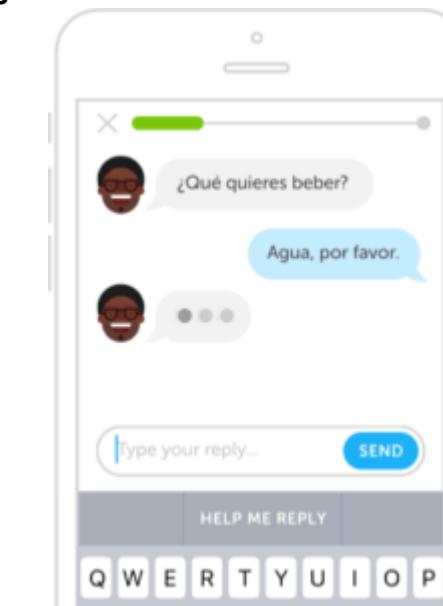
我也姓李，认识你很高兴！

安静！他们在睡觉。

她下个月去西安工作。

- 3 don't be worried about the grade you already worked hard ✗ ↗
- 5 my last name is li i'm pleased to meet you ✗ ↗
- 6 be quiet they are sleeping ✗ ↗
- 7 she will go to xian to work next month ✗ ↗

## Fitur Chatbots

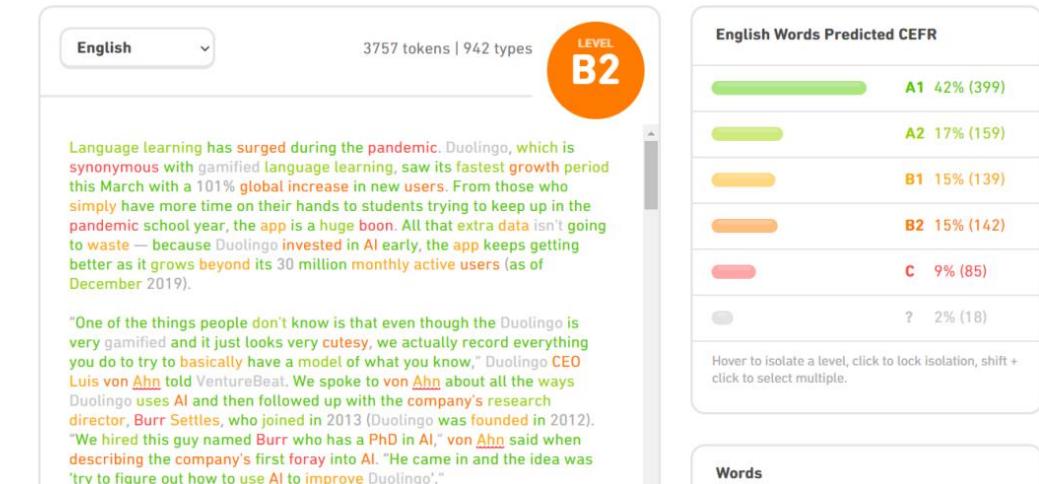
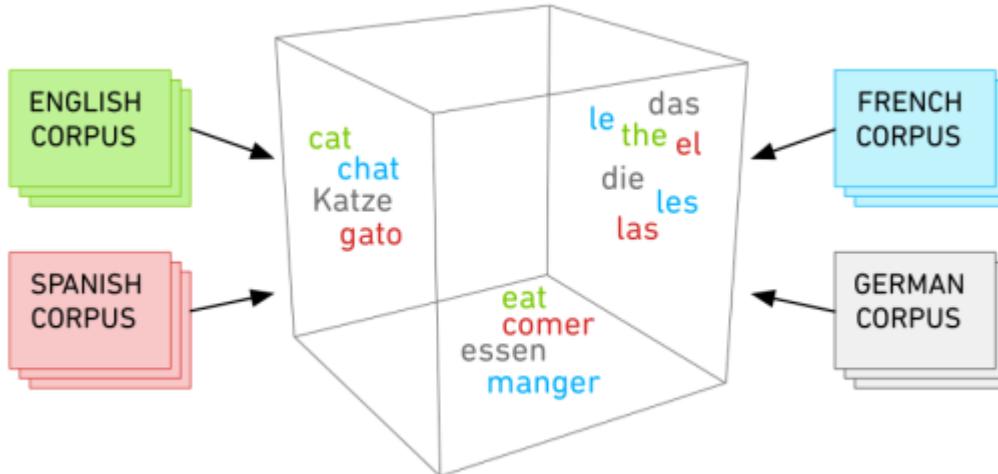


*Setiap kali User mengirimkan jawaban atas tantangan dan Duolingo mengatakan user salah, dan memiliki opsi untuk menekan tombol Laporkan. Jika User berpikir melakukannya dengan benar, maka dapat mengajukan banding.*

Menawarkan percakapan dalam skala besar hingga 300 juta pengguna dalam 94 bahasa yang berbeda? Gunakan chatbot basis AI

# AI di Dunia Nyata: Belajar Bahasa Dunia Duolingo

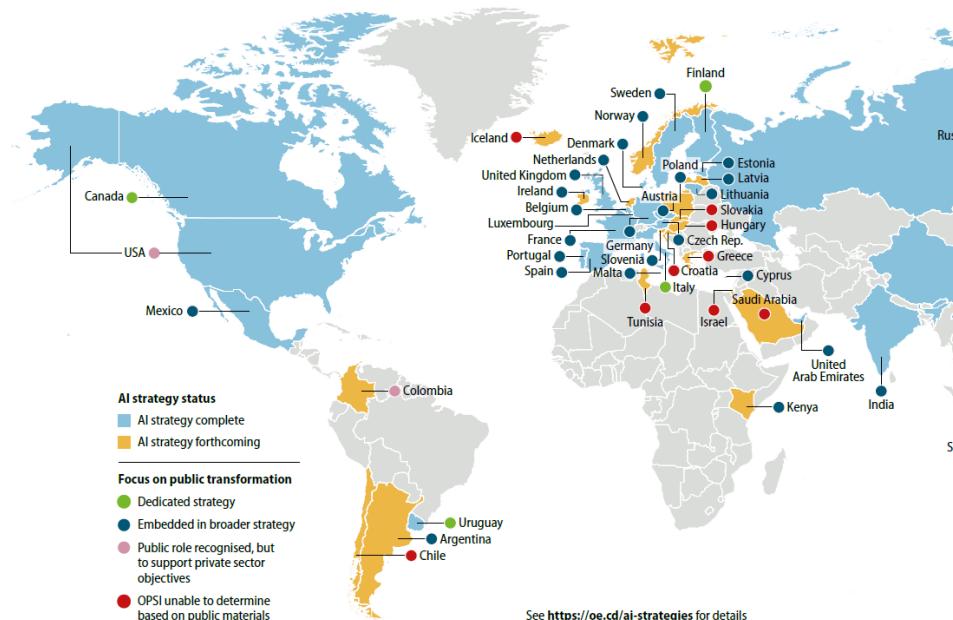
Fitur CEFR checker



*Duolingo menggunakan machine learning unsupervised untuk membangun alat untuk menentukan kesulitan teks apa pun untuk pelajar bahasa. Tim menggunakan Common European Framework of Reference (CEFR), yang memiliki skala enam tingkat: A1 dan A2 (pemula), B1 dan B2 (menengah), dan C1 dan C2 (lanjutan).*



# AI Di Berbagai Negara



## Global AI Strategy Landscape

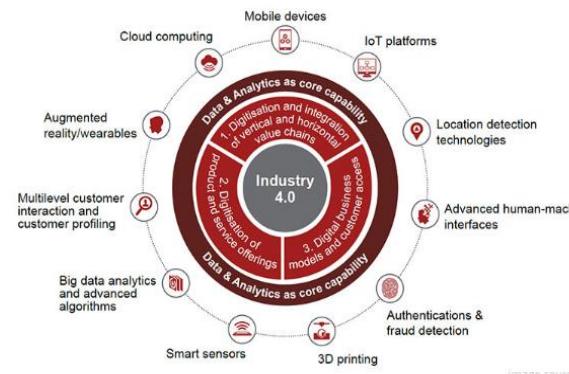
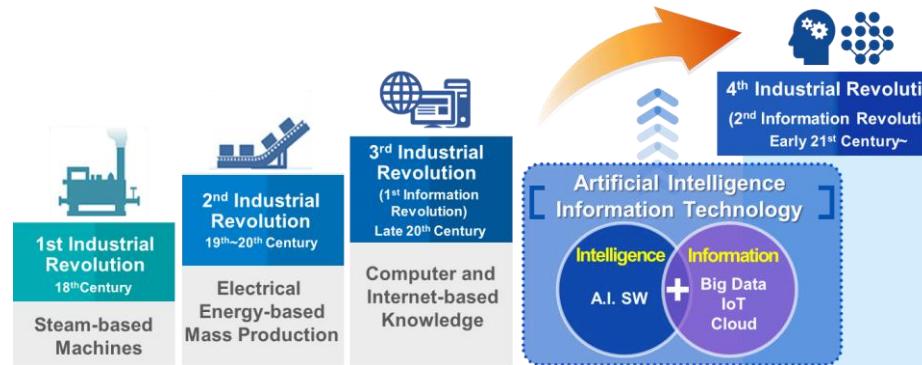
50 National Artificial Intelligence Policies as at February 2020.

Country	Description
Argentina	May 2019, Argentina released the 'National Plan of Artificial Intelligence'. Falls under the Innovative Argentina 2030 Plan and the 2030 Digital Agenda.
Australia	June 2019, Australia's first national AI Roadmap focused on specialization in health, infrastructure and natural resources. Planning for an additional 10,000 AI specialists by 2030.
Austria	July 2019, Austria's first AI Roadmap outlines Austria 2030 (AIM AT 2030). Outlines seven fields for which AI will be critical.
Belgium	March 2019, 'AI 4 Belgium' launched and includes seven major objectives.
Brazil	Consultation period ended January 2020. Building a network of eight research facilities focused on artificial intelligence.
Canada	April 2019, Canada announced five-year, \$500 million plan. Led by CIFAR, it includes a new national AI strategy.
China	July 2017, China launched the most comprehensive AI strategy globally with 2030 targets for AI R&D and AI industry.
Croatia	December 2019, first draft issued for National Strategy for Digital Transformation. Focuses on becoming an AI & Robotics Centre of Excellence.
Czech Republic	May 2019, 'AI for the Czech Republic' was launched.
Denmark	May 2019, Denmark announced the National Strategy for Artificial Intelligence with four key objectives.
Estonia	June 2019, Estonia's AI experts, led by government CIO produced a roadmap, called 'Estonia 2030', in May 2017. Steering Group announced in July 2019.
Egypt - Egypt Strategy	October 2019, Hungary announced an AI Action Plan, the first pillar of a National AI Strategy, expected in 2020.
Finland	June 2019, 'Leading the Way into the Age of Artificial Intelligence' identified 11 priority areas for AI development. May 2017 Steering Group announcement.
Hungary	October 2019, Hungary announced an AI Action Plan, the first pillar of a National AI Strategy, expected in 2020.
India	June 2019, working paper on using AI to ensure social growth, inclusion and positioning the country as a leader in AI.
Indonesia	Indonesia Artificial Intelligence Society (IAIS) announced the Smart Indonesia Committee in October 2019. National Strategy expected in 2020.
Iceland	June 2019, Economic Development Agency led process. A Master program launched in 2019 and a 10% industry share.
Israel	Innovation Authority, tasked with AI policies, has warned that a strategy is needed to prevent being overtaken.
Italy	March 2018, AGID selected a White Paper titled 'AI at the service of citizens', which was edited by the AI Task Force.
Japan	October 2017, Japan's AI policy, the 'National Strategy for Artificial Intelligence Strategy', was announced second only to Canada with Society 5.0.
Kenya	June 2018, government announced its first ever five-year strategy on national use of emerging technologies.
Lithuania	January 2019, Luxembourg announced 'Artificial Intelligence Strategy' to modernise and expand the current AI ecosystem and ensure that the nation is ready.
Malaysia	February 2019, Malaysia released a National Artificial Intelligence Framework expanding the National Big Data Analytics Framework.
Malta	February 2019, Towards an AI Strategy in Malta. Homing the AI Revolution serves as a foundation for building full AI strategy.
Norway	October 2019, Norway issued its National Strategy for Artificial Intelligence.
Poland	September 2019, 'Assumptions for the AI Strategy in Poland' as an action plan towards developing on AI strategy.
Portugal	May 2019, Portugal's AI Strategy is a five-year, \$150 million national program launched to enhance Portugal's capabilities in AI.
Qatar	May 2018, five-year AI development plan launched with \$1.9B budget.
Russia	March 2019, the Spanish Ministry of Science, Innovation and Universities (MINECO) published its National Strategy for the Development of Artificial Intelligence by 2030.
Saudi Arabia	February 2019, Royal decree to establish an AI center to align with the Kingdom's Vision 2030 program.
South Korea	February 2019, Korea's National Strategy for Artificial Intelligence was announced.
Spain	March 2019, the Spanish Ministry of Science, Innovation and Universities (MINECO) published its National Strategy for the Development of Artificial Intelligence by 2030.
Sweden	February 2019, National Approach for Artificial Intelligence launched in May 2018.
Turkey	October 2017, announced strategy. First AI strategy in the Middle East to launch an AI center.
United Arab Emirates	February 2019, Sector Deal announced £1.34B funding as part of the UK's larger industrial strategy.
United Kingdom	February 2019, Executive Order to develop a National Strategy for Artificial Intelligence. A group launched Mar 2019. Followed by the National Artificial Intelligence Research and Development Strategic Plan.
United States of America	February 2019, Executive Order to develop a National Strategy for Artificial Intelligence. A group launched Mar 2019. Followed by the National Artificial Intelligence Research and Development Strategic Plan.
Vietnam	Ministry of Information and Communications developing a broad AI strategy.

