



YAYASAN PERGURUAN CIKINI
INSTITUT SAINS DAN TEKNOLOGI NASIONAL
FAKULTAS SAINS DAN TEKNOLOGI INFORMASI

Jl. Moh. Kahfi II, Bhumi Srengseng Indah, Jagakarsa, Jakarta Selatan 12640
Telp. 021-7270090 (hunting), Fax. 021-7866955, hp: 081291030024
Email: fsti@istn.ac.id Website: www.istn.ac.id

SURAT PENUGASAN TENAGA PENDIDIK

Nomor : 204 / 03.1 – I / IX / 2022

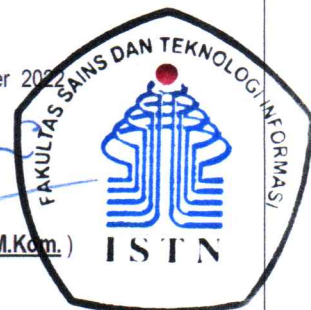
SEMESTER GANJIL, TAHUN AKADEMIK 2022 / 2023

Nama	: Aryo Nur Utomo, ST.,M.Kom.	Status Pegawai	: Edukatif Tetap		
NIK	: 01.121225	Program Studi	: Sistem Informasi		
Jabatan Akademik	: Asiste Ahli				
Bidang	Perincian Kegiatan	Ruang/ Tempat	Jam/ Minggu	Kredit (sks)	Hari / Waktu
I PENDIDIKAN Dan PENGAJARAN	MENGAJAR DI KELAS (KULIAH / RESPONSI DAN LABORATORIUM)				
	1. Cloud Computing (SI)	A-1	1 Jam/Minggu	1	Senin / 08:00-09:40
	2. Sistem Pendukung Keputusan (SI)	D-2	1,5 Jam/Minggu	1,5	Selasa / 08:00-10:00
	3. Sistem Temu Kembali Informasi(SI)	E-4	1 Jam/Minggu		Senin /15:30-17:00
	4. IT Service Management (SI)	D-3	1 Jam/Minggu	1	Jum'at / 14:30-16:00
	5. Keamanan Sistem Informasi (SI)	E-1	1 Jam/Minggu	1	Rabu / 15:30-17:00
	6. Algoritma dan Pemrograman (TIF)	A-2	1 Jam/Minggu	1	Kamis / 08:00-09:40
	7. Analisis dan Perancangan Algoritma (TIF)	A-1	1 Jam/Minggu	1	Senin / 10.30-12.10
	8. Pemrograman Jaringan (Java/Python)	D-2	1,5 Jam/Minggu	1,5	Selasa / 14.41-15.40
	9. Pembelajaran Mesin (TIF)	E-1	1,5 Jam/Minggu	1,5	Rabu / 13.00-14.40
	10. Komputer Forensik (TIF)	A-2	1,5 Jam/Minggu	1,5	Jumat / 12.30-14.00
	11. Pengelolaan Layanan TI (ITSM) (TIF)	A-1	1 Jam/Minggu	1	Senin / 08.00-09.40
	12. Data Compress & Coding (PIGS)	A-2	1 Jam/Minggu		Selasa / 08.00-09.40
	13. Manajemen Proyek Perangkat Lunak	A-3	1,5 Jam/Minggu		Kamis / 10.00-11.30
14. Menduduki Jabatan Struktural (Ka.Prodi TIF)			20 Jam/Minggu	3	
II PENELITIAN	Penulisan Karya Ilmiah			1	
III PENGABDIAN DAN MASYARAKAT	Pelatihan dan Penyuluhan				
IV UNSUR-UNSUR PENUNJANG	Berperan Serta Aktif dalam Pertemuan Ilmiah/Seminar				
Jumlah Total				16	

Kepada yang bersangkutan akan diberikan gaji / honorarium sesuai dengan peraturan penggajian yang berlaku di Institut Sains Dan Teknologi Nasional
Penugasan ini berlaku dari tanggal **02 September 2022** sampai dengan tanggal **29 Februari 2023**.

Jakarta, 30 September 2022
Dekah,

(Marnaeni, S.Kom.,M.Kom.)



Tembusan :

1. Direktur Akademik – ISTN
2. Direktur Non Akademik – ISTN
3. Ka. Biro Sumber Daya Manusia – ISTN
4. Kepala Program Studi Sistem Informasi
5. Arsip.

Jakarta , Februari 2023
Dosen Pengajar

A handwritten signature in blue ink, appearing to be 'Aryo Nur Utomo', written in a cursive style.

(Aryo Nur Utomo, ST.M.Kom)



BERITA ACARA PERKULIAHAN
(PRESENTASI KEHADIRAN DOSEN)
SEMESTER GANJIL TAHUN AKADEMIK 2022/2023
PROGRAM STUDI TEKNIK INFORMATIKA S1 FSTI-ISTN

Mata Kuliah : Pembelajaran Mesin	Semester : 365001
Dosen : Aryo Nur Utomo, ST, M.Kom	SKS : 3
Hari : Rabu	Kelas : A
Jam : 13:00-14:40	Ruang : B-2

No.	TANGGAL	MATERI KULIAH	JML MHS HADIR	TANDA TANGAN DOSEN
1.	21-September 2022	<ul style="list-style-type: none">• Kontrak kuliah.• Pengantar Pembelajaran Mesin.• Instalasi VSCode + Python extension.	16	<i>Ah</i>
2.	28-September 2022	Konsep Pembelajaran Mesin (Machine Learning). Kasus Regresi Linear.	16	<i>Ah</i>
3.	05-Oktober 2022	<ul style="list-style-type: none">• Praktek kasus Dataset Regresi Linear.• Tugas laporan praktek.	16	<i>Ah</i>
4.	12-Oktober 2022	Konsep Pembelajaran. Learning Process dan Find-S.	16	<i>Ah</i>
5.	19-Oktober 2022	Data Analytics	16	<i>Ah</i>
6.	28-Oktober 2022	<ul style="list-style-type: none">• Supervised Learning.• Klasifikasi dengan Nearest Neighbor.• Praktek: case hipertensi.	16	<i>Ah</i>
7.	2-November 2022	Klasifikasi dengan algoritma Decision Tree	16	<i>Ah</i>
8.	9-November 2022	UJIAN TENGAH SEMESTER (UTS)	16	<i>Ah</i>

DOSEN PENGAJAR

(Aryo Nur Utomo, S.T., M.Kom.)

DAFTAR NILAI

SEMESTER GANJIL REGULER TAHUN 2022/2023

Program Studi : Teknik Informatika S1

Matakuliah : Pembelajaran Mesin

Kelas / Peserta : A

Perkuliahan : Kampus ISTN Bumi Srengseng Indah

Dosen : Aryo Nur Utomo, ST.M.Kom.

Hal. 1/1

No	NIM	N A M A	ABSEN	TUGAS	UTS	UAS	MODEL	PRESENTASI	NA	HURUF
			0%	0%	50%	50%	0%	0%		
1	16360008	Denny Chandra Darmawansyah	100	0	63	63	0	0	63	C+
2	16360022	Hadyan Dwi Mudiawan	100	0	79	76	0	0	77.5	A-
3	20360002	Muhammad Satria Wibowo	100	0	75	77	0	0	76	A-
4	20360003	Tegar Maulana Rifaldy	100	0	69	71	0	0	70	B
5	20360004	Maulana Rizqi Dermawan	100	0	79	81	0	0	80	A
6	20360005	Juliani Jakin	100	0	79	81	0	0	80	A
7	20360006	Raihan Putra Kurniawan	100	0	79	81	0	0	80	A
8	20360007	Rasyid Nur Sanjaya	100	0	79	81	0	0	80	A
9	20360008	Iqbal Muhammad Hasbi	100	0	76	79	0	0	77.5	A-
10	20360009	Billi Putra Wilsa	100	0	76	79	0	0	77.5	A-
11	20360010	Adde Arief Nurdin	100	0	79	81	0	0	80	A
12	20360011	Oriel Panaehan	100	0	79	81	0	0	80	A
13	20360013	Hilal Razali	100	0	79	81	0	0	80	A
14	20360014	Qotrunnada Naqiyah	100	0	81	85	0	0	83	A
15	20360015	Afif Alim Ibadurrahman	100	0	53	53	0	0	53	D
16	21360501	Muhamad Firdaus	100	0	79	81	0	0	80	A

Rekapitulasi Nilai							
A	9	B+	0	C+	1	D+	0
A-	4	B	1	C	0	D	1
		B-	0	C-	0	E	0

Jakarta, 18 February 2023

Dosen Pengajar

Aryo Nur Utomo, ST.M.Kom.

