



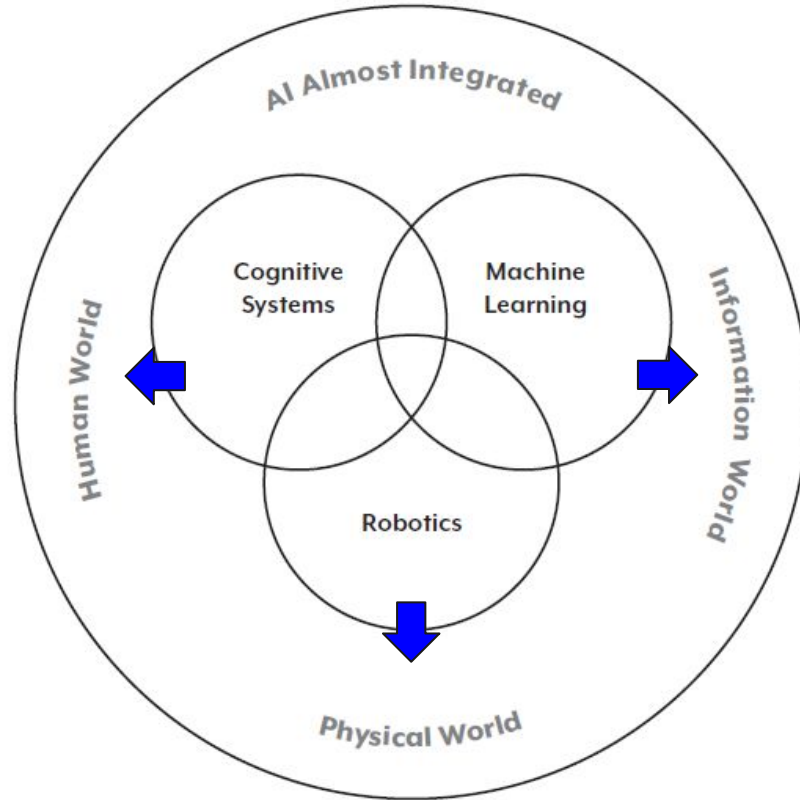
# *Artificial Intelligence (AI)* dalam Pembelajaran

Diskusi Tematik Pendidikan  
Transformasi Digital dalam Menunjang  
Pembelajaran Daring di Masa Pandemi &  
Kesiapan 'New Normal'  
Kamis, 4 Juni 2020

Cahya K. Ratih  
SEAMOLEC R&D Manager  
cahya@seamolec.org

# Kecerdasan Buatan/Artificial Intelligence (AI) memiliki banyak definisi...

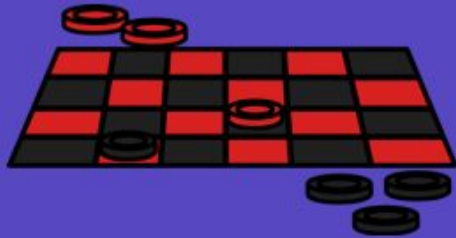
Figure I.1  
Venn diagram illustrating aspects of AI and how they correspond to the real world (Goel & Davies, 2019).



# AI, Machine Learning, dan Deep Learning

## Artificial Intelligence

Any techniques that allows computer to mimic human intelligence



1950s

Daya komputasi meningkat  
Banyaknya data (yang tidak mahal)  
Kemajuan *machine learning*

## Machine Learning

A technique that allows computer to perform task without being explicitly programmed



1980s

## Deep Learning

A subfield of machine learning that use neural network to learning



2010s

# AI di sekitar kita ...

Search: Khimar

Buttons: Semua, Gratis Ongkir XTRA, Cashback XTRA, COD, Fashion Muslim

Product 1: TUNIK AINUN, Rp89.000, 7 terjual

Product 2: Salt n Pepper Kemeja Pria Lengan Pendek SNP 135 L, Rp329.900, 18 terjual

Product 3: NEW EXTRA BASS, 12 MONTH WARRANTY, 20-20,000Hz

Product 4: Star Seller, GRATIS ONGKIR XTRA, CASHBACK XTRA

12:42

Halo, Cahya. Ini Asisten Google Anda. Saya bisa membantu dalam banyak hal. Ini beberapa tindakan yang populer.

