

# EARIN

<http://elektron.elka.pw.edu.pl/~jarabas/EARIN.html>

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EARIN  
Jarosław Arabas

Introduction

# Intelligence

Property of:

- Humans?
- Animals?
- Plants?
- Chemical particles?
- Computers?
- Washing machines?
- ....

# Intelligence

- Ability to predict
- Ability to plan
- Ability to adapt
- Ability to classify
- Ability to communicate
- Ability to cooperate

# Intelligence

- How to recognize intelligence?
  - Behavior
  - Thinking

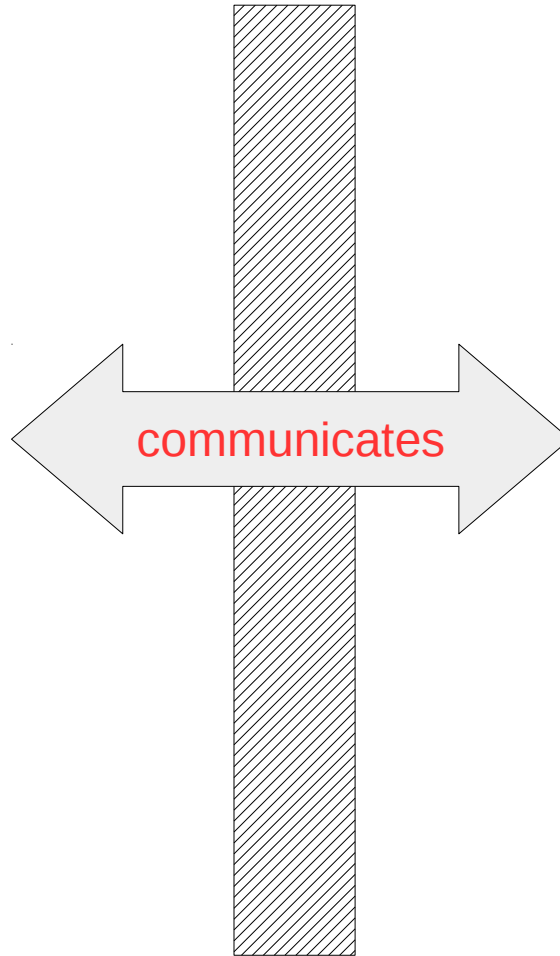
# Artificial Intelligence

Computers can

- predict
- plan
- adapt
- classify
- communicate
- cooperate

# Turing test

Human



A human cannot guess whether on the other side is a human or a computer

# Turing test





# Artificial Intelligence

Computers can

act reasonably

**weak AI**

think reasonably

act like humans

think like humans

**strong AI**

# EARIN

- Weak AI
- Basic course
- Three units
  - Problem solving by searching
  - Inference in predicate logic
  - Building models from data
- Additional unit
  - Decision making support