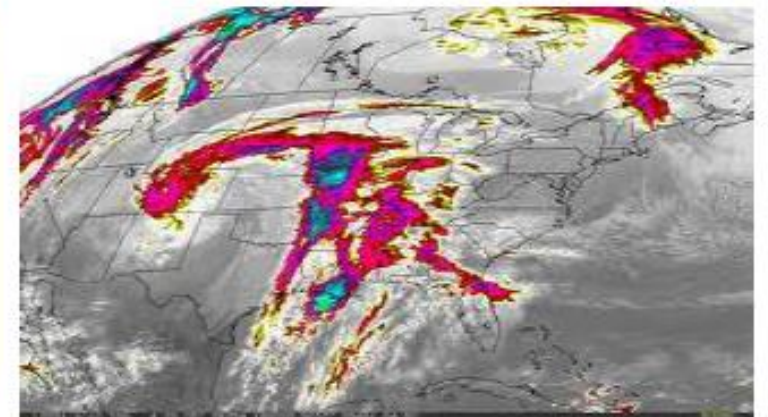
Machine Learning

Pengantar Mesin Pembelajaran

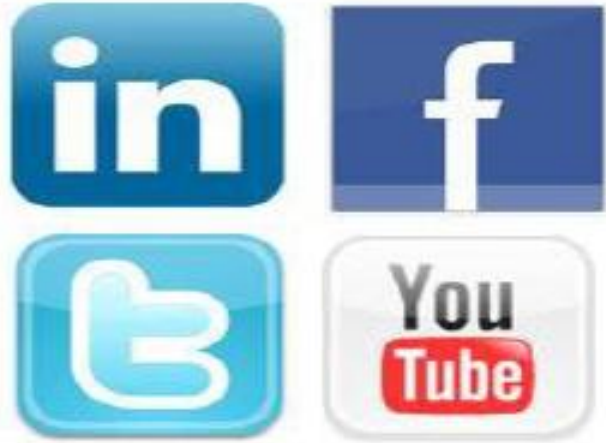
Learning from Data

The world is driven by data.

- Germany's climate research centre generates 10 petabytes per year
- Google processes 24 petabytes per day
- The Large Hadron Collider produces 60 gigabytes per minute (~12 DVDs)
- There are over 50m credit card transactions a day in the US alone.



The World of Data





1 NEW DEFINITION IS ADDED ON UP.DEN

1,600+ READS ON Scribd

13,000+ HOURS MUSIC STREAMING ON PANDORA

12,000+ NEW ADS POSTED ON craigslist

370,000+ MINUTES VOICE CALLS ON skype

98,000+ TWEETS

20,000+ NEW POSTS ON tumblr.

THE LARGEST SOCIAL READING PUBLISHING CONTINUES

320+ NEW twitter ACCOUNTS

100+ NEW Linked in ACCOUNTS

13,000+ iPhone APPLICATIONS DOWNLOADED

1 associated content NEW ARTICLE IS PUBLISHED

QUESTIONS ASKED ON THE INTERNET...

100+ Answers.com

40+ YAHOO! ANSWERS

IN 60 SECONDS...

6,600+ NEW PICTURES ARE UPLOADED ON flickr

THE WORLD'S LARGEST COMMUNITY CREATED CONTENT!!

600+ NEW VIDEOS YouTube

50+ WORDPRESS DOWNLOADS

25+ HOURS TOTAL DURATION

70+ DOMAINS REGISTERED

60+ NEW BLOGS

695,000+ facebook STATUS UPDATES

125+ PLUGIN DOWNLOADS

1,500+ BLOG POSTS

168 MILLION EMAILS ARE SENT

694,445 SEARCH QUERIES

1,700+ Firefox DOWNLOADS

79,364 WALL POSTS

510,040 COMMENTS

Learning from Data

Data is recorded from some real-world phenomenon.

What might we want to do with that data?

Prediction

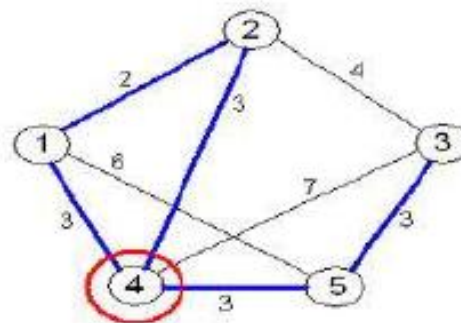
- what can we **predict** about this phenomenon?

Description

- how can we **describe/understand** this phenomenon in a new way?



AHRQ Prevention Quality Indicators						
Dehydration Admission Rate (ESQ 10)						
Greater Risks or Higher Rates of AHRQ are significantly lower than the National Average.						
Greater Risks or Higher Rates are significantly higher than the National Average.						
County Name	Cases	Population	Catch Rate	Risk Adj. Rate	Adjusted Risk Adj. Rate	UL
1. Aiken	25	13,774	0.74	4.63	5.49	6.76
2. Allen	28	14,288	1.96	1.81	2.89	2.89
3. Anderson	17	44,454	0.15	0.25	0.68	1.47
4. Beaufort	5	6,638	1.22	0.24	1.08	1.83
5. Bladen	102	31,712	3.29	2.55	3.09	3.31
6. Burke	15	2,663	1.05	0.84	1.95	2.35
7. Cabarrus	122	20,956	5.29	4.62	4.96	5.41
8. Caswell	68	78,330	0.87	0.88	1.14	1.42
9. Cherokee	38	18,248	1.21	0.72	1.26	1.81
10. Clay	32	39,383	0.61	0.38	0.72	1.06
11. Columbus	32	22,287	1.43	0.88	1.34	1.70
12. Davidson	49	6,790	2.02	1.78	2.43	3.47
13. DeWitt	40	12,384	3.23	2.84	3.59	4.35
14. Dupont	22	15,035	1.52	0.94	1.00	2.07
15. Gaston	33	62,512	0.44	0.23	0.55	0.83
16. Guilford	9	18,286	0.07	0.78	0.90	1.54
17. Halifax	15	32,291	1.36	0.38	1.00	1.61
18. Harnett	28	29,788	0.96	0.82	0.93	1.20
19. Henderson	54	68,477	0.81	0.63	0.81	1.07
20. Hertford	6	2,266	1.18	0.60	0.93	1.88
21. Johnston	20	7,060	2.52	1.77	2.54	3.35
22. Jones	38	21,180	0.85	0.37	0.85	1.34
23. Lenoir	49	12,846	2.12	2.72	3.39	3.89



Learning from Data

How can we extract knowledge from data to help humans take decisions?

How can we automate decisions from data?

How can we adapt systems dynamically to enable better user experiences?

Write code to explicitly
do the above tasks



Write code to make the computer
learn how to do the tasks

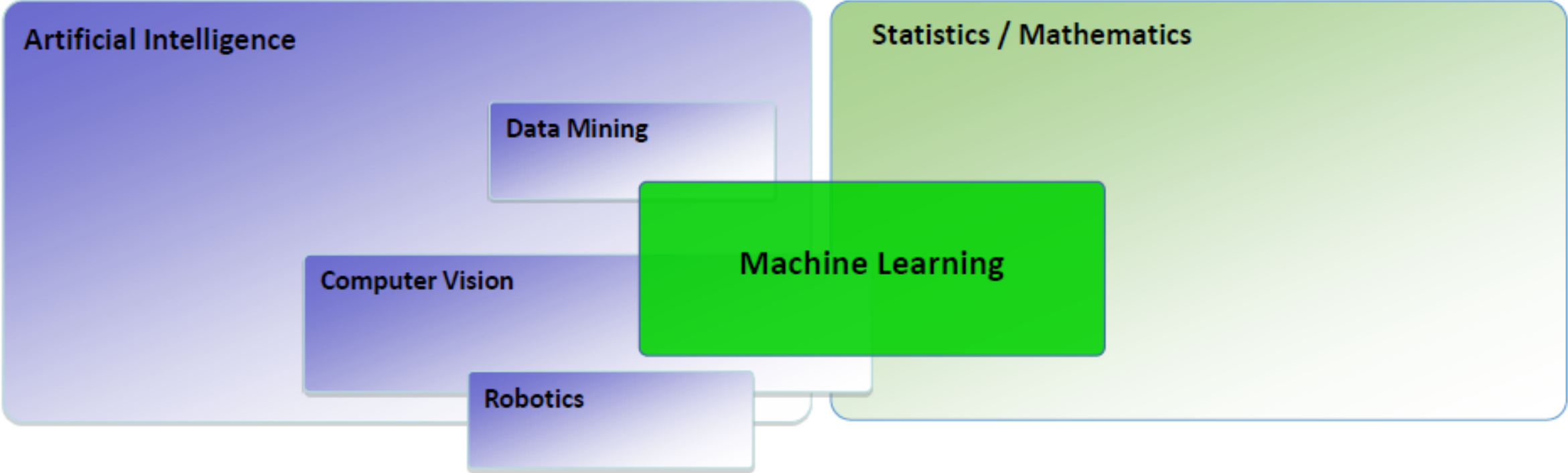


Apa itu Machine Learning?