Coba ucapkan

“Telepon”

“Setel alarm”

“Kirim pesan”

“Terjemahkan “Selamat pagi” ke bahasa Portugis”

“Cari fakta tentang bulan”



Personal Assistants

Detect language: English

Enter text

Translation

Open in Google Translate

Feedback

Language Translation

Chatbots

Facial Recognition



VERONIKA

Veronika

Hi Cahya Ratih, I am Veronika. Welcome to Telkomsel Virtual GraPARI. How can I help you today?

3/6/2020 - 12:48

Berapa sisa kuota data saya?

3/6/2020 - 12:48

Here's your remaining Internet quota:

1. Entertainment Remaining: 24.58 GB Valid until 10 Jun 2020
2. Internet Remaining: 24.74 GB Valid until 10 Jun 2020

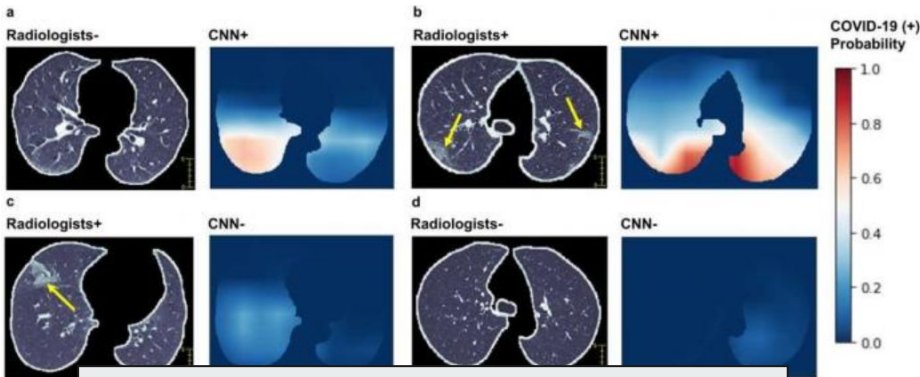
12:49

Icons: Signal, Wi-Fi, 4G, Battery

Purchase recommendation

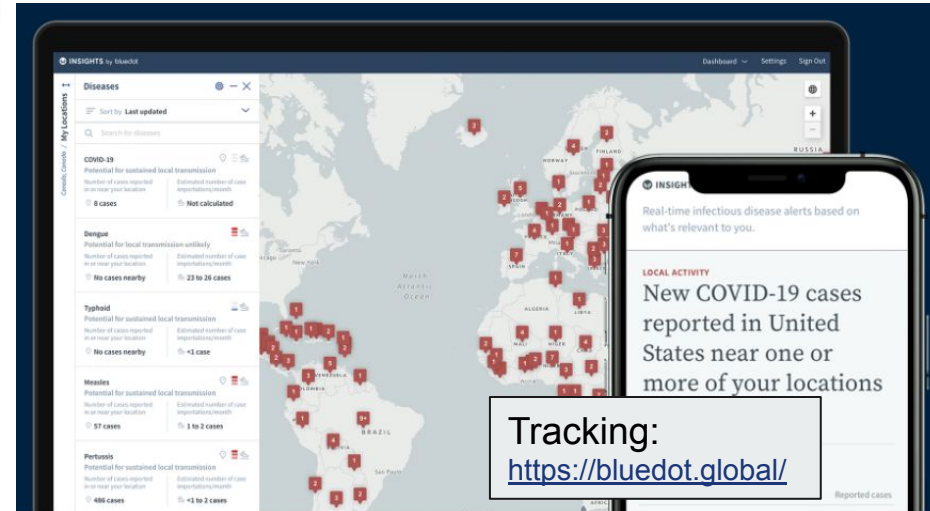
Cahya Ratih X

# Peran AI di Masa Pandemi COVID 19

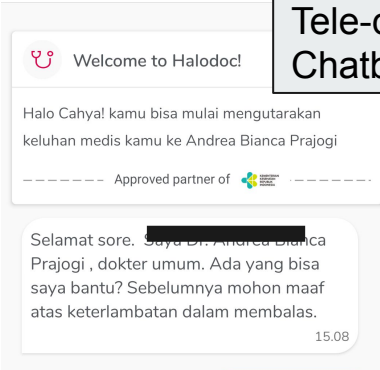


Deteksi: AI + Hasil CT Scan

<https://www.nature.com/articles/s41591-020-0931-3>

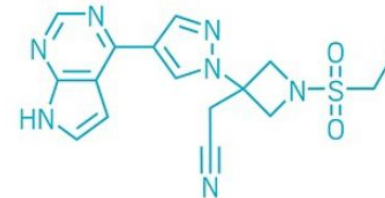


Tele-diagnosis:  
Chatbot dengan dokter



## Finding a Cure BenevolentAI

- Inputs: Chemical properties of Coronavirus and symptoms
- Looking for places the virus might enter the cell, and ways to block those points
- Found a drug that should help: Baricitinib
  - This drug is currently used to treat rheumatoid arthritis