HolonIQ

www.holoniq.com

# Arahan Teknologi Artificial Intelligence di Indonesia



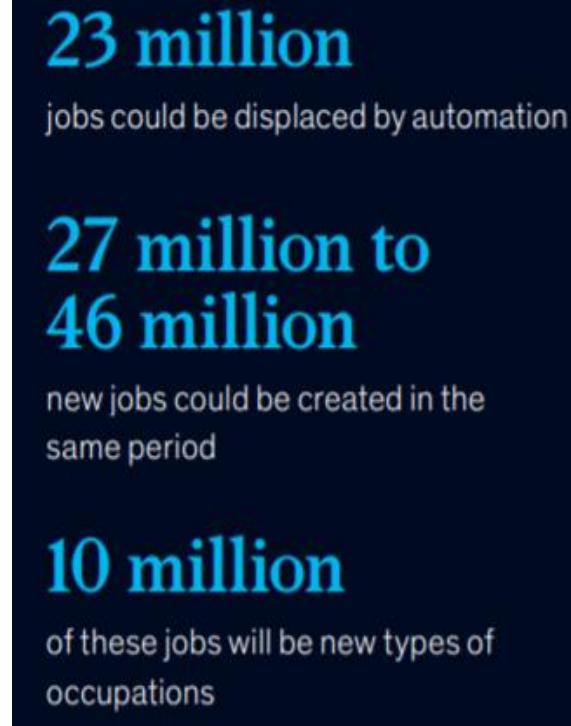
Strategi Nasional Kecerdasan Artifisial



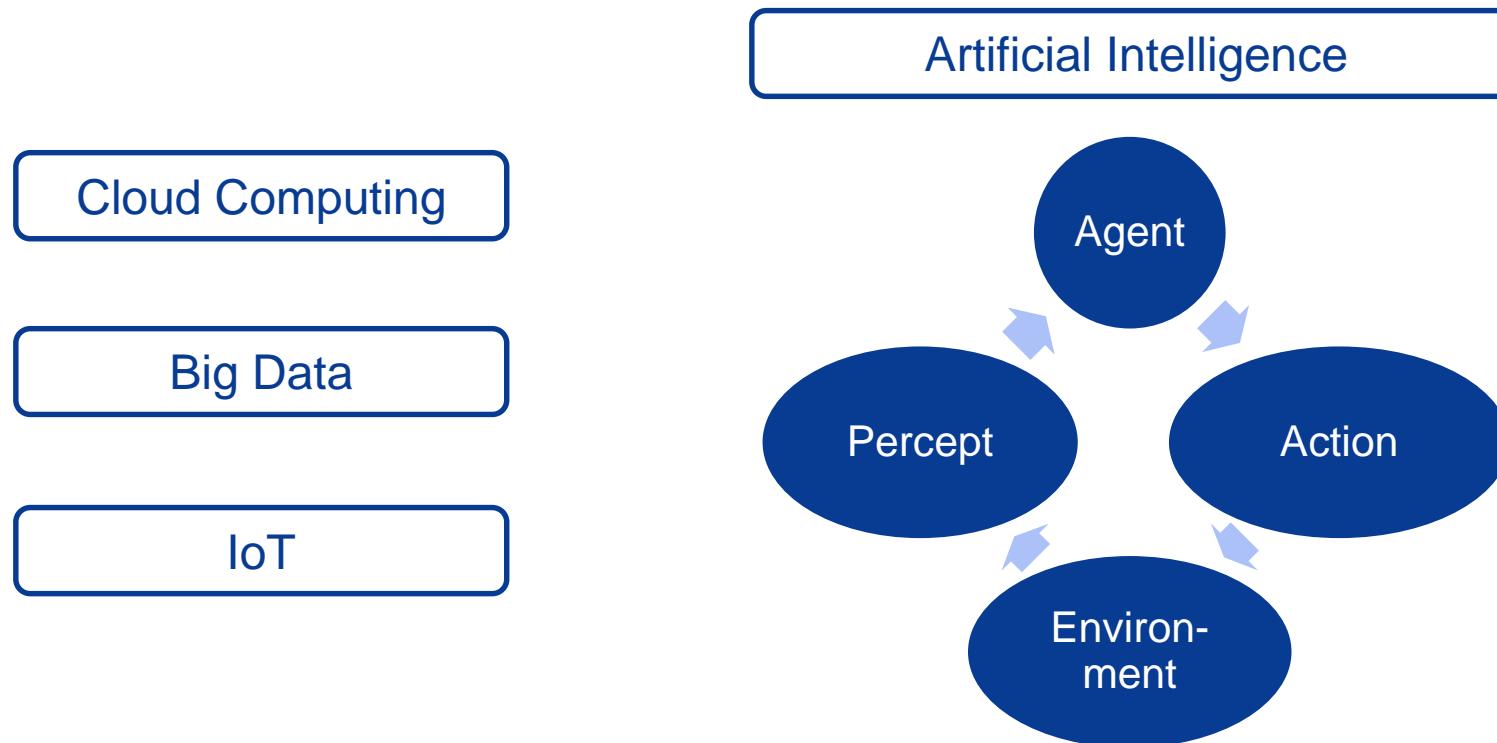
# AI sebagai Disruptive Technology

- Pekerjaan yang digantikan oleh teknologi Kecerdasan Buatan adalah pekerjaan yang berulang dan dapat dengan mudah diprediksi. Sebagian besar Teknologi AI bertujuan untuk membantu pekerjaan manusia
- Industri di Indonesia sudah mulai menggunakan teknologi AI untuk menekan biaya, meningkatkan pendapatan, memberikan nilai tambah pada produk

McKinsey: Sept 2019  
Automation Effect in  
Indonesia:



# Artificial Intelligence Agent



# Internet of Things

## Definisi:

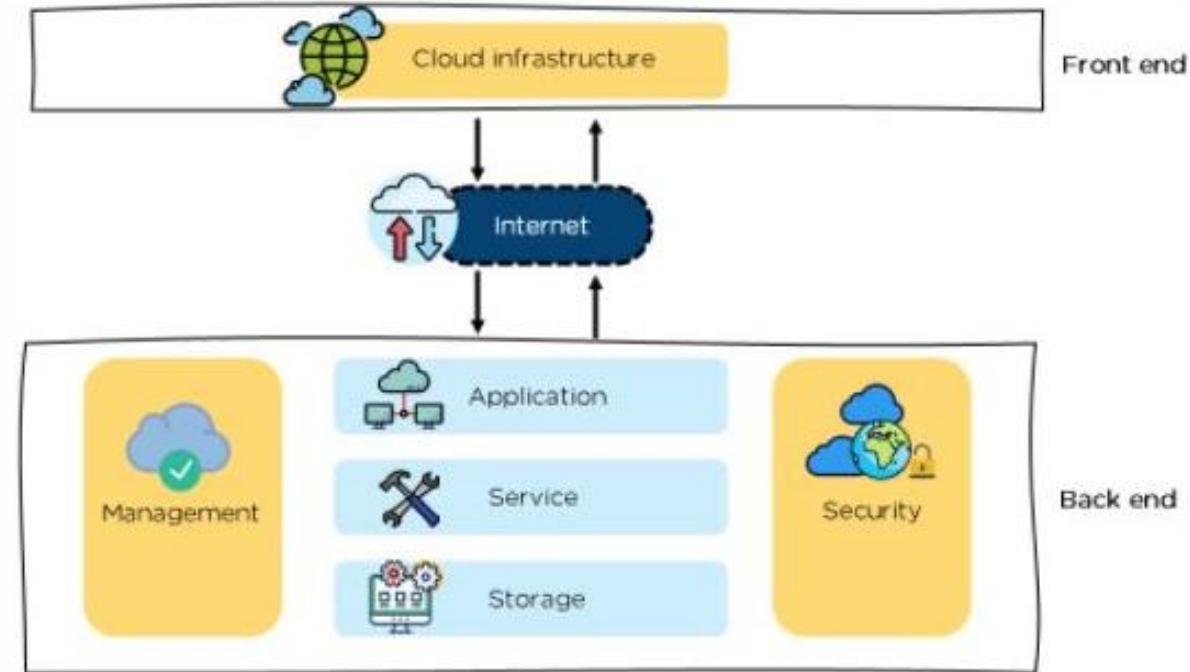
Peralatan/gadget sehari-hari atau objek yang terhubung dengan Internet dan memiliki kemampuan untuk mengumpulkan dan mengirimkan data

**Contoh IoT** pada keseharian/rumah dalam bentuk smart consumer goods: *smart bulb, smart light switch, smart doorlock, smart watch, smartphone, fitness tracker, smart tv, smart thermostat, smart toilet, smart bike lock* dll.