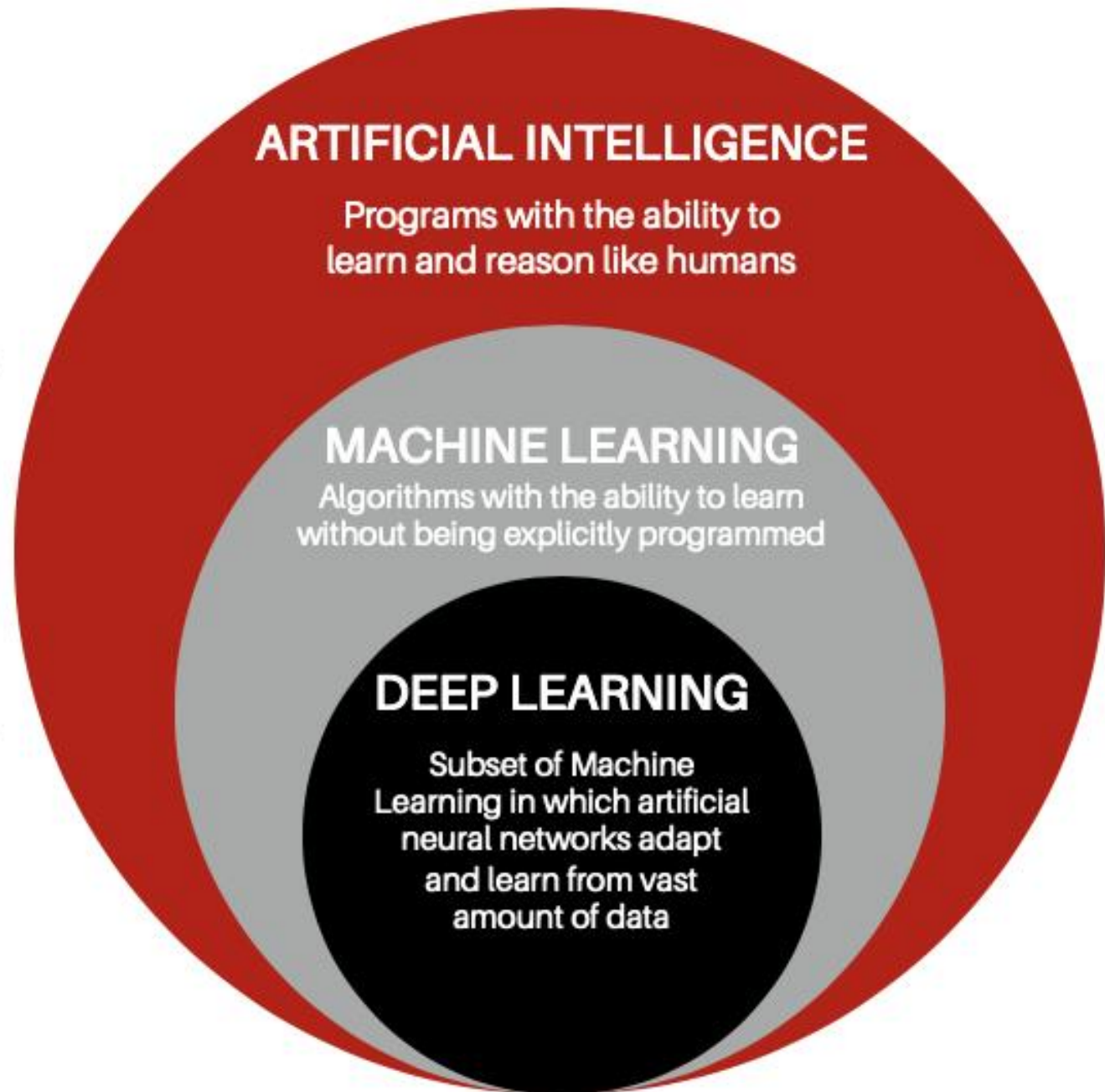
- Machine Learning adalah salah satu disiplin ilmu dari Computer Science yang mempelajari bagaimana membuat komputer/mesin itu mempunyai suatu kecerdasan
- Agar mempunyai suatu kecerdasan, komputer/mesin harus dapat belajar.
- Dengan kata lain, Machine Learning adalah suatu bidang keilmuan yang berisi tentang pembelajaran komputer/mesin untuk menjadi cerdas

Machine Learning

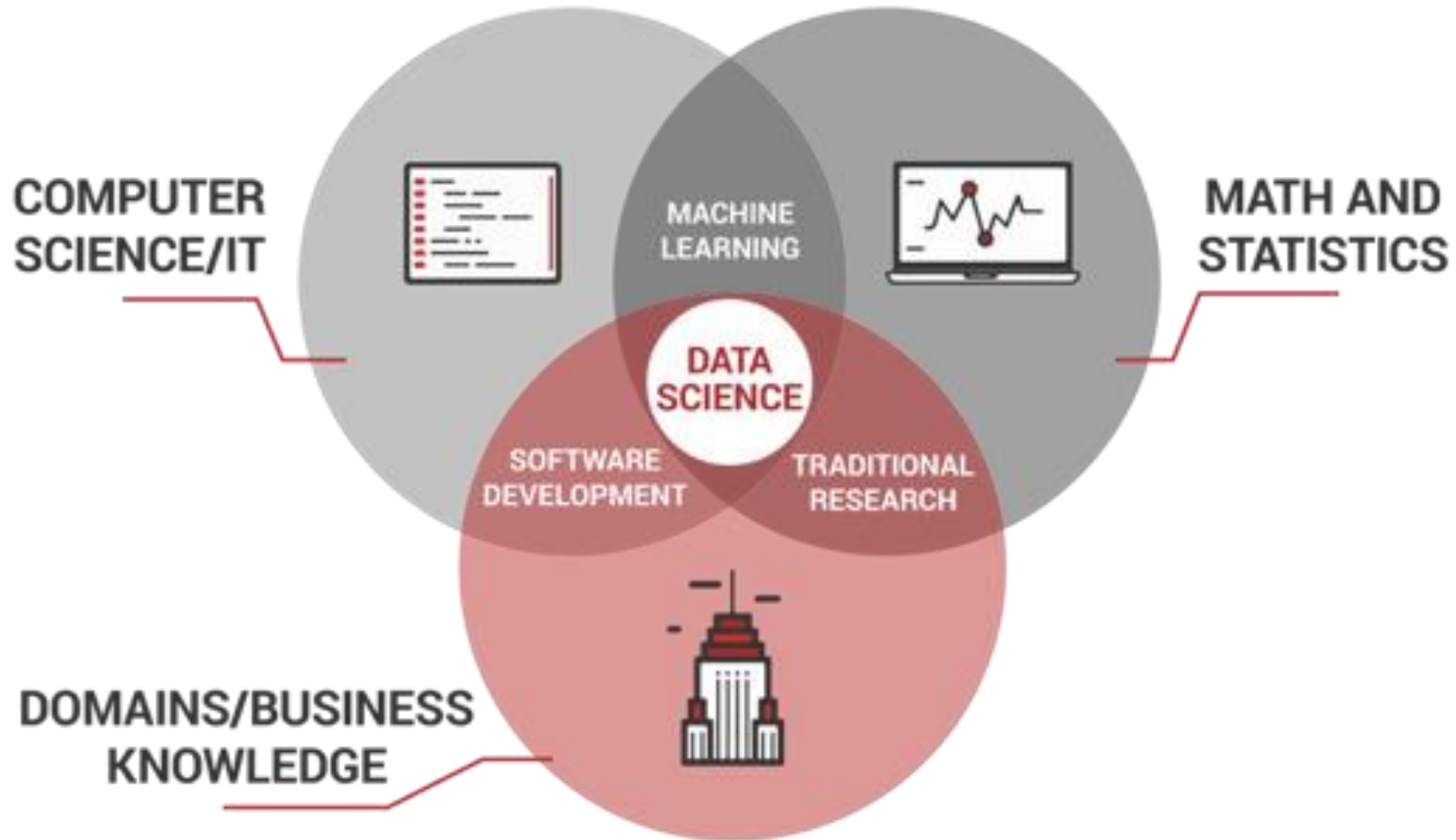
Where does it fit? What is it **not**?