Baricitinib

# AI Mendekati Kemampuan Manusia



**> 95 %**

akurasi dalam skala besar  
kosakata pada *speech  
recognition*

**> 90 %**

Akurasi dalam sebagian  
*speech identification*  
dalam teks

**< 5 %**

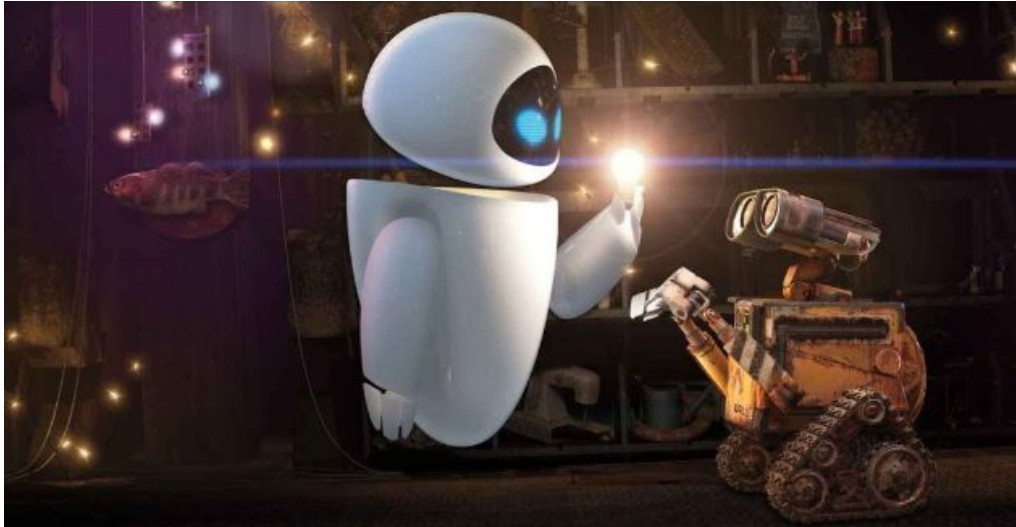
kesalahan dalam  
pengenalan visual skala  
besar

AI telah dapat "meniru" manusia  
pada beberapa aspek dalam berpikir, belajar, berbicara

Mesin dapat mengerjakan banyak tugas dengan cepat

Bagaimana dengan masa depan kita ?

# Diskusi kelas dimulai dari “bercerita”



- Apa perbedaan AI dan robot ?
- Apakah robot tsb. memiliki AI ?
- Apa yang menjadikan manusia berbeda dengan mesin?
- Apakah robot tersebut menunjukkan kecerdasan yang lebih daripada manusia?
- Apakah robot tersebut lebih memiliki emosi daripada manusia?
- Perhatikan “Natural Language Processing” .....dst



**AI adalah “alat” seperti yang lainnya.**

**AI bukanlah bubuk ajaib yang Anda taburkan pada benda-benda. Pada saat tertentu, AI mampu melaksanakan tugas yang dikerjakan seorang anak, tetapi dengan lebih cepat dan secara paralel.**

**Program komputer AlphaGo (Chan 2017) dapat mengalahkan manusia manapun dalam bermain GO, tetapi ia tidak dapat bermain Tic-Tac-Toe.**