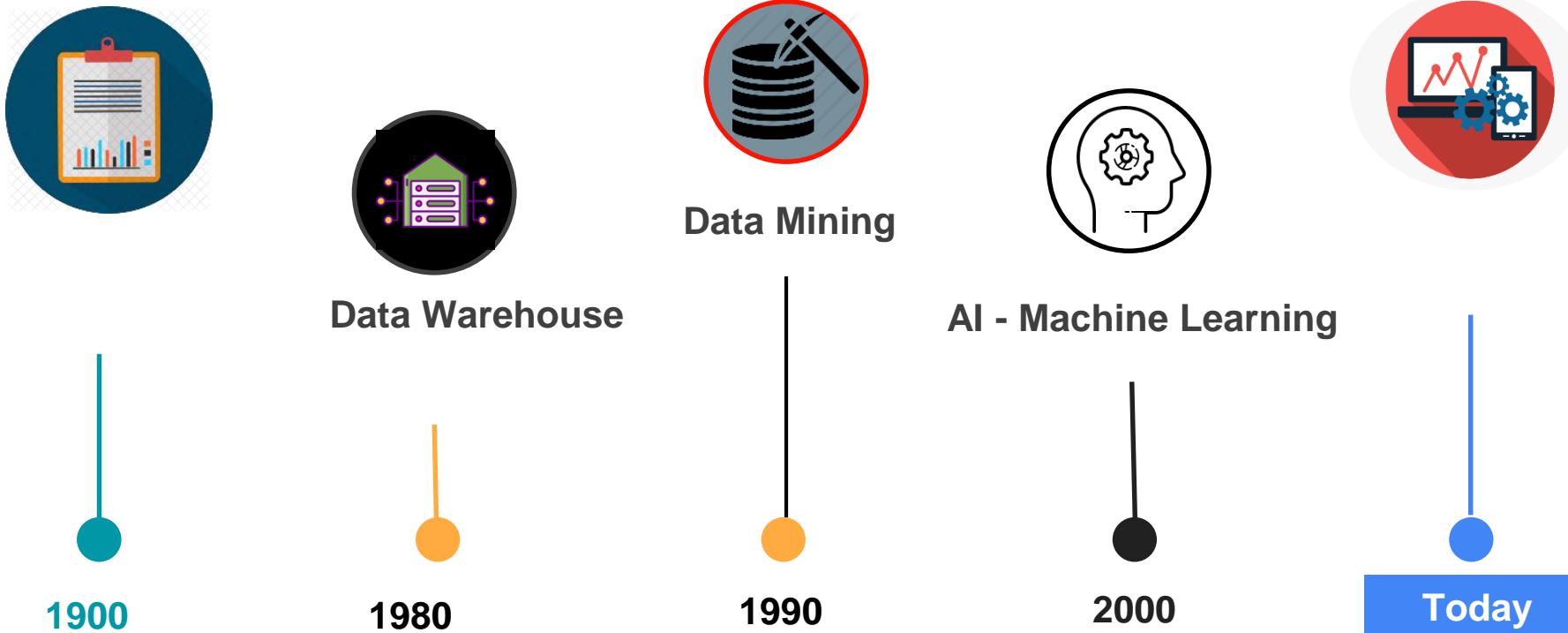
# Cloud & Edge Computing

- o Menyimpan dan memproses data di komputer (*datacenter*) orang lain melalui jaringan Internet
- o Pemrosesan data di peralatan seperti smartphone (yang saat ini semakin powerful)
- o Sudah banyak dipakai di kehidupan sehari-hari
  - o Saat mengakses e-mail berbasis Web (misal Gmail)
  - o Saat upload foto/video di Facebook/Youtube/Google Drive
  - o Saat menggunakan Office 365, Google Doc
  - o Saat order gojek atau booking hotel lewat apps di smartphone
- o Untuk bisnis, platform untuk consumer services, inventory management, recruiting & HR, design, retail dan shipping (oleh cloud provider kebanyakan sudah disediakan sebagai “software-as-a-service”)



<https://www.simplilearn.com/tutorials/cloud-computing-tutorial/cloud-computing-architecture>

# Big Data



18



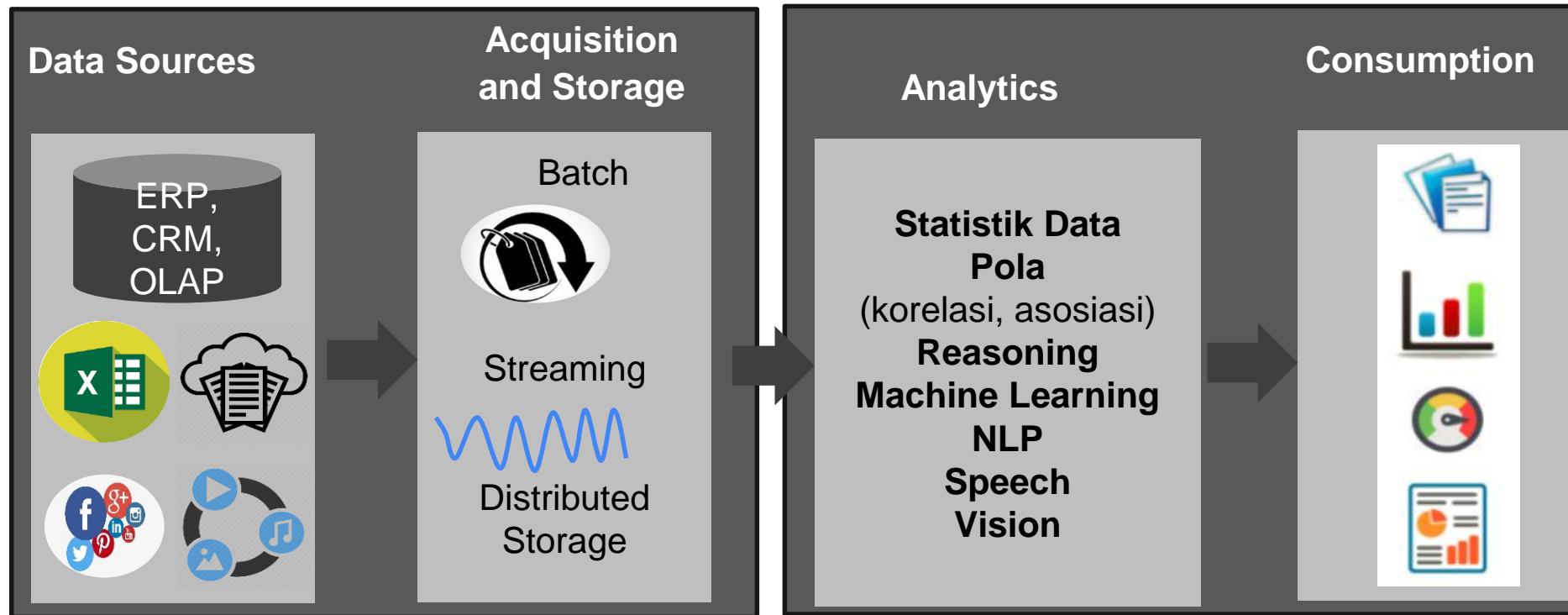
# Big Data

- **High-volume, high-velocity, and/or high-variety information assets**
- Require new forms of processing: capture, curation, storage, search, sharing, transfer, analysis, visualization
- To enable:
  - enhanced decision making
  - insight discovery
  - and process optimization

## Karakteristik Big Data

- **Velocity:** kecepatan data yang dihasilkan (per detik, per menit, per jam, per hari, dst).
- **Volume:** jumlah data yang diakumulasikan (terabyte, petabyte, exabyte, zettabyte, yottabyte dst)
- **Variety:** jenis/ragam data yang bermacam-macam: terstruktur, semi-terstruktur, tidak terstruktur (teks, suara, gambar, video dll)
- **Veracity:** kesesuaian dengan fakta dan akurasi (khususnya dari data tidak terstruktur)
- **Value:** kemampuan untuk mengubah data ke value (profit, manfaat medis & social, customer satisfaction)

# Ekosistem Big Data





# Analytics on Data

01

## **Descriptive:**

Menjelaskan keadaan bisnis saat ini melalui data historis.

02

## **Diagnostic:**

Menjelaskan mengapa suatu masalah terjadi dengan melihat data historis.

03

## **Predictive:**

Memproyeksikan atau memprediksi hasil masa depan berdasarkan data historis.

04

## **Prescriptive:**

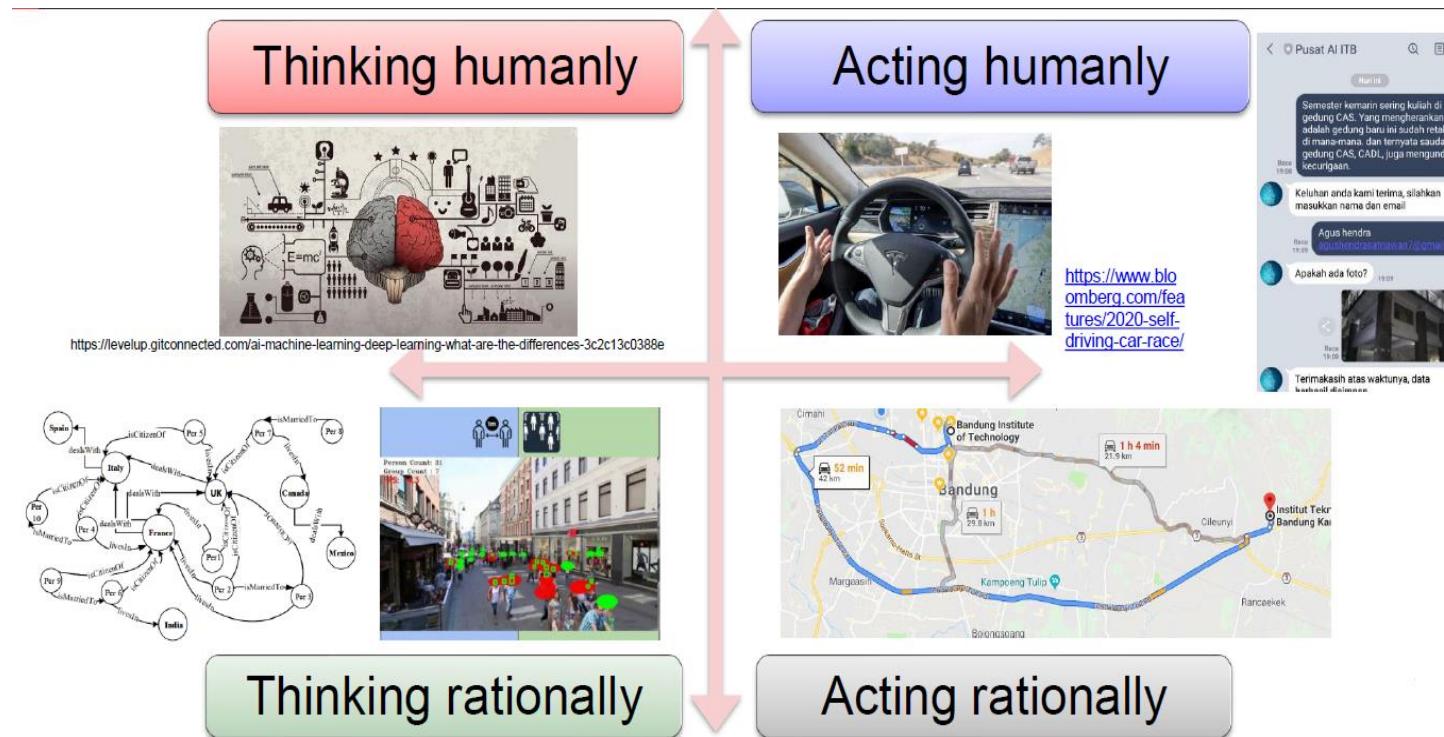
Menggunakan hasil analitik prediktif dan pengetahuan lain dengan menyarankan upaya terbaik di masa depan.