Artificial Intelligence vs Machine Learning vs Deep Learning



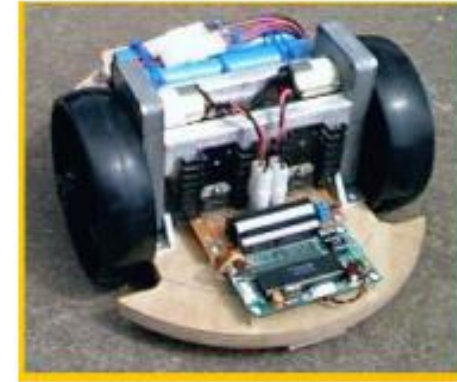
Computer Science – Math & Statistics – Domain Business



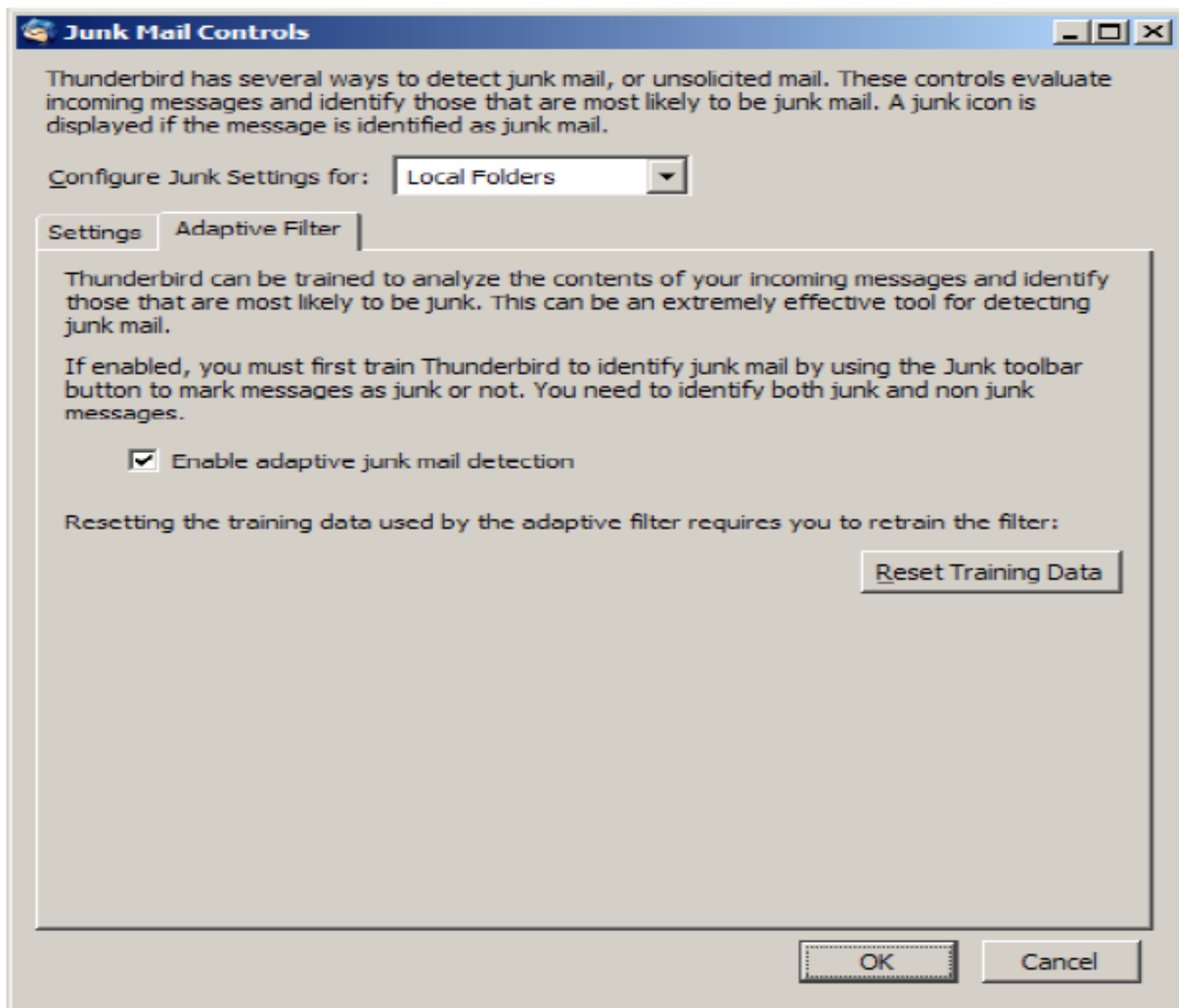
Applications of Machine Learning

- Interface – Audio Visual Speech Recognition (AVSR); natural language processing, etc.
- AI – robotics, computer games, entertainment, etc.
- Data Analysis – information retrieval, data mining, etc.
- Biological – gene sequencing, genomics, computational pharmacology
- Computer – run time optimization
- Industrial – fault diagnosis
- Applications of machine learning cover a broad range
 - Genomics - matching of protein strands
 - Collaborative Filtering - personal “Google”
 - Drug Discovery – shortening of drug discovery cycle
 - Patient and elder care – wireless camera and sensor network help monitor patients

ASIMO



- Using machine learning to detect spam emails.



To: you@gmail.com
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ALGORITHM
Naïve Bayes
Rule mining

- Using machine learning to recommend books.

The screenshot shows the Amazon.co.uk website with a 'Recommended for you' section. The page title is 'Amazon.co.uk: Recommended For You - Mozilla Firefox'. The browser address bar shows 'http://www.amazon.co.uk/gp/yourstore/ref=pd_Lr_Lgr'. The page content includes a search bar, a navigation menu, and a list of recommended books. The first book is 'Bad Science' by Ben Goldacre, the second is 'Irrationality' by Stuart Sutherland, and the third is 'Blink: The Power of Thinking Without Thinking' by Malcolm Gladwell. Each book entry includes a cover image, title, author, release date, average customer review, and price. The page also features a 'Just For Today' section and a 'Recommendations' sidebar.

Amazon.co.uk: Recommended For You - Mozilla Firefox
http://www.amazon.co.uk/gp/yourstore/ref=pd_Lr_Lgr

amazon.co.uk
Hello Gavin Brown. We have recommendations for you. (Get Good?)
Gavin's Amazon.co.uk | Deals of the Week | Gift Certificates | Gifts & Wish Lists

Shop All Departments | Search: All Departments | Basket

Gavin's Amazon.co.uk > Recommended for you
(If you're not Gavin Brown, click here.)

Just For Today
Browse Recommended

Recommendations
Baby
Books
DIY & Tools
DVD
Electronics & Computing
Garden & Outdoors
Health & Beauty
Home & Garden
Jewellery
MP3 Downloads
Music
PC & Video Games
Shoes & Accessories
Software
Sports & Leisure
Toys & Games
Video
Watches

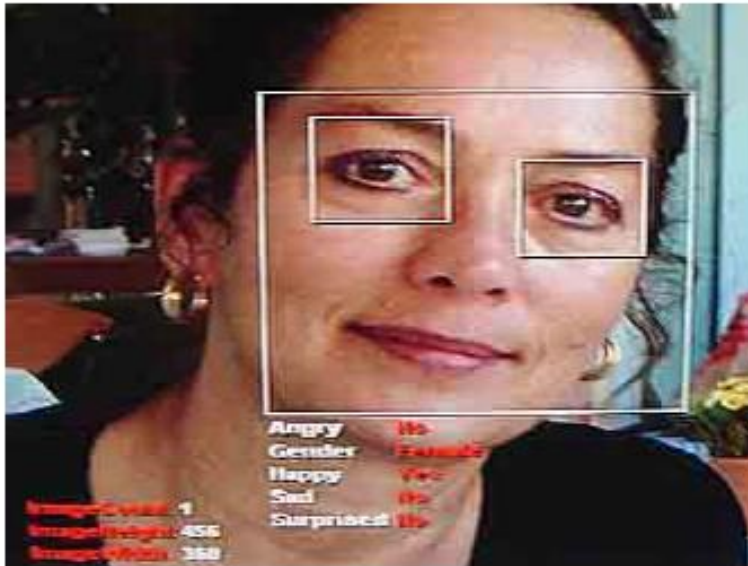
These recommendations are based on items you own and more.
view: All | New Releases | Coming Soon