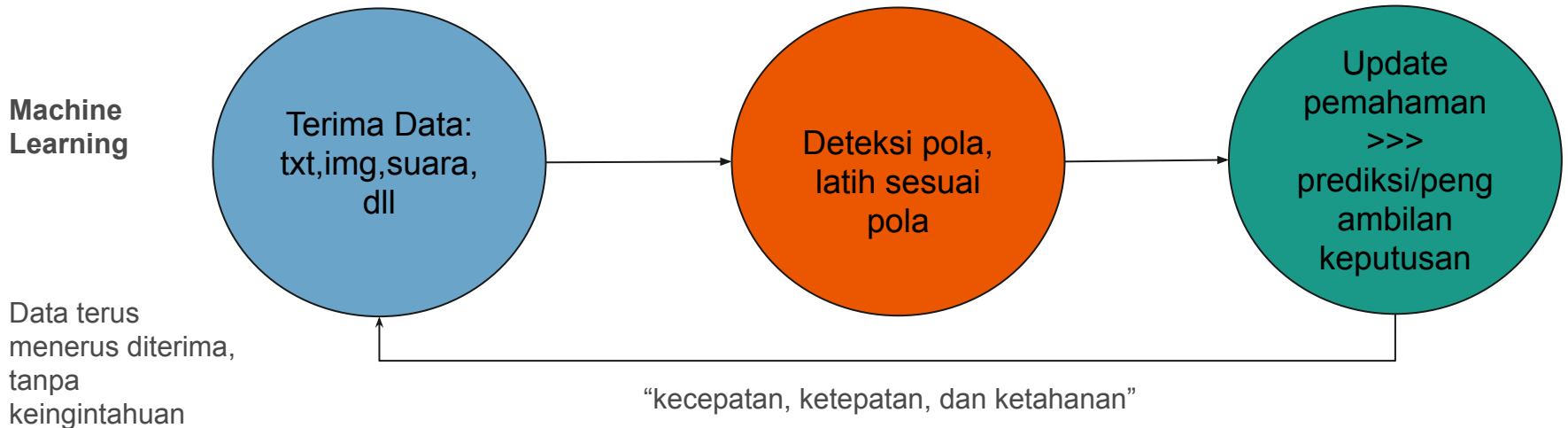
**(Jared Zimmerman, Google Design Lead, 2018)**



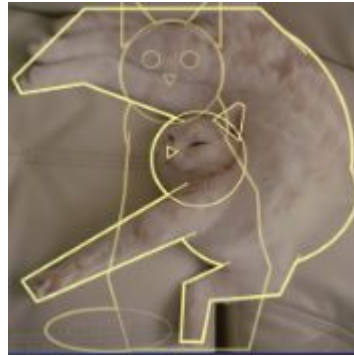
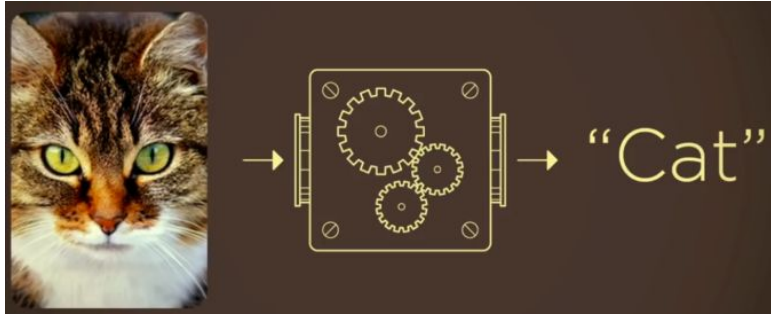
# Cara Belajar: Manusia dan AI

Bagi manusia, **bagaimana informasi diterima - dan indra mana saja yang terlibat** - berpengaruh terhadap bagaimana informasi tsb diproses dan diingat (Baddeley, 1990, p.9, Medina, 2008, Kopell & Greenberg, 2008)

Pembelajaran terjadi karena **proses terus menerus** untuk mengenali pola, menemukan koneksi, mengembangkan 'pertanyaan-pertanyaan', dan menghubungkannya dengan emosi manusia melalui cerita (Tokuhamas-Espinosa, 2011; Medina, 2008)

