# The rise of AI



## Prof. Damien ERNST

Université de Liège

https://www.google.be/#q=mobile+phone
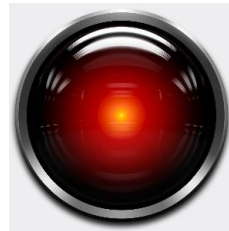
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# Google

mobile phone

Damien

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## Images for mobile phone                    Report images

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### Mobile phone - Wikipedia, the free encyclopedia
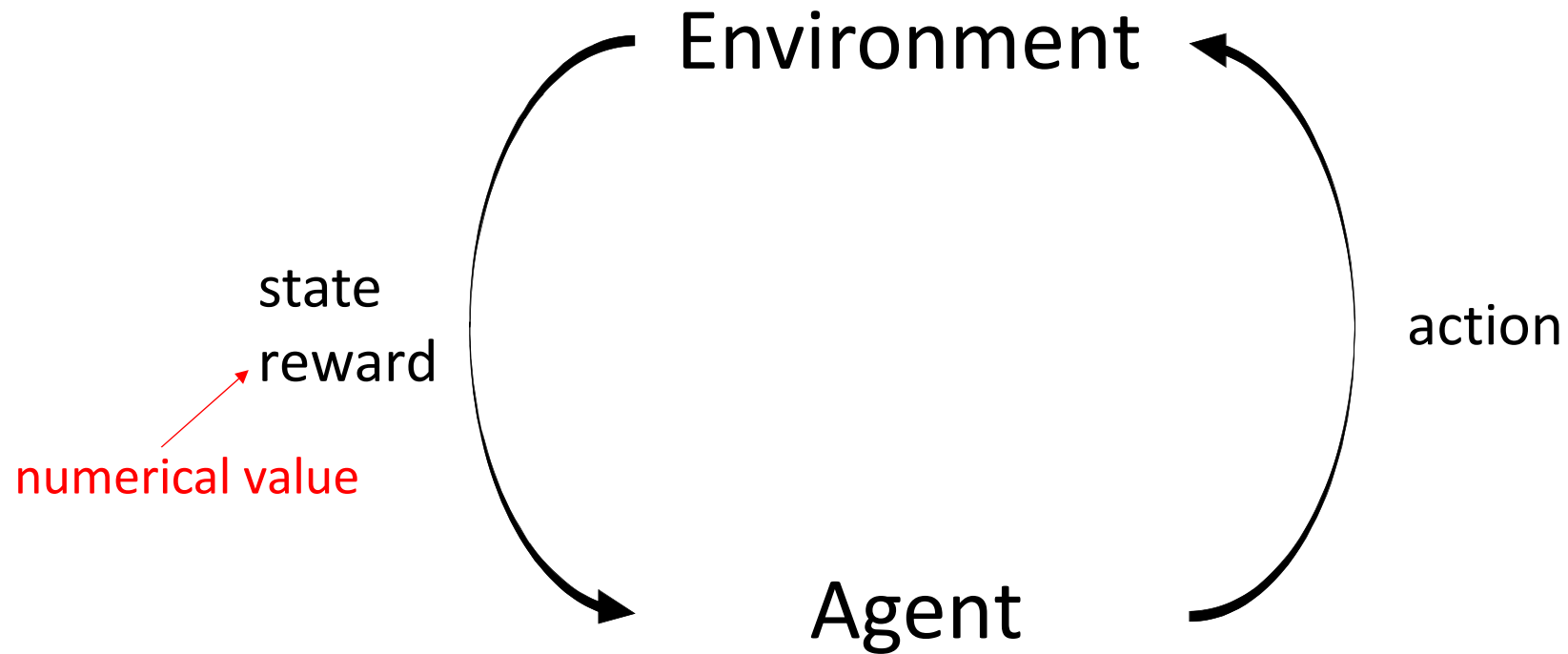https://en.wikipedia.org/wiki/**Mobile_phone** ▾
A **mobile phone** is a telephone that can make and receive calls over a radio frequency
carrier while the user is moving within a telephone service area. The radio ...
History of mobile phones - DynaTAC - List of best-selling mobile ... - Martin Cooper

### Shop for mobile phone on Google          Sponsored ⓘ

Samsung SAM **MOBILE PHONE** KIT - SM-A310F
"Galaxy A3 2016" Black
275,88 € - Centralpoint.be
Free shipping