- Bad Science**
by Ben Goldacre (April 2, 2009)
Average Customer Review: (181)
In stock
RRP: £9.99
Price: £3.60
31 used & new from £1.99
 I own it Not interested Rate this item
Recommended because you purchased **Outliers: The Story of Success** and more (Fix this)
- Irrationality**
by Stuart Sutherland (Jan 10, 2007)
Average Customer Review: (33)
In stock
RRP: £8.99
Price: £6.99
36 used & new from £3.50
 I own it Not interested Rate this item
Recommended because you purchased **Outliers: The Story of Success** and more (Fix this)
- Blink: The Power of Thinking Without Thinking**
by Malcolm Gladwell (Feb 23, 2006)
Average Customer Review: (88)
In stock

ALGORITHMS

Collaborative Filtering
Nearest Neighbour
Clustering

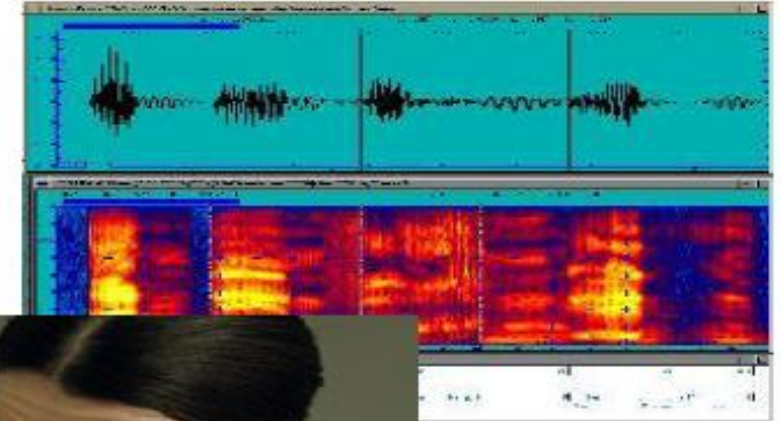
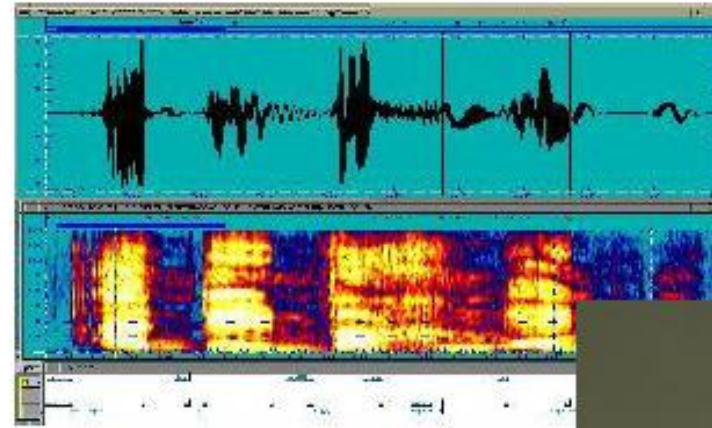
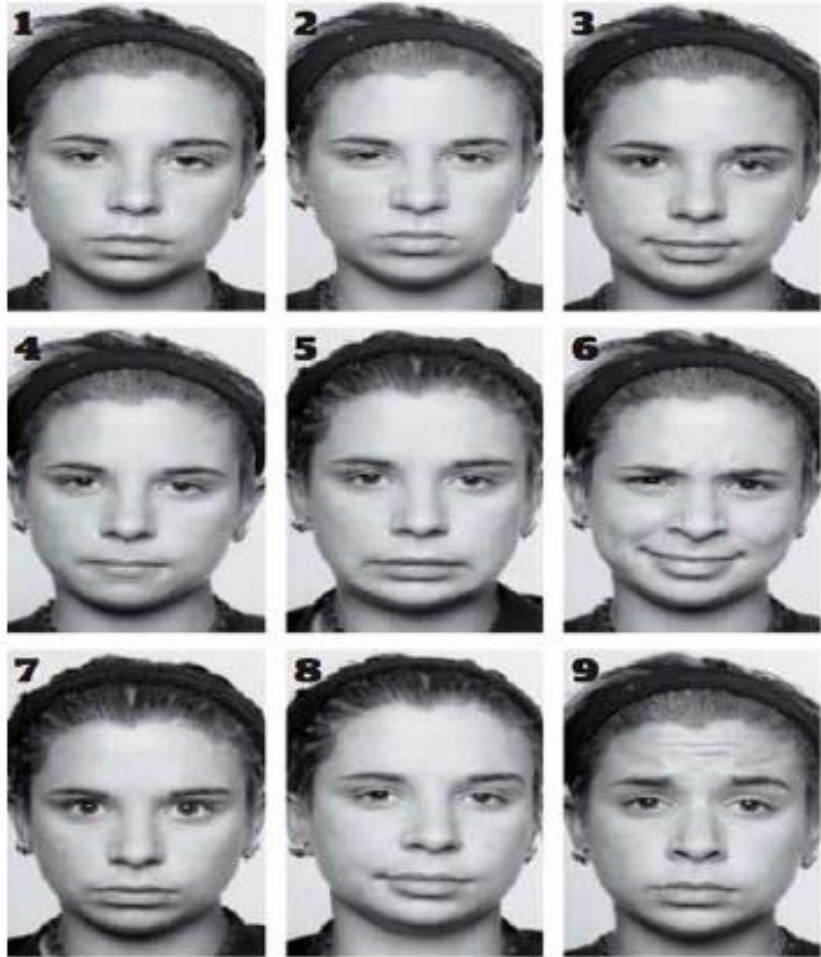
- Using machine learning to identify faces and expressions.



ALGORITHMS

Decision Trees
Adaboost

- Using machine learning to identify vocal patterns



ALGORITHMS

Feature Extraction
Probabilistic Classifiers
Support Vector Machines
+ many more....

- ML for working with social network data: detecting fraud, predicting click-thru patterns, targeted advertising, etc etc etc .



ALGORITHMS

Support Vector Machines
Collaborative filtering
Rule mining algorithms
Many many more....

Driving a car

Recognising spam emails

Recommending books

Reading handwriting

Recognising speech, faces, etc

How would you write these programs?

Would you want to?!?!?!?



Learning process

- Supervised learning
- Unsupervised learning
- Reinforcement learning



Pembahasan di dalam ML

- Concept learning
- Bayesian learning
- Instance based learning (clustering)
- Neural Networks
- Genetic Algorithm
- Reinforcement Learning
- Dan lain-lain

Concept learning

- Learning from examples
- General to specific ordering of hypotheses
- Uses only the positive data → Find-S
- Uses both positive and negative data → Candidate-Elimination
- Data harus konsisten
- Jawaban berada dalam 2 kemungkinan, ada atau tidak ada

Contoh kasus

Data	Sky	AirTemp	Humidity	Wind	Water	Forecast	EnjoySport
1	Sunny	Warm	Normal	Strong	Warm	Same	Yes
2	Sunny	Warm	High	Strong	Warm	Same	Yes
3	Rainy	Cold	High	Strong	Warm	Change	No
4	Sunny	Warm	High	Strong	Cool	Change	Yes