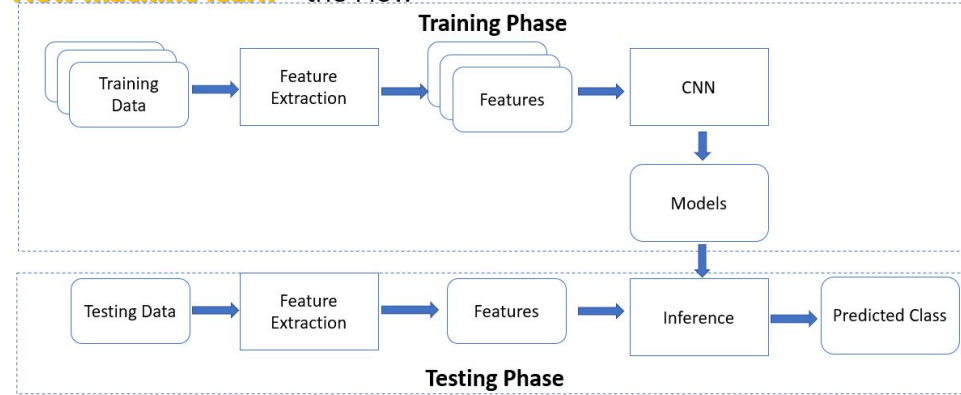


# Bagaimana manusia melatih mesin mengenali gambar ?



# SEAMOLEC AI Prototype: Fruit Recognition

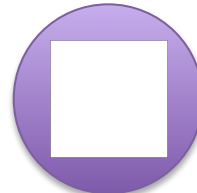
How machine learn – the Flow



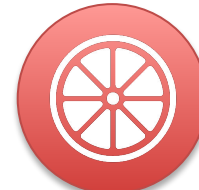
Machine learning consisted of two phases. First phase is training phase, which its goal is to created a model. And the second phase is Testing phase, which use model generated by previous phase as inference to predict correct label.



Detection



Recognition



Identification

**“Menghitung nutrisi dari buah (pada porsi tsb) yang akan dikonsumsi”**

# Apa yang dapat kita siapkan untuk siswa ?



Mengajarkan bagaimana siswa untuk melakukan coding/programming adalah hal yang baik.

Akan tetapi, bagaimana jika AI akan mampu untuk **lebih cepat** membuat **lebih banyak** kode-kode sederhana ?

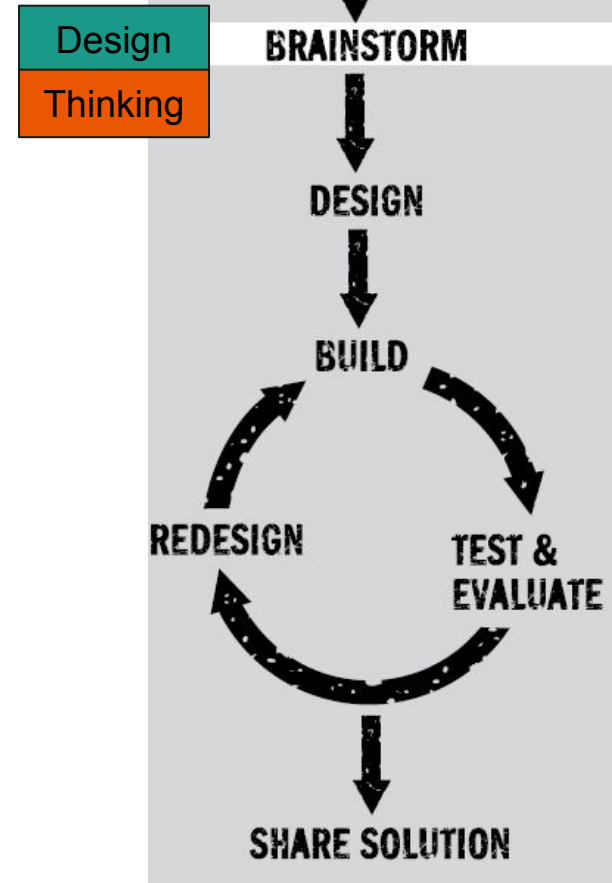
Kita harus **memaksimalkan aspek “human”** seperti keingintahuan, membuat koneksi, berkreasi, dsb dalam pembelajaran,

Jika tidak, kita akan mengajarkan mereka sebagaimana mesin yang hanya mengikuti satu set prosedur.