Ascension Day might affect these hours

The Phone House Belle Ile

# Reinforcement learning agent

Environment

Agent

state
reward

action

numerical value

## Learning:

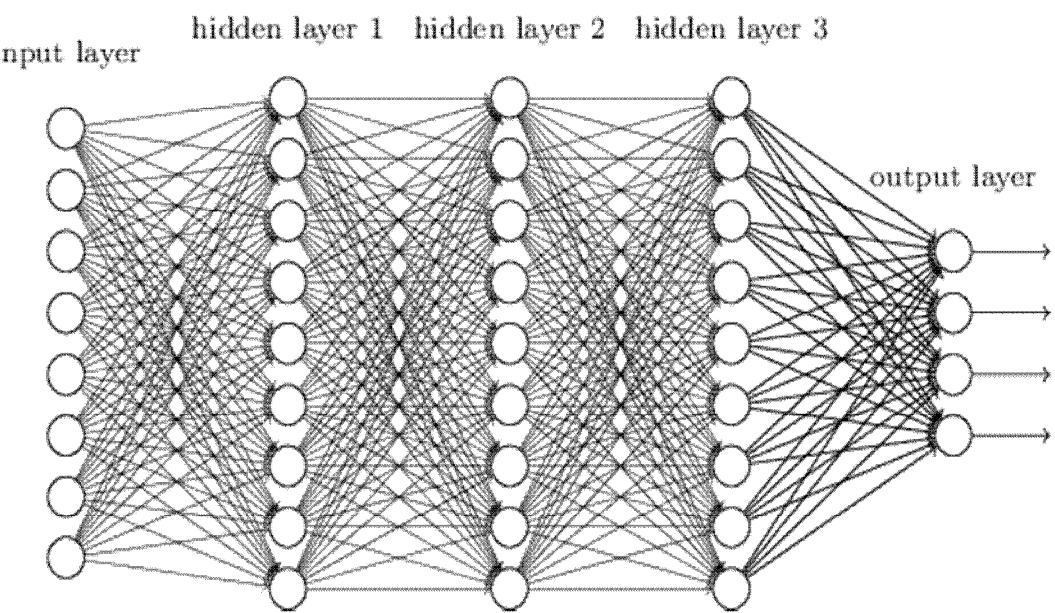**Input :** $x_t, u_t, r_t$ and $x_{t+1}$

$$\delta \leftarrow (r_t + \gamma \max_{u \in U(x_{t+1})} Q(x_{t+1}, u)) - Q(x_t, u_t)$$

$$Q(x_t, u_t) \leftarrow Q(x_t, u_t) + \alpha\delta$$

**Exploration/exploitation:** Not always take the action that is believed to be optimal to allow exploration.

**Generalization:** Generalize the experience gained in some states to other states.

input layer   hidden layer 1   hidden layer 2   hidden layer 3   output layer

in People You ... | G "Damien Er... | The global ... | in Who's view... | Tc Google Acq... | f (1) Damien ... | G Google ... × | G Google Dee... | G deep neural... | W Shane Legg... | G Shane legg ...

https://deepmind.com    C    Rechercher

**Google DeepMind**

# SOLVE INTELLIGENCE

## USE IT TO MAKE THE WORLD A BETTER PLACE

We joined forces with Google in order to turbo-charge our mission.

The algorithms we build are capable of **learning** for themselves directly from raw experience or data, and are **general** in that they can perform well across a wide variety of tasks straight out of the box. Our world-class team consists of many renowned experts in their respective fields, including but not limited to deep neural networks, reinforcement learning and systems neuroscience-inspired models.

Founded by **Demis Hassabis**, **Shane Legg** and **Mustafa Suleyman** in London, 2010. DeepMind was supported by some of the most iconic tech entrepreneurs and investors of the past decade, prior to being acquired by Google in early 2014 in their largest European acquisition to date.

**DeepMind AlphaGo vs Lee Sedol**

Lee Sedol played an historic five game match against Google DeepMind's AlphaGo computer program in March 2016.

AlphaGo won the match, making it the first time a computer Go program had defeated a world class human player on even terms:

# AlphaGo 4 – Lee Sedol 1

After defeating Fan Hui 2p with a 5–0 score, Google DeepMind chose to challenge Lee Sedol because of his record as the best Go player in the world over the last decade.

The games were even, with $1 million USD in prize money for the winner.

The match took place from March 9 to 15, 2016, in Seoul, Korea. Here's the match record:

Game 1: Mar 9 — AlphaGo wins by resignation — Video
Game 2: Mar 10 — AlphaGo wins by resignation — Video — Commentary
Game 3: Mar 12 — AlphaGo wins by resignation — Video
Game 4: Mar 13 — Lee Sedol wins by resignation! — Video — Commentary
Game 5: Mar 15. — AlphaGo wins by resignation — Video

21509/+229     19/20
7003/+48       16/20

1/4 (25%)

You Annihilated the enemy!