Bayesian Learning

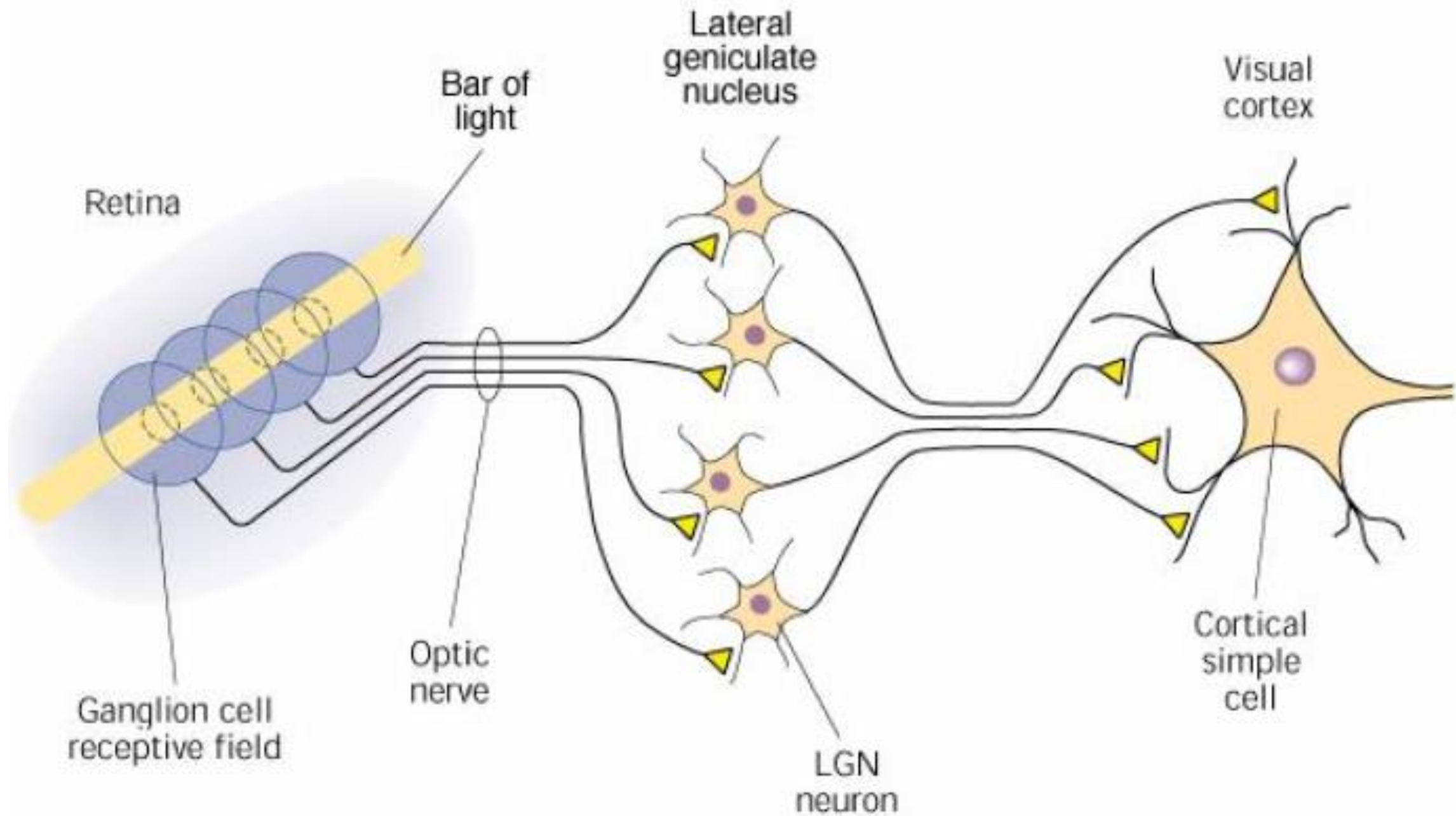
- Learning from examples
- Termasuk ke dalam supervised learning
- Didasari pada Bayes Theorem
- Uses both positive and negative data
- Tidak mengharuskan data harus konsisten
- Jawaban ditunjukkan oleh nilai probabilitas
- Biasanya dipakai untuk fungsi-fungsi klasifikasi

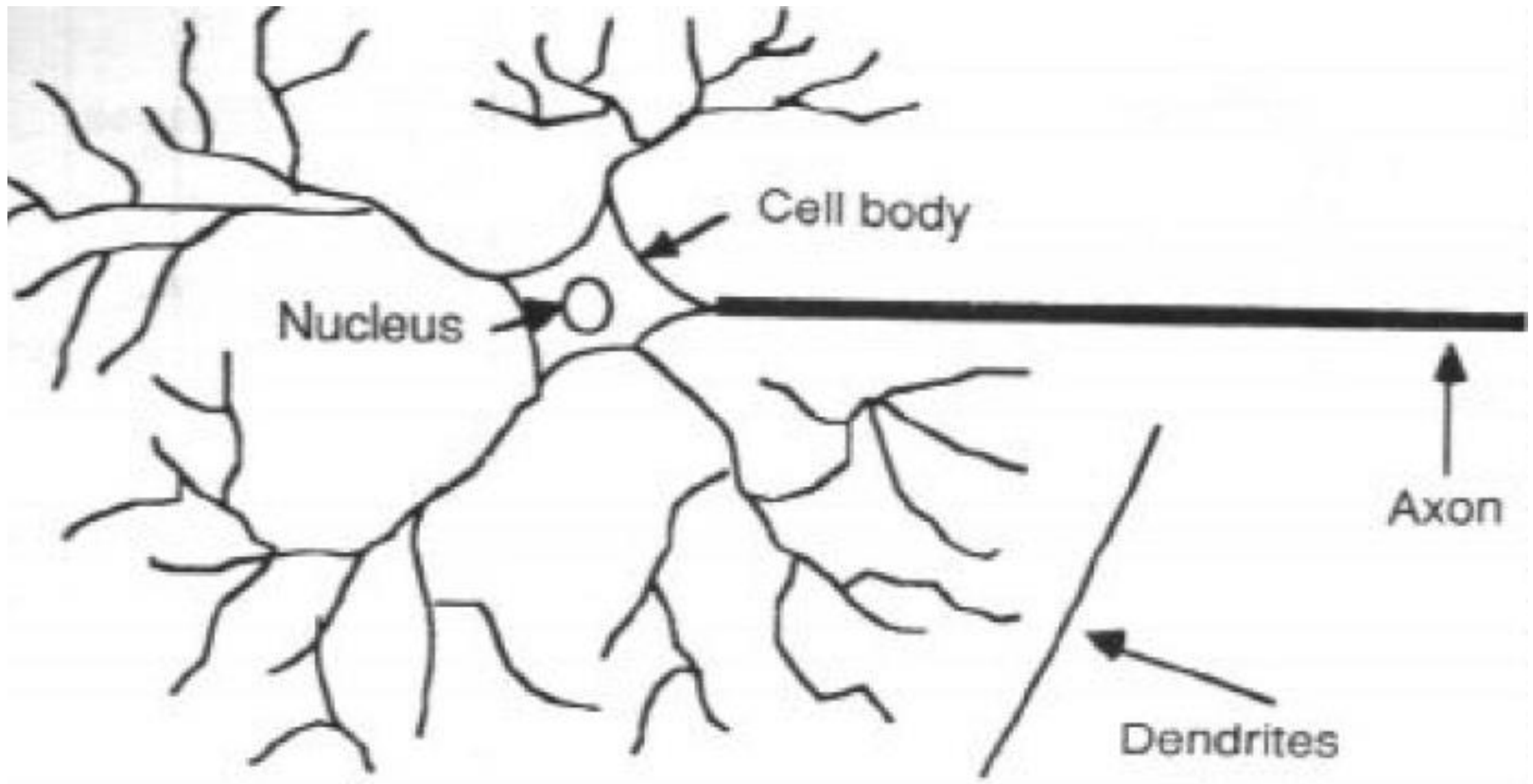
Instance based learning (Clustering)