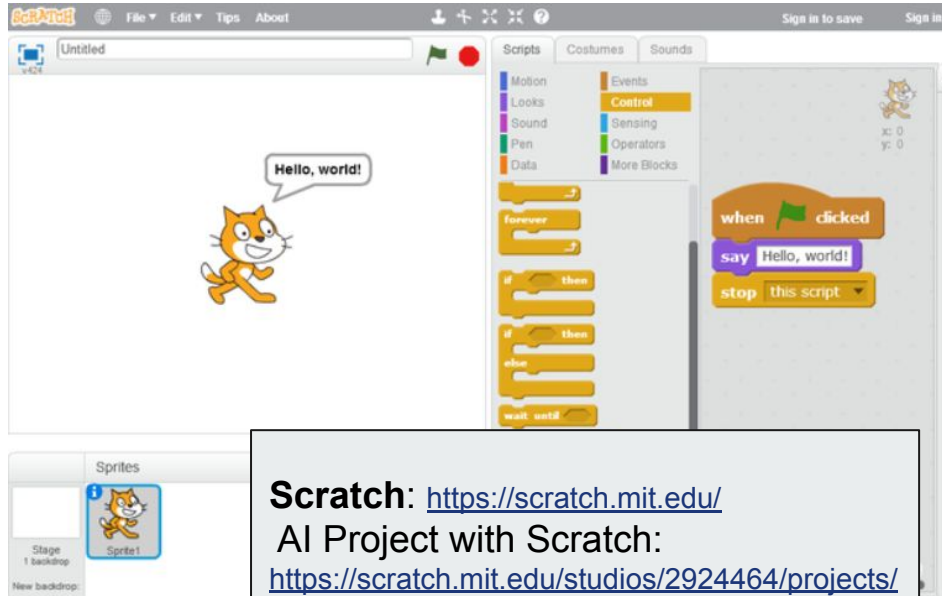
(Michelle Zimmerman, Teaching AI Exploring New Frontiers for Learning)

# Pendekatan kepada Siswa

- “High-Touch and High-Tech” Learning
  - High-Touch : lebih banyak “pembelajaran berbasis proyek” dengan bimbingan guru
  - High-Tech : pembelajaran adaptif dengan dukungan teknologi
- Design Thinking
  - Divergent thinking
  - Visual thinking: <https://vtshome.org/>
- Konteks STEM/STEAM
  - “Storytelling”
- Ajak siswa untuk bertanya
  - Nullius in Verba : jangan percaya kepada yang lain
  - Pertanyakan ‘Fakta dan Teori’ berdasarkan bukti-bukti yang ada
  - Perspektif yang berbeda-beda
  - ‘Cerita’ mana yang lebih mempengaruhi yang lain



# Proyek AI bagi siswa SD, SMP, SMA\*



**Scratch:** <https://scratch.mit.edu/>  
AI Project with Scratch:  
<https://scratch.mit.edu/studios/2924464/projects/>  
Machine Learning For Kids:  
<https://machinelearningforkids.co.uk/>

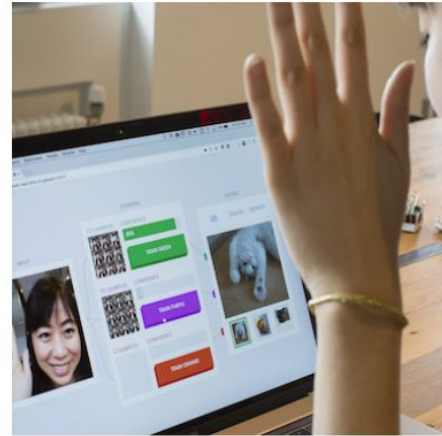


**App Inventor:** <https://appinventor.mit.edu/>  
AI with App Inventor (resource for teachers):  
<https://appinventor.mit.edu/explore/ai-with-mit-app-inventor>

# Google Educational Resources on AI

<https://ai.google/education/>

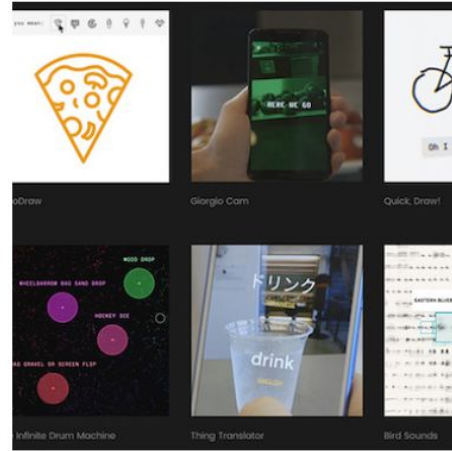
## Teachable Machine



Teachable Machines is a browser-based platform by Google, where you can train classifiers for your own image recognition algorithm.

<https://teachablemachine.withgoogle.com/>

## Google AI Experiments



AI Experiments is a showcase for simple experiments that make it easier for anyone to start exploring machine learning.