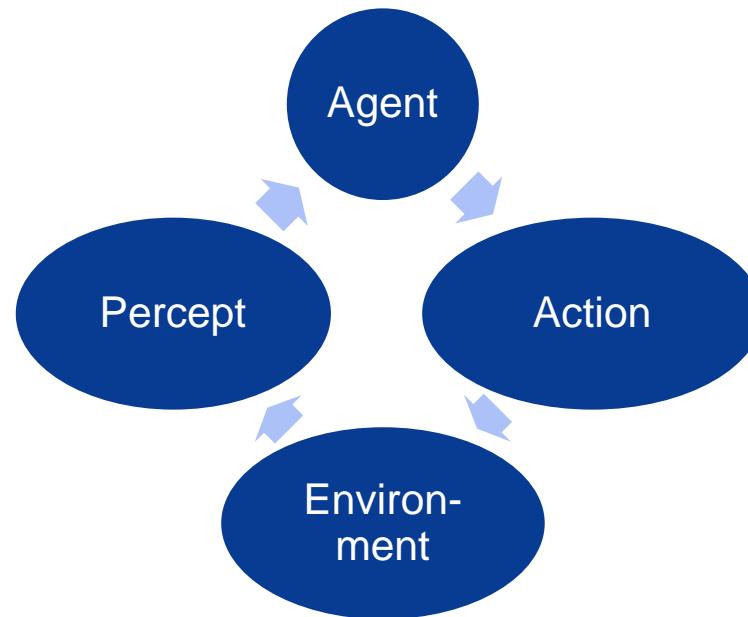
# Definisi Artificial Intelligence

<b>Thinking Humanly</b>  “The exciting new effort to make computers think.. Machines with minds, in the full and literal sense” (Haugeland, 1985) “[The automation of] activities that we associate with human thinking, activities such as decision making, problem solving, learning ...” (Bellman, 1978)	<b>Thinking Rationally</b>  “The study of mental faculties through the use of computational models.” (Charniak and McDermott, 1985) “The study of the computations that make it possible to perceive, reason, and act.” (Winston, 1992)
<b>Acting Humanly</b>  “The art of creating machines that perform functions that require intelligence when performed by people.” (Kurzweil, 1990) “The study of how to make computers do things at which, at the moment, people are better.” (Rich and Knight, 1991)	<b>Acting Rationally</b>  “Computational Intelligence is the study of the design of intelligent agents.” (poole et al., 1998) “AI .. Is concerned with intelligent behavior in artifacts.” (Nilsson, 1998)

# Definisi Artificial Intelligence (2)



# Intelligent Agent



## Merancang PEAS:

- **Performance/Pengukuran performansi:** aman, cepat, tidak melanggar aturan lalu lintas, kenyamanan penumpang
- **Environment/Lingkungan:** jalan, rambu-rambu lalu lintas, kendaraan lain, penumpang
- **Actuator:** kemudi, gas, rem, klakson
- **Sensor:** kamera, sonar, speedometer, GPS



# Environment Type

<b>Fully observable (vs. partially observable)</b>	An agent's sensors give it access to the complete state of the environment at each point in time.
<b>Deterministic(vs. stochastic)</b>	The next state of the environment is completely determined by the current state and the action executed by the agent. (If the environment is deterministic except for the actions of other agents, then the environment is strategic)
<b>Episodic (vs. sequential)</b>	The agent's experience is divided into atomic "episodes" (each episode consists of the agent perceiving and then performing a single action), and the choice of action in each episode depends only on the episode itself



# Environment Type (2)

<b>Static (vs. dynamic)</b>	The environment is unchanged while an agent is deliberating.
<b>Discrete(vs. continuous)</b>	A limited number of distinct, clearly defined percepts and actions.
<b>Single agent(vs. multiagent)</b>	An agent operating by itself in an environment
<b>Known(vs Unknown)</b>	This distinction refers not to the environment itself but to the agent's (or designer's) state of knowledge about the “laws of physics” of the environment



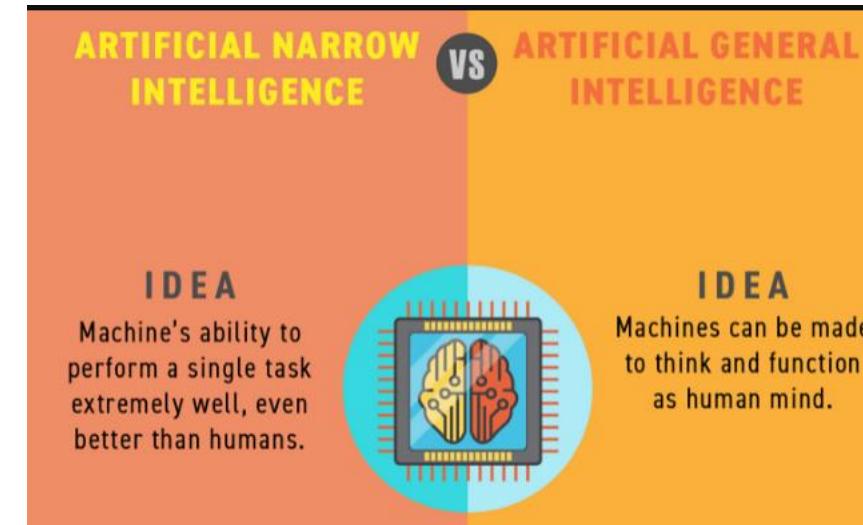
# Example on Environment Type

	Chess with a clock	Chess without a clock	Taxi driving
Fully Observable	Yes	Yes	No
Deterministic	Deterministic	Deterministic	No
Episodic	No	No	No
Static	Semi	Yes	No
Discrete	Yes	Yes	No
Single agent	No	No	No

- The environment type largely determines the agent design
- The real world is (of course) partially observable, stochastic, sequential, dynamic, continuous, multi-agent

# Pembagian Jenis Teknologi Artificial Intelligence (1)

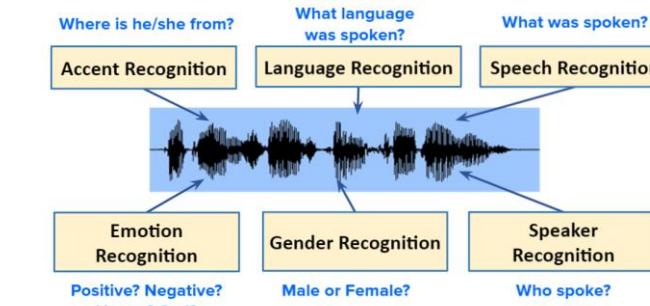
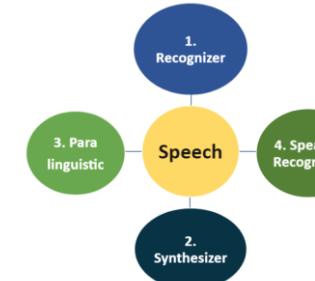
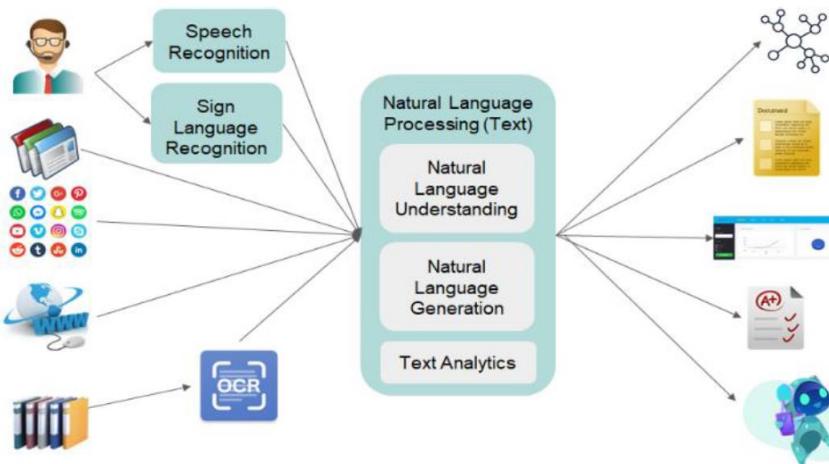
- Berdasar **task scope**:
  - Artificial Narrow Intelligence (ANI) – weak AI: teknologi AI yang ditujukan untuk melakukan satu task khusus
    - Contoh: chatbot pemesanan tiket pesawat, klasifikasi jenis penyakit kulit
  - Artificial General Intelligence (AGI) – strong AI: teknologi AI yang bisa menangani semua task yang dilakukan manusia



Sumber gambar: [analyticsindiamag.com](http://analyticsindiamag.com)

# Pembagian Jenis Teknologi Artificial Intelligence (2)

- Berdasar **domain persoalan**:
  - Teknologi AI juga dapat dibagi menjadi cabang-cabang domain persoalan yang diselesaikan, contohnya: Natural language processing (input/output berupa Bahasa), Speech Processing (input/output berupa sinyal suara), Image Processing/Computer Vision (input/output berupa gambar), dst



Gambar Lingkup Teknologi Natural Language Processing (Text)



# Pembagian Jenis Teknologi Artificial Intelligence (3)

Berdasarkan prinsip kerja dalam teknologi AI:

Problem solving agent

Solution state space sudah terdefinisi, agent bertugas mencari solusi terbaik dari solution state space tersebut

Diselesaikan menggunakan searching algorithm

Knowledge based agent

Solution state space belum terdefinisi (non deterministic)

Agent mencari solusi berdasar knowledge yang dimiliki dimana knowledge dapat berasal dari expert/sumber informasi atau berdasar knowledge yang dipelajari (learning agent) dari data

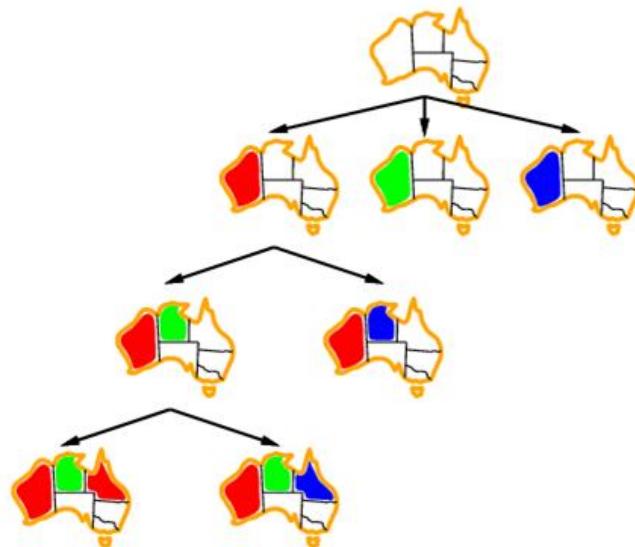


# Problem Solving Agent

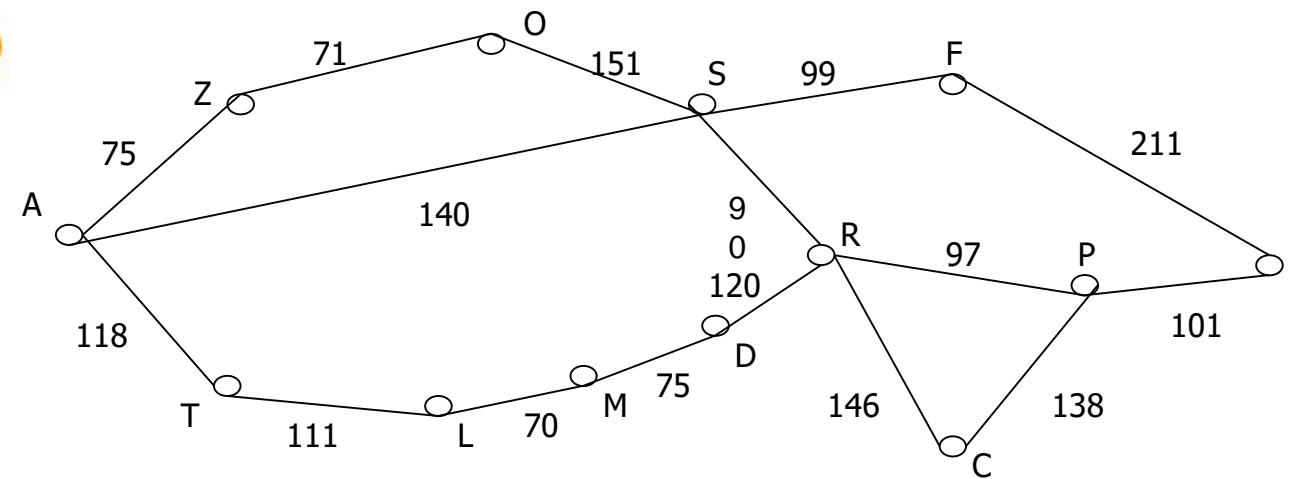
- o Agent design:
  - o formulate problem  search solution  execute
  - o Task Environment: Remember PEAS
- o Problem: satisfy goal (goal state)
  - o Agent task: find out which sequence of actions will get it to a goal state
  - o 4 components of a **problem**: initial state, operator/successor function, goal test, path cost
- o Searching: process of looking for sequence of action
- o Solution: sequence of action to goal state