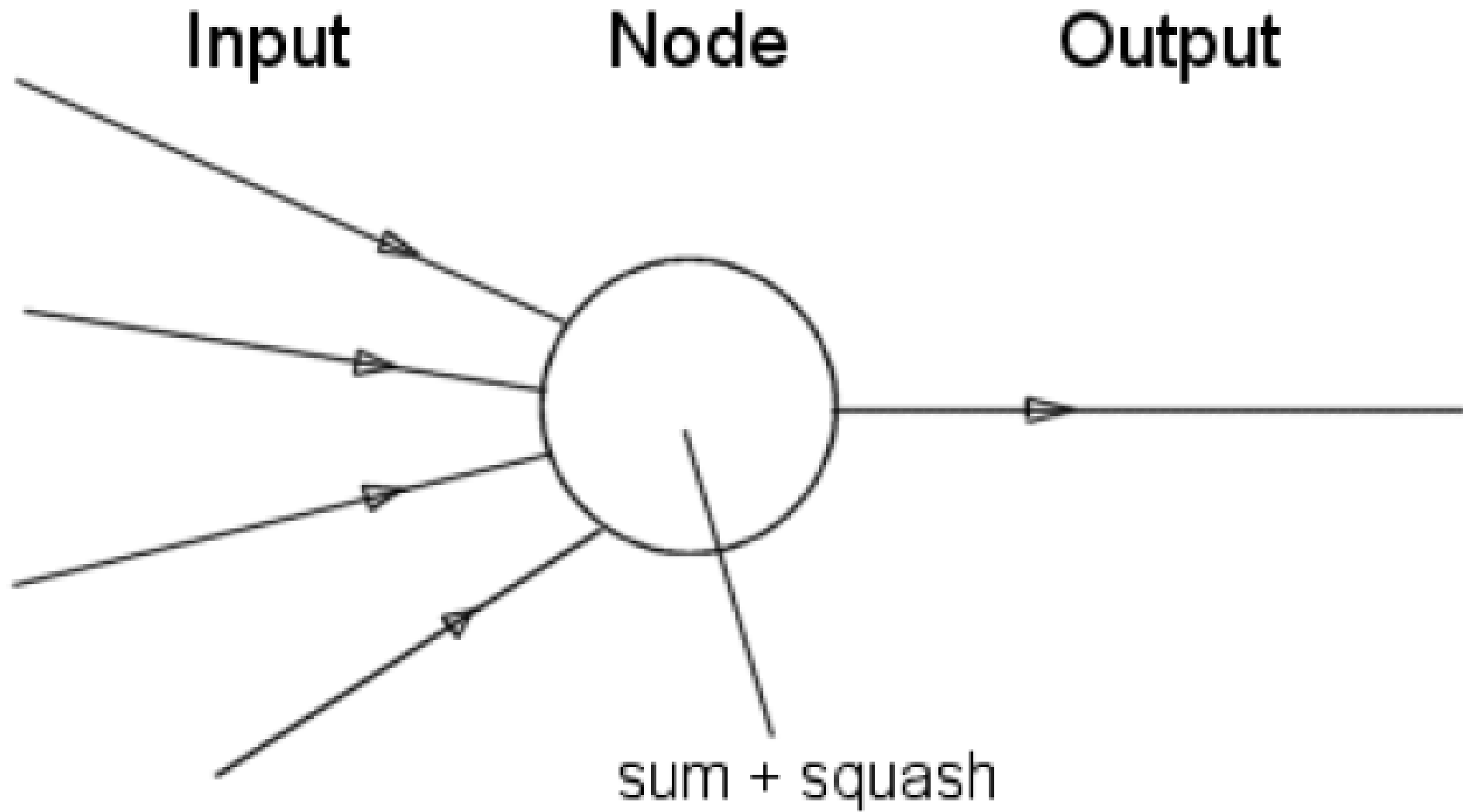
- Tidak melibatkan jawaban dalam data
- Termasuk ke dalam unsupervised learning
- Hanya membuat suatu klasifikasi tanpa label/jawaban
- Labelisasi (pemberian jawaban) menjadi tanggung jawab user

Neural networks

- Mensimulasikan kerja otak manusia
- *Neuron* adalah satuan unit pemroses terkecil pada otak
- Bentuk standard ini mungkin dikemudian hari akan berubah
- Jaringan otak manusia tersusun tidak kurang dari 10^{13} buah neuron yang masing-masing terhubung oleh sekitar 10^{15} buah *dendrite*
- Fungsi dendrite adalah sebagai penyampai sinyal dari neuron tersebut ke neuron yang terhubung dengannya
- Sebagai keluaran, setiap neuron memiliki *axon*, sedangkan bagian penerima sinyal disebut *synapse*
- Penjelasan lebih rinci tentang hal ini dapat diperoleh pada disiplin ilmu *biology molecular*
- Secara umum jaringan saraf terbentuk dari jutaan (bahkan lebih) struktur dasar neuron yang terinterkoneksi dan terintegrasi antara satu dengan yang lain sehingga dapat melaksanakan aktifitas secara teratur dan terus menerus sesuai dengan kebutuhan