<https://experiments.withgoogle.com/collection/ai>

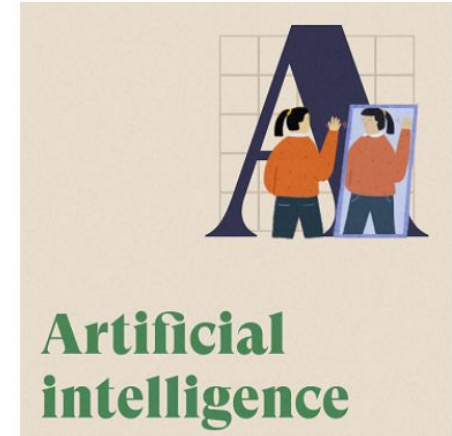
## Google AIY



With AIY maker kits, build intelligent systems that see, speak, and understand.

<https://aiyprojects.withgoogle.com/>

## The A-Z of AI

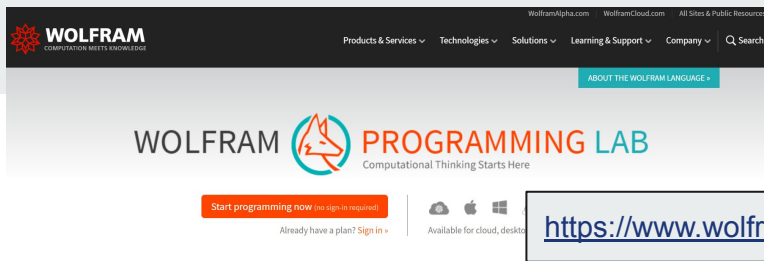


This A-Z guide offers a series of simple, bite-sized explainers to help anyone understand what AI is, how it works and how it's changing the world around us.

<https://atozofai.withgoogle.com/intl/en-GB/>

“Beginner”

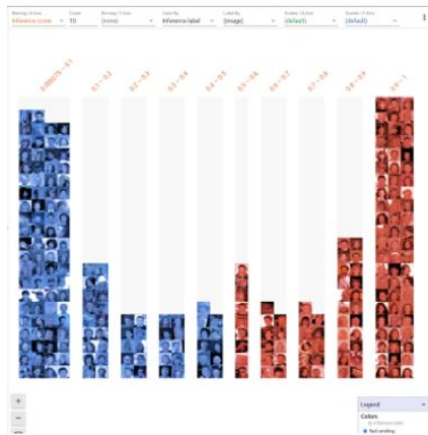
# Other Resources



<https://pair-code.github.io/what-if-tool/>

<https://www.wolfram.com/programming-lab/>

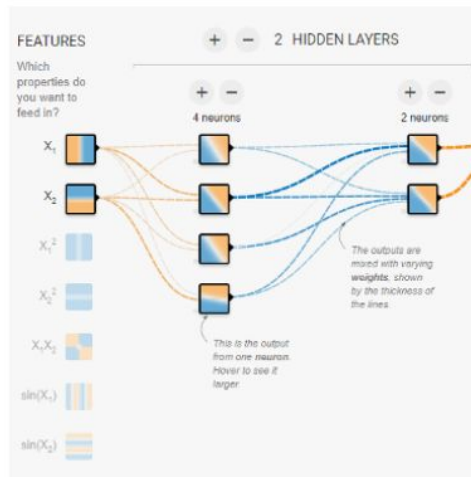
## Google What If



The What-If Tool makes it easy to efficiently and intuitively explore up to two models' performance on a dataset.

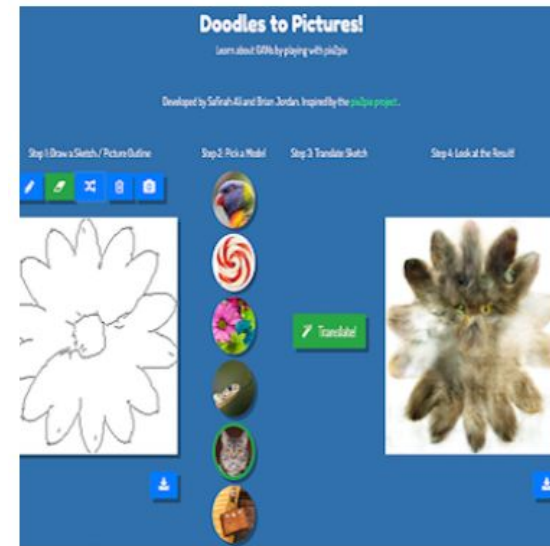
<https://playground.tensorflow.org/>

## Tensorflow Playground



TensorFlow Playground is an interactive visualization of neural networks.

## GAN Play



Learn about GANs Image Transfer!