Agent knows world dynamics  
World states, actions  
[when agent doesn't know  learning]  
World state is finite, small enough to enumerate  
[when state is infinite  logic]  
World is deterministic  
[when non-deterministic  uncertainty]  
Agent knows current state  
[when agent doesn't know  logic, uncertainty]  
Utility for a sequence of states is a sum over path

# Contoh Persoalan pada Problem Solving Agent



Map Coloring



Route Planning

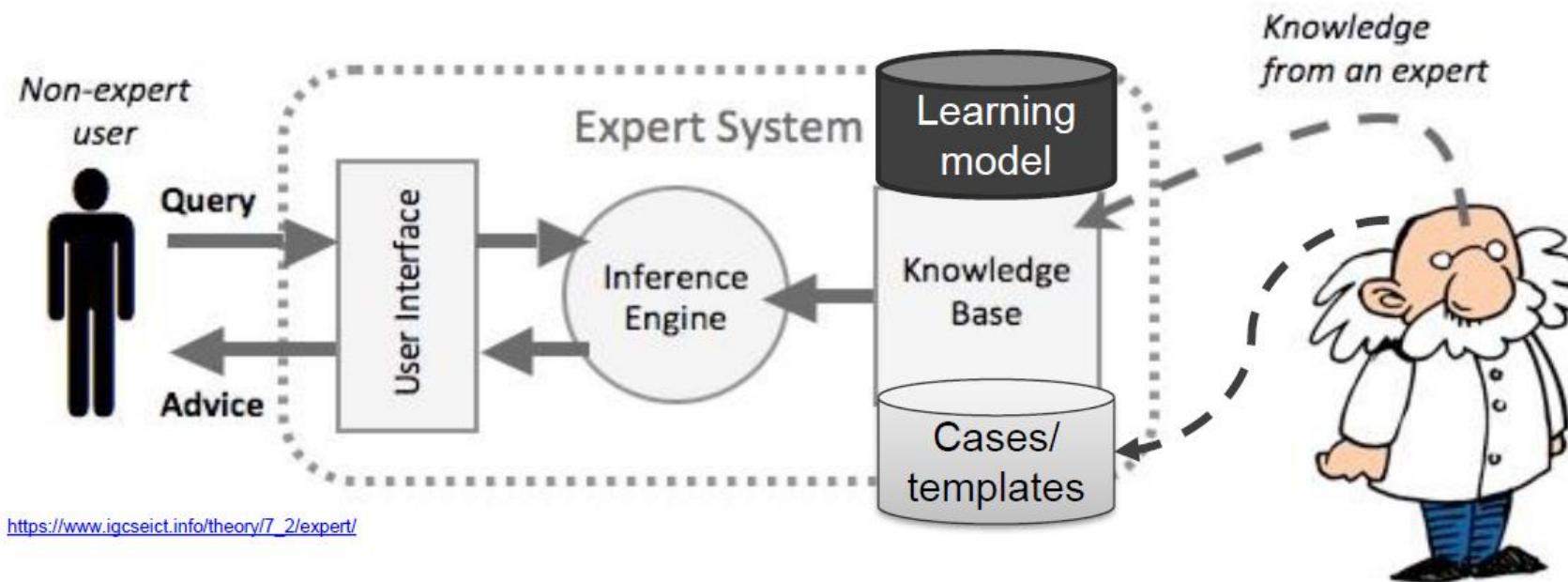




# Searching Algorithm pada Problem Solving Agent

- **UnInformed/Blind Search**
  - Look around, don't know where to find the right answer
  - No additional information beyond that provided in problem definitional
  - Example: DFS, BFS, IDS, UCS , DLS
- **Informed Search**
  - Heuristic Search
    - Know some information that sometimes helpful
    - Know whether one non-goal state is “more promising” than another
    - Example: Best FS, A\*,
- **Local Search (for Optimization Problem) □ Beyond Classical Search**
  - Path to goal is irrelevant
  - Use very little memory
  - Can find reasonable solutions in large or infinite state spaces for which systematic algorithms are suitable
  - Example: Hill-climbing search, simulated annealing search, GA

# Knowledge based Agent





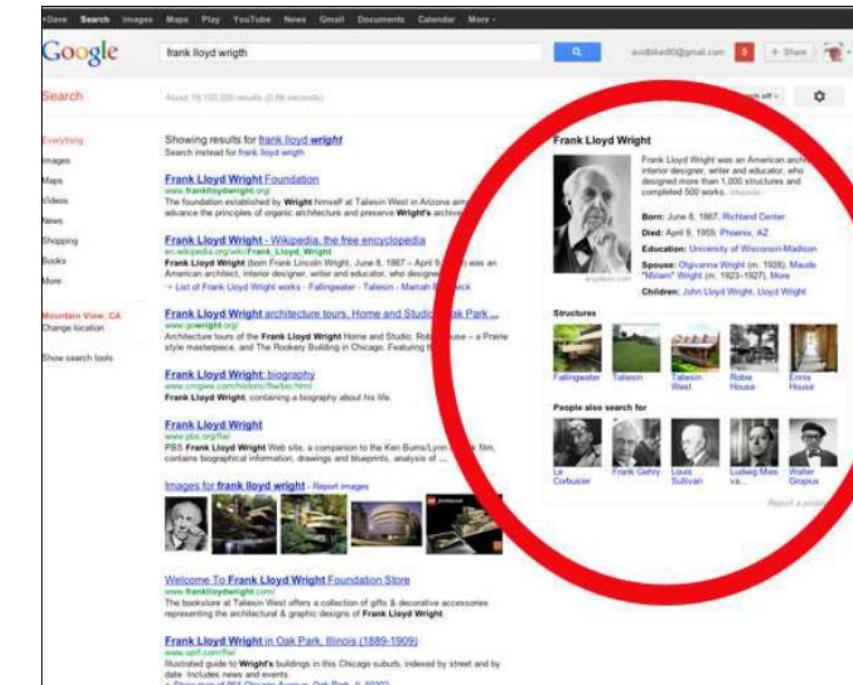
# KBS vs Conventional Program

KBS	Conventional Program
ill structured problem (uncertain solution, undefined goal, unknown operator)	well structured problem (exact/certain solution, explicit goal, explicit operator)
expert determine actions, but execution order by interpreter	programmer determines actions and execution order
problem solving method + domain knowledge + data	algorithm + data

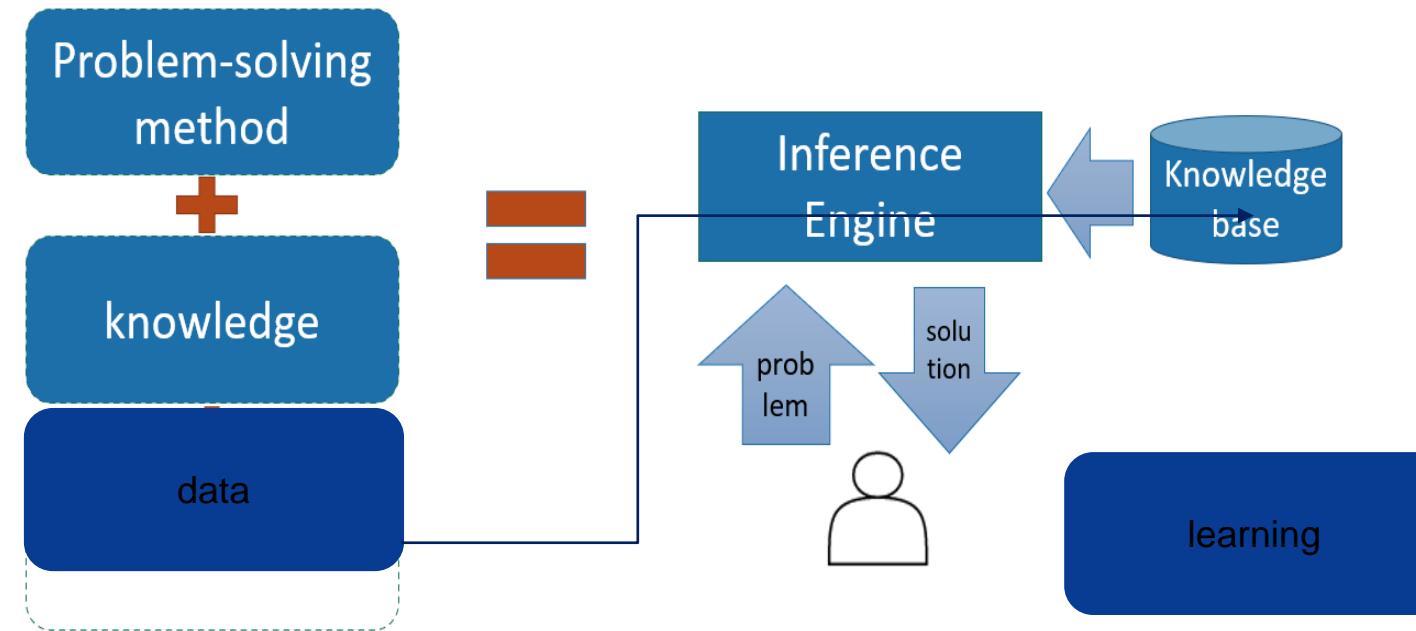
# Pendekatan pada KBS

- Symbolic vs Statistical
- Statistical □ speech recognition, vision
- Why symbolic still needed?
  - Explanation
  - Planning
  - Diagnosis
- Many AI systems are hybrid:
  - Watson
  - SIRI

## Google knowledge graph



# Alur Proses dalam KBS



# Symbolic based KBS: Knowledge Type



- Declarative knowledge
  - Know about something: concepts, facts, objects
  - Also called descriptive knowledge
- Procedural knowledge
  - Knowing how to do something: rule, strategy, procedure, agenda
  - Also known as imperative knowledge
- Meta knowledge
  - Knowledge about other type of knowledge
- Heuristic knowledge
  - Representing knowledge in a field/subject
  - Rules of thumb based on previous experience, good to work but not guaranteed
- Structural knowledge
  - Describe relationship between concepts such as kind-of, part-of, group of something



# Symbolic based KBS: Knowledge Representation Technique

## Production Rules

- rule as condition and action pair
- forward & backward chaining

## Logical Representation

- propositional logic, first order logic, default logic, etc

## Semantic Networks

- knowledge as a form of graphical networks

## Frame Representation

- As structure consists of collection of attributes and its values to describe an entity in the world