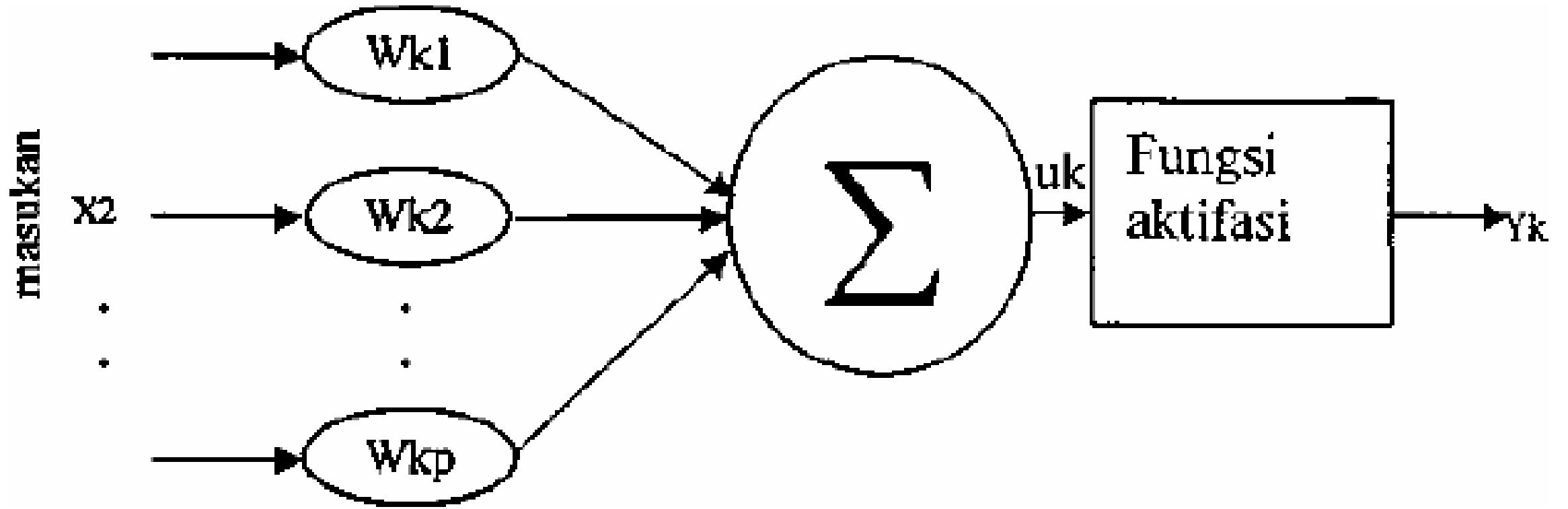




Penimbang

penjumlahan

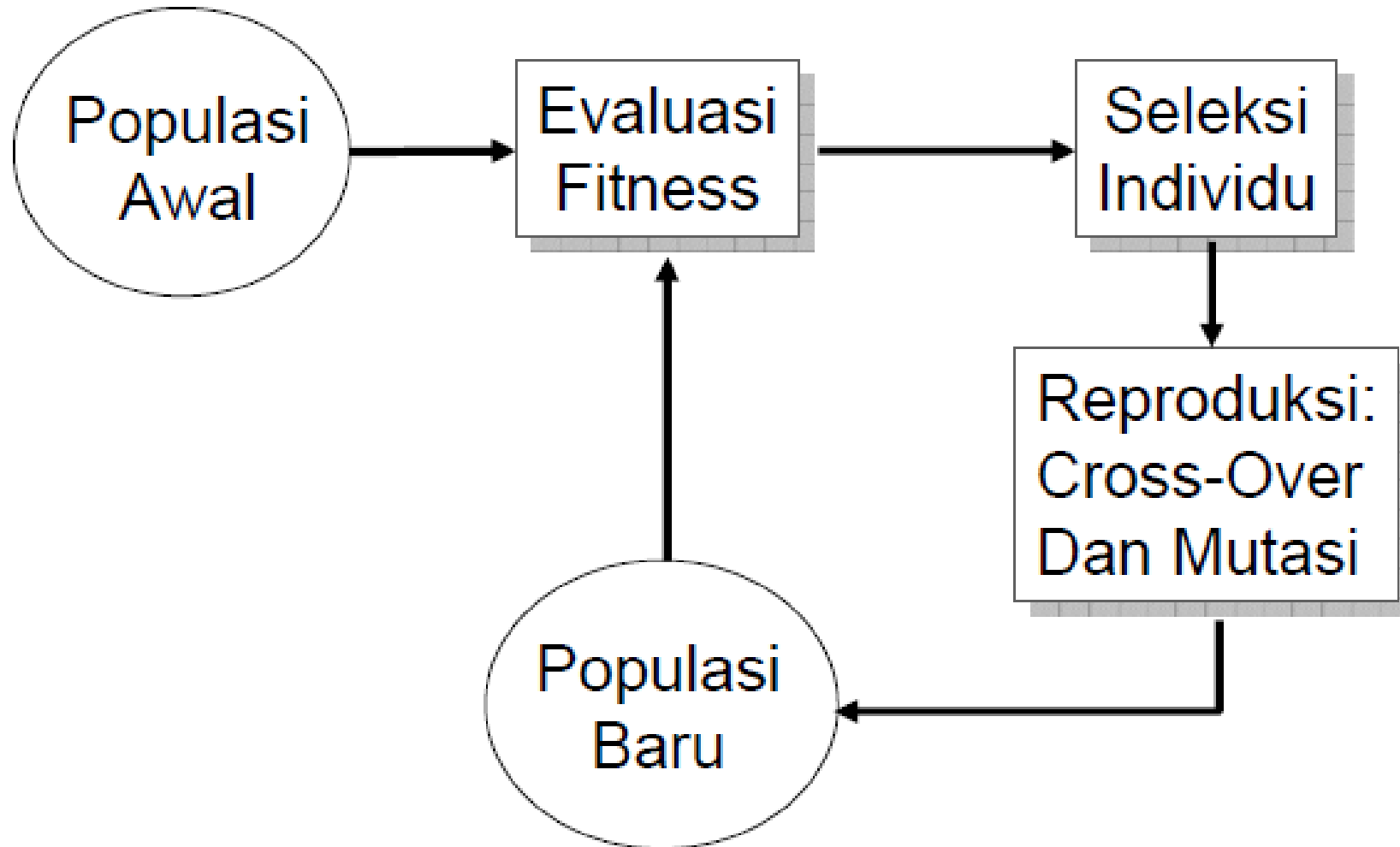
Keluaran



Genetic Algorithm

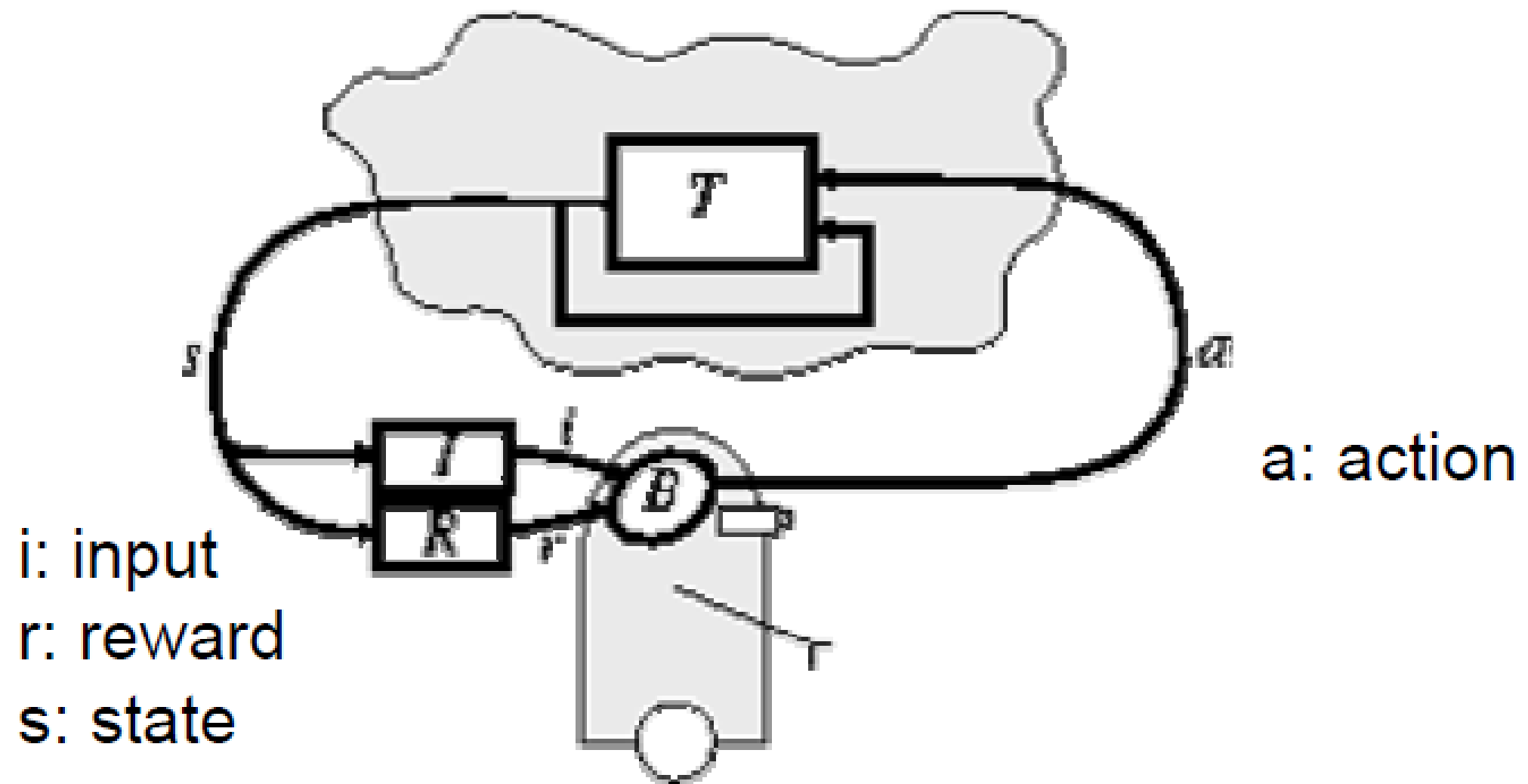
- ◆ Algoritma Genetika adalah algoritma yang memanfaatkan proses seleksi alamiah yang dikenal dengan proses evolusi.
- ◆ Dalam proses evolusi, individu secara terus-menerus mengalami perubahan gen untuk menyesuaikan dengan lingkungan hidupnya. **“Hanya individu-individu yang kuat yang mampu bertahan”**.
- ◆ Proses seleksi alamiah ini melibatkan perubahan gen yang terjadi pada individu melalui proses perkembang-biakan. Dalam algoritma genetika ini, proses perkembang-biakan ini menjadi proses dasar yang menjadi perhatian utama, dengan dasar berpikir: **“Bagaimana mendapatkan keturunan yang lebih baik”**.

Siklus Genetic Algorithm



Reinforcement Learning

- Learning from experiences
- Memakai konsep reward dan punishment dalam proses learning

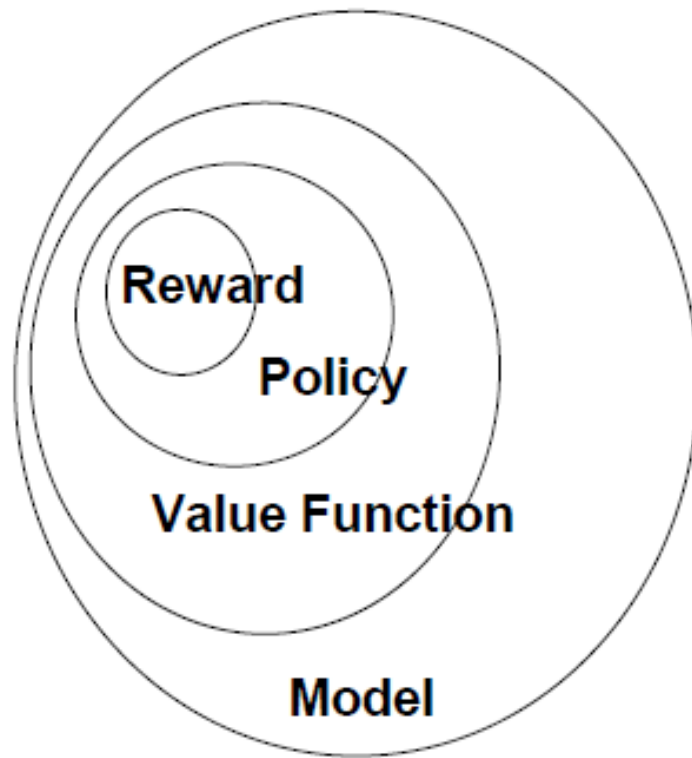


i: input
 r: reward
 s: state

a: action

The standard reinforcement-learning model

Components of Reinforcement Learning



Reward: How good is this action?

Policy: what do I do now?

Value function: how good is this state?

Model: what happens if I do this action?

Terimakasih