Player Dropped

**Howling Banshee**
Heroes | Savage - Ally - Team 2
- Infantry.
- Close combat specialist.
- Effective against Infantry and Heavy Infantry.
- Call of War upgrade (Soul Shrine) increases their hitpoints and damage.
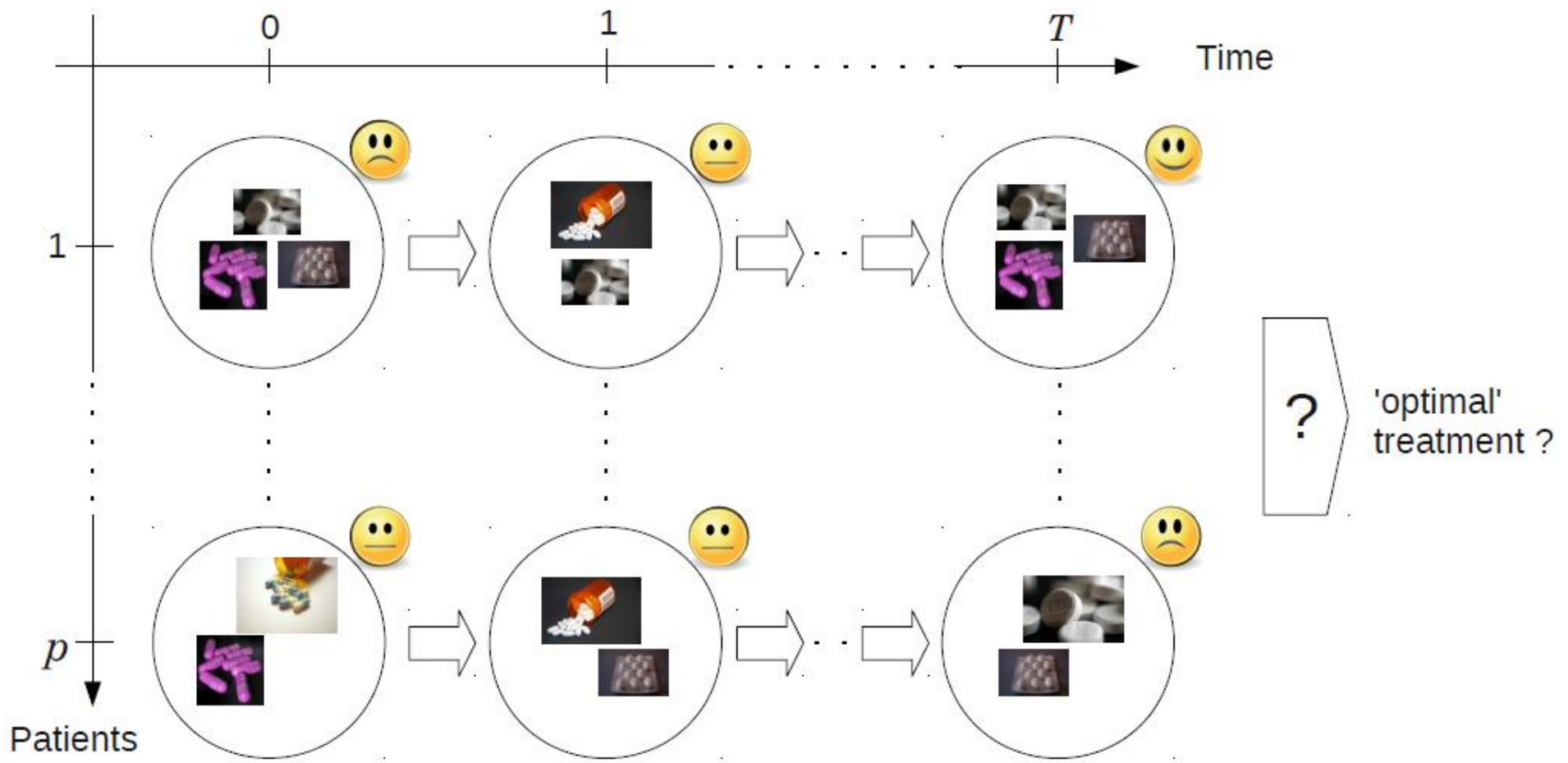
Left-Click to Select

Auto_Mail          Team 2

FOW

# Google given access to London patient records for research

By Jane Wakefield
Technology reporter

🕐 3 May 2016 | Technology



The records go back over the past five years and include full names

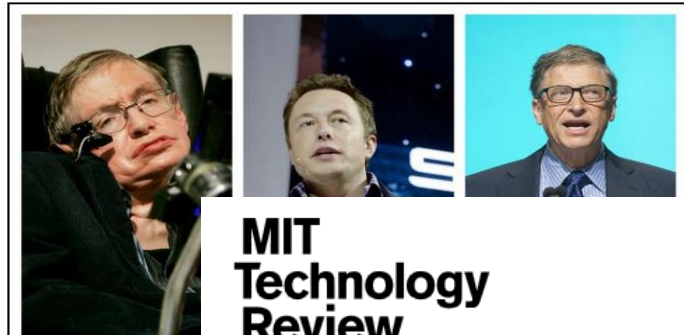**Google has been given access to an estimated 1.6 million NHS patient records, it has been revealed.**

## Stephen Hawking, Elon Musk, and Bill Gates Warn About Artificial Intelligence

Google-owned Boston Dynamics released a video showing a 6' tall 320-lb humanoid robot named Atlas running freely in the woods

By Michael Sainato • 08/19/15 12:30pm

# MIT Technology Review

A View from **Paul G. Allen**

## Paul Allen: The Singularity Isn't Near

The Singularity Summit approaches this weekend in New York. But the Microsoft cofounder and a colleague say the singularity itself is a long way off.

October 12, 2011



waitbutwhy.com

Input current

Mean modulation

PYR neuron

Transfer function

$\hat{H}(\omega)$

Spiking response

Firing rate modulation

$K_m$

Membrane filter

Nonlinearity

Spiking mechanism

$\xi$

Effective kernel

$T$

$T$