# Statistical based Knowledge Based System

- **Learning Agent**
  - Changes in the system that are adaptive in the sense that they enable the system to do the task or tasks drawn from the same population more efficiently and more effectively the next time
- **Why need learning?**
  - Learning is essential for unknown environment
    - i.e., when designer lacks omniscience, agent doesn't know world dynamic
  - Learning is useful as a system construction method
    - i.e., expose the agent to reality rather than trying to write it down
  - Learning modifies the agent's decision mechanism to improve performance
    - Learning from observations, feedback for improving the agent's ability to act in the future

# Taxi Driver as Learning Agent



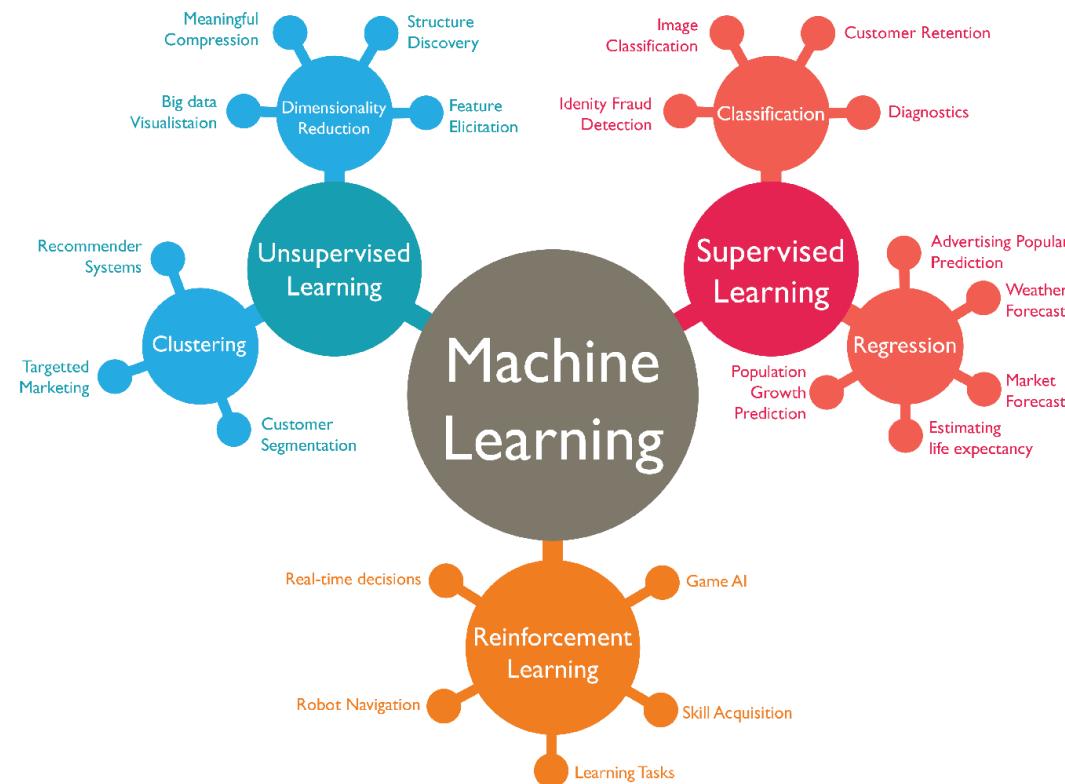
<http://www.gettyimages.com/detail/83988175/Stone>

- **Brake decision**
  - Whether to push the **brake** or not based on the **current state**
  - Feedback: instructor shouts
- **Buses recognition**
  - Input: image from camera
  - Output: whether it is a bus or not
  - Feedback: labeling bus images

[http://www.  
stahle.com/](http://www.stahle.com/)



# Learning Type



## Unsupervised Learning (no feedback)

- Given set of examples without label, detect potentially useful clusters of input examples, e.g: customer clustering

## Supervised Learning

- Given set of examples (input-output pairs), learns a function that maps from input to output, e.g: object classification

## Reinforcement Learning

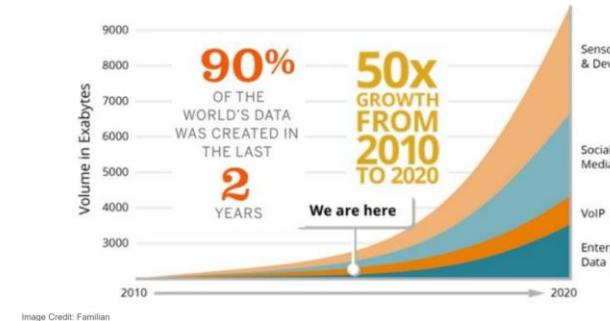
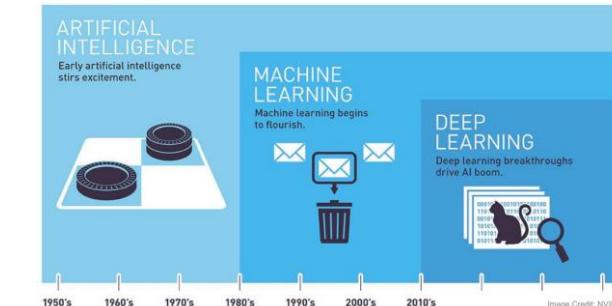
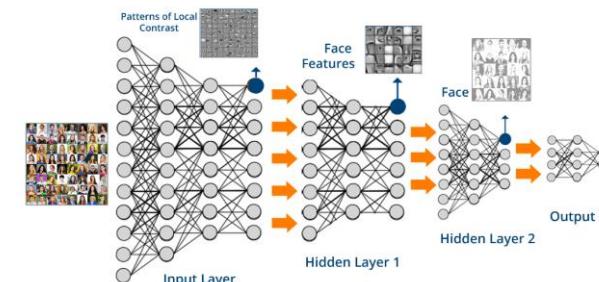
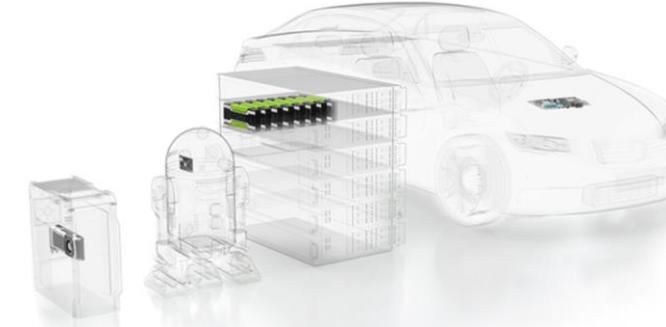
- Agent learns from a series of reinforcements (rewards or punishments)

# Perkembangan Teknologi AI

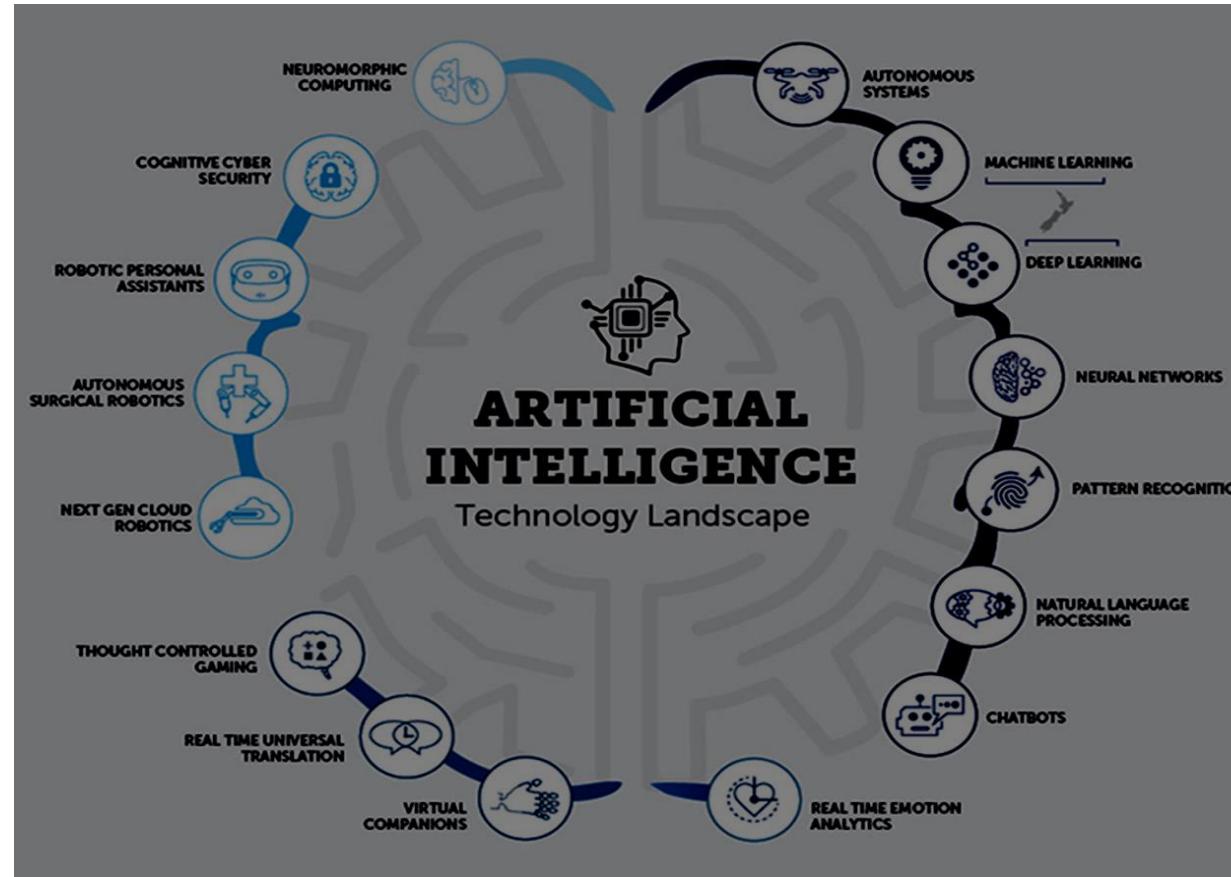


# Why Now?

- **Computing Hardware**
  - GPU, TPU, etc
  - Cloud
- **Algorithm**
  - Deep Learning
- **Data availability**
  - IoT device, Social Media



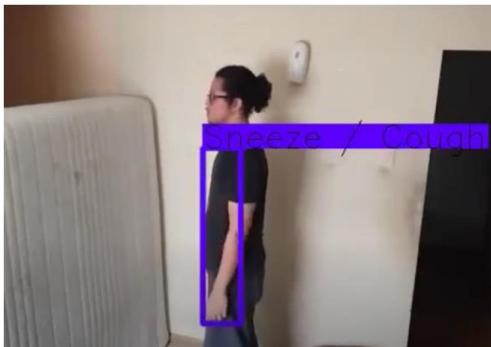
# Teknologi AI



# Penerapan AI: Monitoring



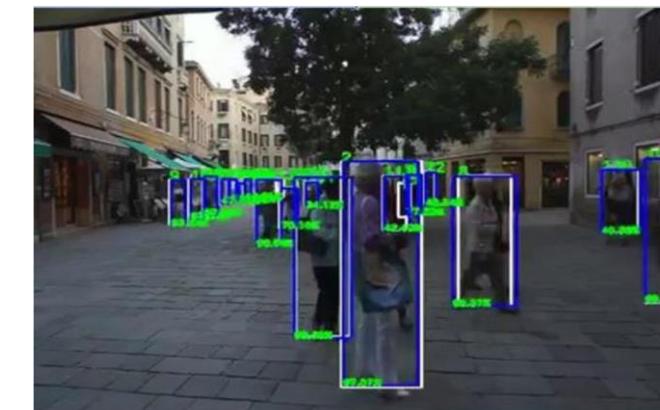
Contoh hasil inferensi model-AI deteksi penggunaan masker-wajah



Gambar . Contoh hasil inferensi model-AI untuk deteksi aktivitas manusia

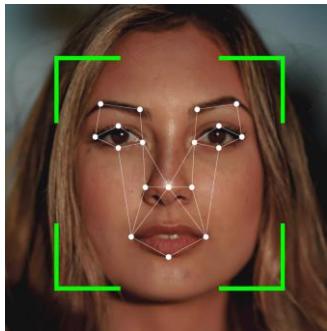


Contoh hasil inferensi model-AI estimasi jarak sosial aman dan kerumunan.