<https://mitmedialab.github.io/GAN-play/>



# AI-powered Applications : Language Learning

2:08 4G

4 IN A ROW

Translate this sentence

Hallo, ich bin  
Duo.

Hello I am Duo

Duolingo

he evening are  
and

CHECK

2:09 4G

9 IN A ROW

Speak this sentence

Guten Tag, willkommen!

Nice! Meaning:  
Hello, welcome!

CONTINUE

3:20 4G

What skill do you want to improve the most?

- Overcoming Nerves
- Speaking Pace
- Removing Fillers
- Facial Expression
- Vocal Clarity
- Using Concise Language
- Speaking with Energy
- Intentional Pausing

Next Question

3:26 4G

Share Done

Orai Score: 56%

What to work on:

- Pace 0%
- Energy 27%
- Confidence 46%

You did the best in:

- Conciseness 95%

Next time, try to speed up, vary your pitch, and avoid awkward pauses.

00:00 00:33

Orai

# Resources for Teachers

- 
1. AI for K12: <https://github.com/touretzkyds/ai4k12/wiki>
  2. AI - Unplugged: <https://ddi.cs.fau.de/schule/ai-unplugged/> => mengenal AI tanpa komputer
  3. NVIDIA Teaching Kits: <https://developer.nvidia.com/teaching-kits> (untuk SMA/K & PT)
  4. Python You Mean It: <https://www.pythonlikeyoumeanit.com/> (untuk mulai belajar Python)
  5. Code.org: <https://curriculum.code.org/hoc/plugged/9/>

Various MOOC for teacher/beginner:

6. AI for All: <http://ai-4-all.org/open-learning/>
7. MOOC - CSER K-12 Digital Technologies Education:
  - a. Teaching AI in Primary Classroom: [https://csermoocs.appspot.com/ai\\_primary/course](https://csermoocs.appspot.com/ai_primary/course)
  - b. Teaching AI in Secondary Classroom :[https://csermoocs.appspot.com/ai\\_secondary](https://csermoocs.appspot.com/ai_secondary)
8. Elements of AI : <https://www.elementsofai.com/>
9. Coursera Course - AI For Everyone <https://www.coursera.org/learn/ai-for-everyone/>
10. Microsoft Course - First Steps Into AI <https://education.microsoft.com/en-us/course/9534f9d9/overview>
11. ML Mastery: <https://machinelearningmastery.com/start-here/#getstarted>
12. Onno Center: <https://www.youtube.com/channel/UCvYfBQdMzsWTbNAsgJEC7Ig/videos> and many more.....

SEAMOLEC MOOC: Scratch, App Inventor,  
Computer Vision (end of year)

<http://etraining.seamolec.org/>  
<http://mooc.seamolec.org/>

# Top 15 Open Source Machine Learning Tools by Springboard



## ML Programming Languages:

- Python: <https://www.python.org/>
- R: <https://www.r-project.org/>

## ML Tools

- Tensor Flow: <https://www.tensorflow.org/>
- Scikit Learn: <https://scikit-learn.org/stable/>
- Weka (GUI): <https://www.cs.waikato.ac.nz/ml/weka/>

## Deep Learning Tools

- Keras: <https://keras.io/>
- Pytorch: <https://pytorch.org/>

## Visualization Tools

- Jupyter notebook: <https://jupyter.org/>
- Matplotlib: <https://matplotlib.org/>
- Seaborn: <https://seaborn.pydata.org/>

## Analytical Tools:

- Apache Spark: <https://spark.apache.org/>

## Other Tools:

- SQL
- Apache Hadoop
- Pandas

# Catatan Akhir



AI telah hadir di berbagai perangkat yang kita dan juga siswa kita gunakan.

Bagaimana menyiapkan masa depan siswa dimana AI akan punya peran yang lebih penting dalam kehidupan dan karir mereka?

Siswa kita perlu untuk memahami: siapa mereka sebagai manusia; mengapa masyarakat, budaya, dan tradisi adalah hal yang penting; bagaimana menjadi lebih baik di berbagai area yang tidak dapat dilakukan oleh mesin; sambil belajar bagaimana kemampuan mesin untuk meningkatkan kapasitas kita sebagai manusia.

Siswa sebaiknya mengetahui bagaimana *learn, unlearn, and relearn*.

Siswa dilatih untuk *design thinking, project-based learning, STEAM/multidisciplinary approach*.

*Diversity Matters*