Gambar . Hasil inferensi model-AI pelacakan dan penelusuran manusia

# Penerapan AI: Verification & Identification



## BENEFITS

- Better User Experience (UX)  
Personalized; Greater Accuracy; Convenient; Frictionless; Fast; Automated
- Improved Security
- Reduce Cost  
Accessibility: Disabled person (blind, can't type)

## USE CASE SCENARIOS

- Electronic-Know Your Customer (eKYC)
- "Kependudukan & Pencatatan Sipil" ("Dukcapil")
- Verify Login
- Verify Transactions
- Customer Service Conversational Analytics



## Faster Authentication

Up to 10 times faster than traditional authentication methods\*



## Accurate & Secure

Using state-of-the-art AI technology to achieve real-time result with guaranteed high accuracy

Sumber: prosa.ai



## Voice Biometrics



## Wide Application

Applicable to banking, financial services, insurance & healthcare, and other industries

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# Penerapan AI: Document Digitization

Go paperless. Digitize and secure your past, present and future



## BENEFITS

- Reduce Clerical Work
- Faster and Accurate Data Input
- Reduce Operational Costs
- Convenience
- Automated
- Improve User Experience
- Save time
- Save money

## USE CASE SCENARIOS

- Electronic-Know Your Customer (eKYC)  
eKTP, NPWP, Passport, ITAS, ITAP
- Digitize Invoice and Purchase Orders
- Credit Card, Birth Certificate, etc
- Digitize Documents and Forms
- Digitize Name Cards
- Digitize Video/Speech Recording

# Penerapan AI: Meeting analytics



**Meeting Details** (Completed)

**Info** **Attendance**

**Title:** Coba offline **Start Time:** 2:45 **Agenda:** 1. agenda 1 **Keyword:** #ada **Edit Info**

**Location:** Ruang Meeting **End Time:** None **References:** ReferencesFiles1.ppt, ReferencesFiles2.doc, ReferencesFiles3.txt

**Meeting Date:** April 30, 2019 **Last Edited:** April 29, 2019, 7:45 p.m. by Dominic Keller **Recording:** Audio is available **Recording Player:** 0:00 / 0:00

**Minutes of Meeting** **Export I**

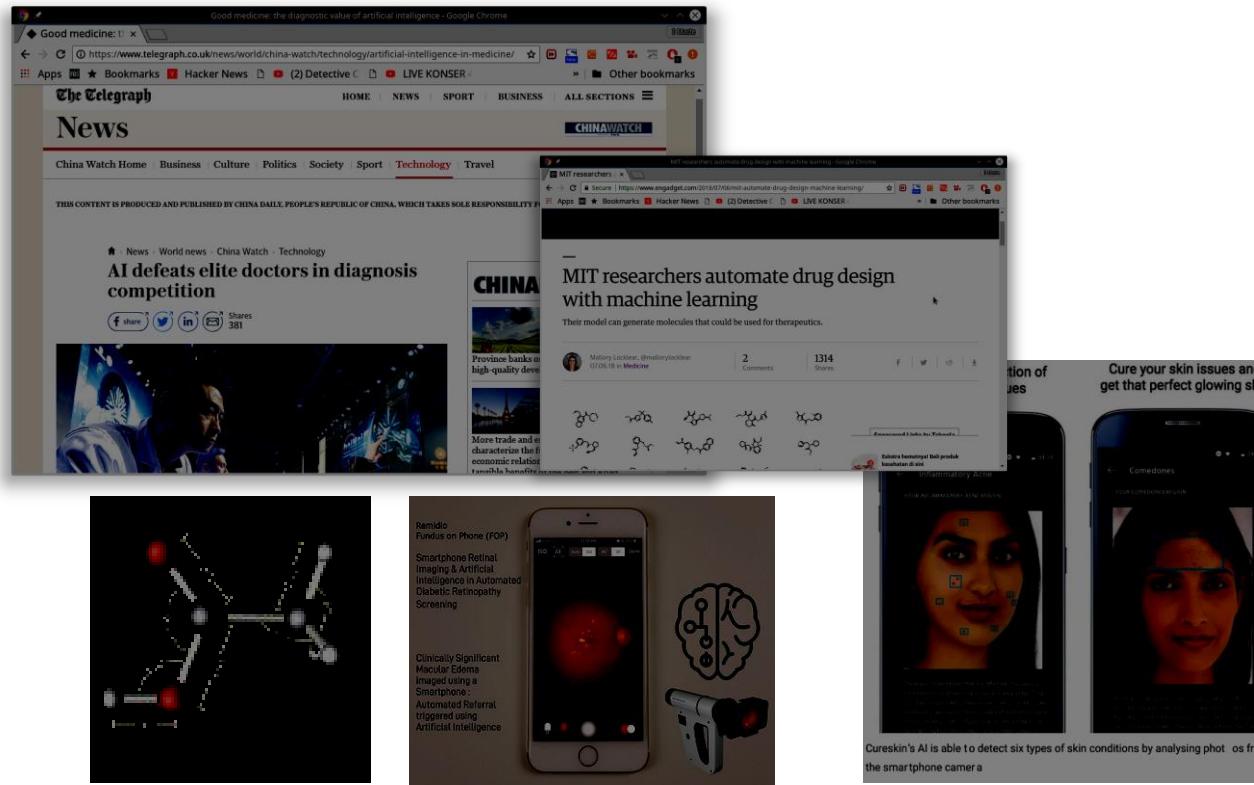
**Original Transcript:** Rahmi **Revised Transcript:** Trisa

Rahmi:  
oh baik selamat pagi terima kasih atas kehadiran rekan-rekan semua pada rapat haryanti data kita tidak berlama-lama nya langsung saja masing-masing dipersilakan melaporkan progres kerjanya beserta kendala yang dihadapi dan penanganannya.  
oh baik selamat pagi terima kasih atas kehadiran rekan-rekan semua pada rapat haryanti data kita tidak berlama-lama nya langsung saja masing-masing dipersilakan melaporkan progres kerjanya beserta kendala yang dihadapi dan penanganannya.

Trisa:  
kalo hari ini saya berhasil mawar liril transcript tau gitu banyak solo percakapan dengan durasi sekitar 30 menit dan sejauh ini sih aman yang belum ada kendala yang dihadapi.  
kalo hari ini saya berhasil mawar liril transcript tau gitu banyak solo percakapan dengan durasi sekitar 30 menit dan sejauh ini sih aman yang belum ada kendala yang dihadapi.

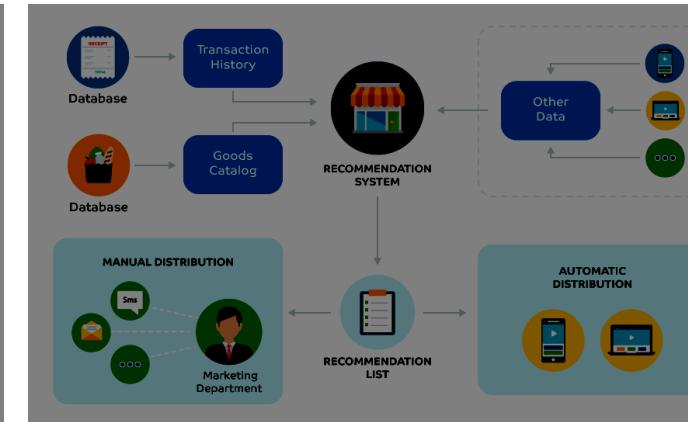
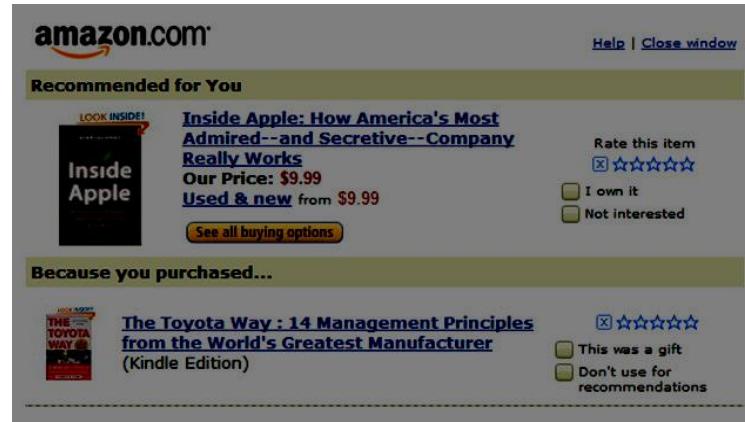
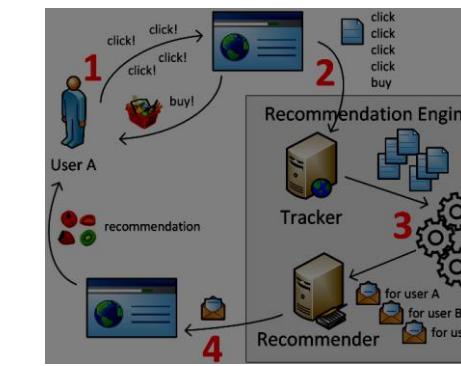
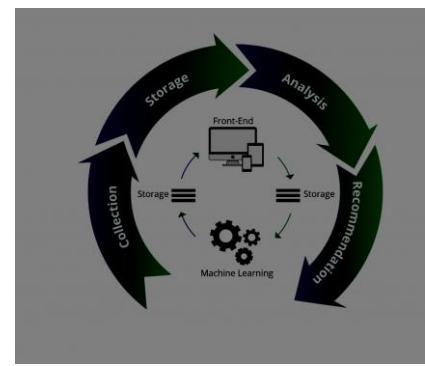


# Penerapan AI: Kesehatan

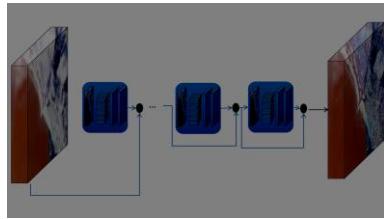


- Kombinasi AI dengan image processing, mampu membantu dokter mendeteksi penyakit kulit
- BioMind dikembangkan peneliti dari AI Research Centre for Neurological Disorders and Capital Medical University
- Mendeteksi dengan ketepatan 87% untuk 225 kasus dalam waktu 15 menit
- Tim dokter yang terdiri dari 15 dokter dari RS ternama di China mendapatkan akurasi 66% dalam waktu 30 menit.
- Untuk kasus brain ematoma expansion AI 83 % dan dokter 63%

# Penerapan AI: eCommerce



# Penerapan AI: GeoAI

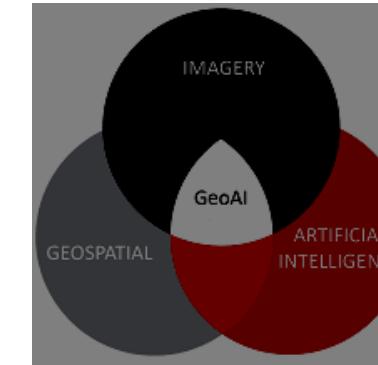
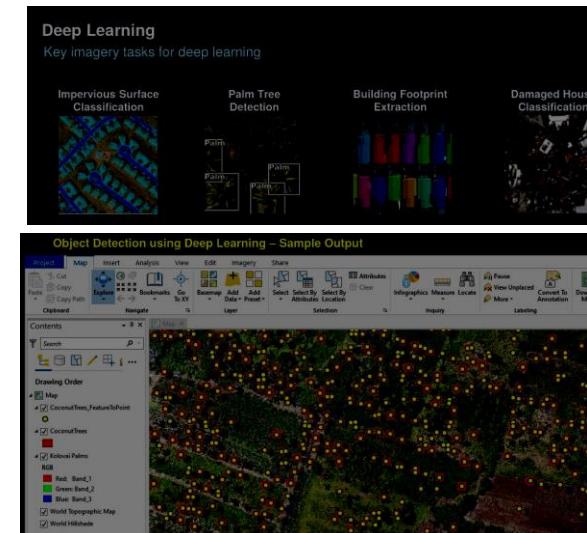


Super resolution dengan Deep Learning



Blurred

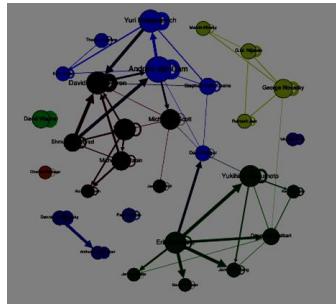
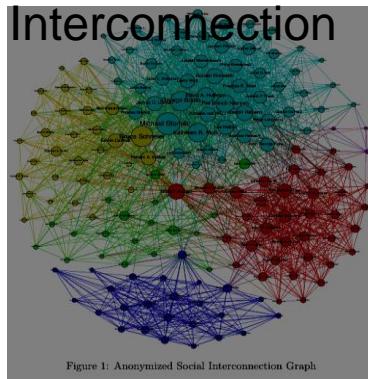
Hi Res



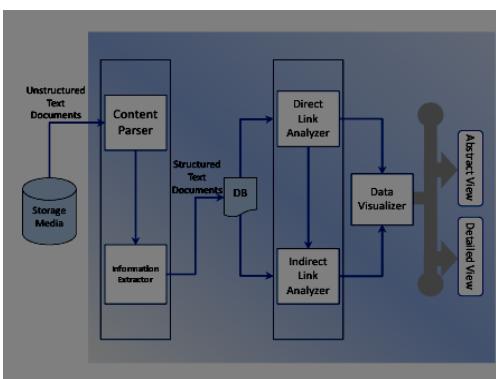
- Kombinasi antara Artificial Intelligence (AI) dan Geographic Information System (GIS), pemanfaatan data mining, komputasi berkinerja tinggi digunakan untuk mengekstraksi knowledge dari spatial big data. Meningkatkan pendekatan seleksi pada pola spatial
- Banyak digunakan pada kesehatan, lokasi merupakan data terintegrasi dari populasi. Dengan pemanfaatan Internet of Things (IoT) maka memiliki potensi besar di dalam memonitor kesehatan publik
- Penggunaan sumber data lain yang dikombinasikan merupakan ciri aplikasi ini, misal aplikasi dari media sosial, electronic health record, remote sensing, sensor perorangan dan perangkat lainnya.
- Menilai akurasi prediktif dan kesesuaian teknik permodelan spatial secara independen dan suatu model terintegrasi dari berbagai dataset
- Mendapatkan pemahaman dari fungsi spatial yang penting dan memproses sesuai aturan ekstraksi dan penujian faktor sensitifitas

# Penerapan AI: Keamanan dan Forensik

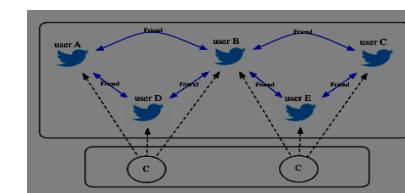
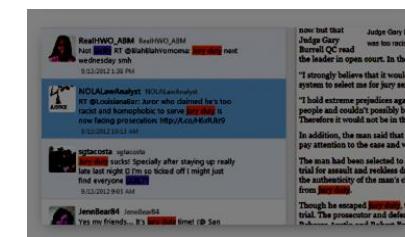
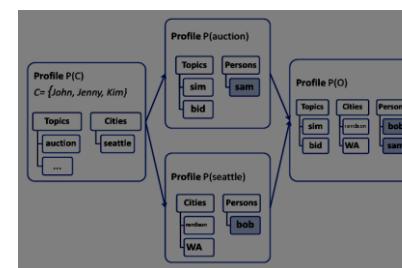
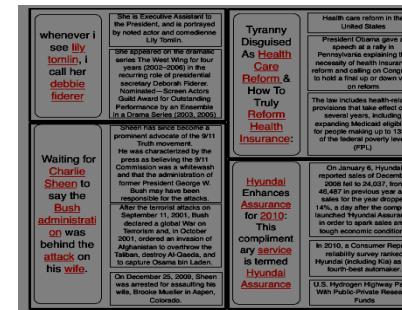
## Social



## Criminal Miner

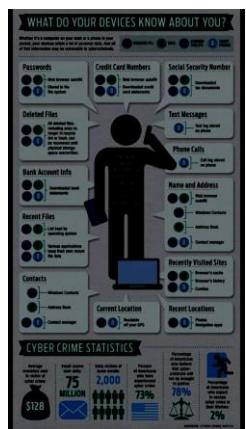


## Semantic Link

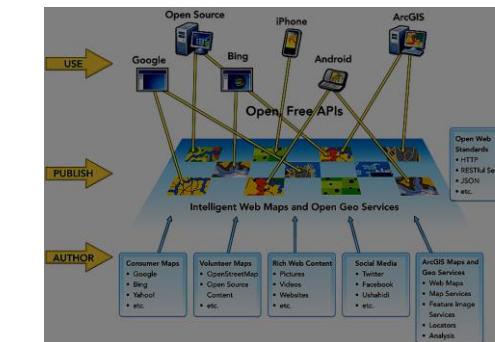


- Complete Time Line
- Location Visualization
- Event tracking
- Timeline matching
- Differential Snapshot

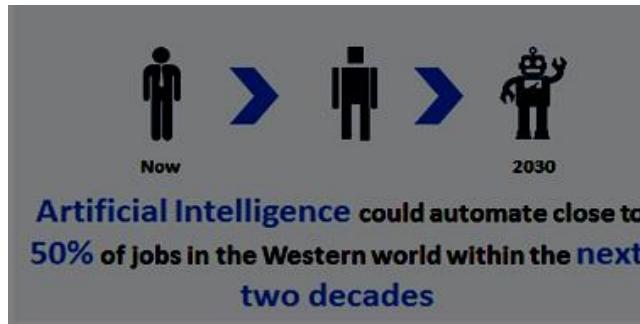
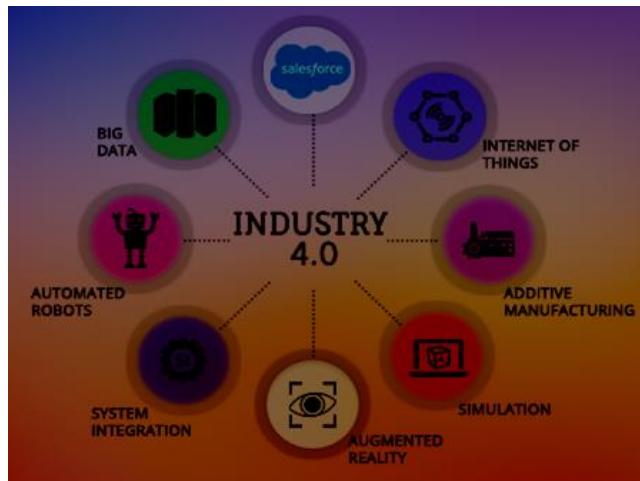
# Resiko AI : Kesalahan AI



- Mobile tak berawak menggunakan beragam sensor, dan data dari berbagai sumber
- Tetapi trend mobil tak berawak (driveless car) memiliki risiko
- Kesalahan data mengakibatkan dapat mobil berekaksi salah. Beberapa kasus sudah terjadi
- Kurangnya training set terkait data untuk melatih AI.
- Bila ada kecelakaan SALAH siapa?
- Pada saat kondisi macet dan diluar “training set” mobil akan stuck. Bagaimana dengan kondisi kemacetan luar biasa, kondisi perubahan jalanan
- AI mulai banyak digunakan untuk menseleksi pegawai, bagaimana bila dari data-training menjadikan AI “rasis”
- Bagaimana bila dengan melakukan profiling dapat mengungkapkan beberapa profil “personal” dan dapat digunakan secara tidak benar
- **Data Ethics** dan Ethics pada AI menjadi perlu pertimbangan



# Resiko AI : Hilangnya Pekerjaan



“Will a machine take away my job?”

Data driven application  
AI based Decision Support  
Smart Cyber-Physics



# Tantangan dalam Perkembangan AI

- **Regulasi**
  - Pengaturan etika dan pemakaian AI yang lebih bertanggung-jawab
- **Privasi**
  - Terkait dengan penggunaan data yang dipakai untuk pembangunan model AI
- **Kurangnya penjelasan**
  - Bagaimana model AI sampai pada suatu keputusan/kesimpulan tertentu (terkait dengan akuntabilitas dan trust)
- **Ketersediaan data**
  - Sejauh mana data yang dipakai cukup representative dan tidak bias
- **Kurangnya Talenta**

# Fasilitas AI dan Data Science

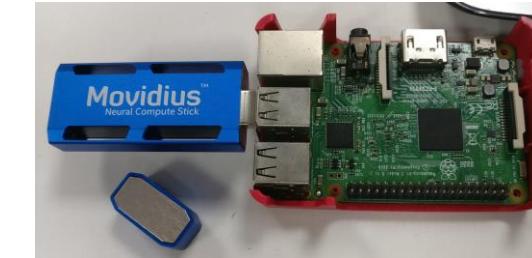
Collab Lab



Super Computer



EdgeAI



Salah satu tantangan dalam perkembangan AI adalah: ketersediaan talenta SDM, Langkah yang dapat dilakukan dengan mengadakan pelatihan terkait data science, praktikum yang diikuti oleh mahasiswa.



# Referensi Video

- **Introduction to AI**

- <https://www.youtube.com/watch?v=s9vDgPotU-4>
- <https://www.youtube.com/watch?v=wfmM5-d0Zh0>
- <https://www.youtube.com/watch?v=eUpRwSrwbHY>
- <https://www.youtube.com/watch?v=XfEOoAIArXw>
- <https://www.youtube.com/watch?v=uyWHthN3Q9c>

- **Intelligent Agent**

- [https://www.youtube.com/watch?v=XqAUPrLu8\\_s](https://www.youtube.com/watch?v=XqAUPrLu8_s)
- [https://www.youtube.com/watch?v=ehXgvsl8i\\_I](https://www.youtube.com/watch?v=ehXgvsl8i_I)
- <https://www.youtube.com/watch?v=NqeVTW4DUuU>
- <https://www.youtube.com/watch?v=btffOHgYsBc>
- <https://www.youtube.com/watch?v=d2608-UCcR8>
- <https://www.youtube.com/watch?v=Spia43l493c>

- **Introduction to Knowledge based Agent**

- <https://www.youtube.com/watch?v=P2DVmc4Zf7I>
- <https://www.youtube.com/watch?v=VhKPNCtwlnw&t=338s>
- [https://www.youtube.com/watch?v=7iZWC\\_NtegM](https://www.youtube.com/watch?v=7iZWC_NtegM)
- <https://www.youtube.com/watch?v=o2alb-eJNqc>



# Quiz / Tugas

Quiz dapat diakses melalui <https://spadadikti.id/>



*Terima kasih*