# EARIN

- Three units

- Problem solving by searching

- Inference in predicate logic

- Building models from data

- Additional unit

- Decision making support

## Computers can

- predict

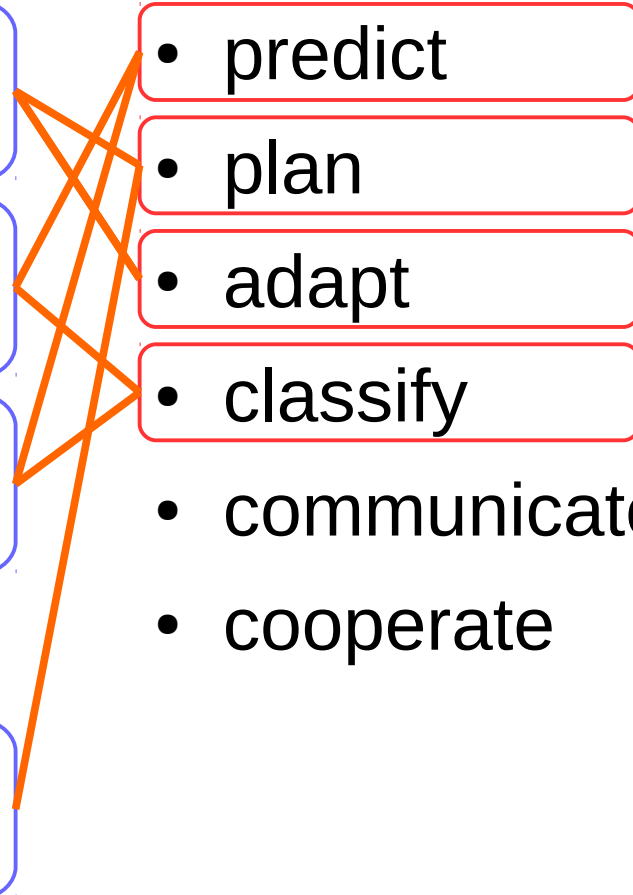
- plan

- adapt

- classify

- communicate

- cooperate



# Example application fields

- Playing games
- Autonomous car
- Mobile robots
- Speech recognition
- Recognition of written text
- Recommending systems
- Fraud detection
- Search engines
- Industrial control systems
- Computer Aided Design

# Example application fields

Deep Blue versus Garry Kasparov - Wikipedia, the free encyclopedia - Mozilla Firefox

https://en.wikipedia.org/wiki/Deep\_Blue\_versus\_Garry\_Kasparov#The\_1997\_rematch

deep blue kasparov

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Article Talk

## Deep Blue versus Garry Kasparov

From Wikipedia, the free encyclopedia

**Deep Blue versus Garry Kasparov** was a pair of six-game chess matches between chess champion [Garry Kasparov](#) and an IBM supercomputer called [Deep Blue](#). The first match was played in Philadelphia in 1996 and won by Kasparov. The second was played in New York City in 1997 and won by Deep Blue. The 1997 match was the first defeat of a reigning world chess champion to a computer under tournament conditions.


The 1997 match was the subject of a documentary film, *The Man vs. The Machine*.<sup>[1]</sup>

**Contents** [hide]

- Summary
- 1996 match
  - Game 1
  - Game 2
  - Game 3
  - Game 4
  - Game 5
  - Game 6
- 1997 rematch
  - Game 1
  - Game 2
  - Game 3
  - Game 4
  - Game 5
  - Game 6
- See also
- References
- Further reading

This article uses algebraic notation to describe chess moves.

### Deep Blue vs. Kasparov chess matches



Deep Blue vs. Kasparov chess matches

Deep Blue  
IBM chess computer

Garry Kasparov  
World Chess Champion

#### First match

- February 10, 1996: takes place in Philadelphia, Pennsylvania
- Result: **Kasparov**-Deep Blue (4-2)
- Record set: First computer program to defeat a world champion in a *classical game* under tournament regulations

#### Second match (rematch)

- May 11, 1997: held in New York City, New York
- Result: **Deep Blue**-Kasparov (3½-2½)
- Record set: First computer program to defeat a world champion in a *match* under tournament regulations

### Summary

[ edit ]

The 1996 match					The 1997 rematch				
Game #	White	Black	Result	Comment	Game #	White	Black	Result	Comment
1	<b>Deep Blue</b>	Kasparov	1-0		1	<b>Kasparov</b>	Deep Blue	1-0	
2	<b>Kasparov</b>	Deep Blue	1-0		2	<b>Deep Blue</b>	Kasparov	1-0	
3	Deep Blue	Kasparov	½-½	Draw by mutual agreement	3	Kasparov	Deep Blue	½-½	Draw by mutual agreement

Menu Terminal Deep Blue vers... EARINL16 wyklad2.odp - ... wyklad1.odp - ...

1 2 09:42

# Example application fields

Google car – which drives WITHOUT a steering wheel – to hit public roads this summer | Tech | Life & Style | Daily Express - Mozilla Firefox

www.express.co.uk/life-style/science-technology/577426/Google-Self-Driving-Car-Without-Steering-Wheel-Public-Roads

google car

Firefox has prevented the outdated plugin "Adobe Flash" from running on www.express.co.uk. Continue Blocking Allow...

A word from the Editor: Coping with a relative who suffers from...  
Are we CRAZY? UK faces Russia & ISIS & OUR military is in...  
PM's 'brilliant' EU deal Isn't all it's cracked up to be, blasts...  
David Cameron has just become the best advert for leaving the EU...  
Stop the bullying, Dave, says Nick Ferrari

## Google car – which drives WITHOUT a steering wheel – to hit public roads this summer

GOOGLE'S most radical self-driving car to date – a pod-like two-seater which can drive without the need for pedals or a steering wheel – will join the traffic on public roads this summer.

By AARON BROWN  
PUBLISHED: 10:05, Fri, May 15, 2015 | UPDATED: 10:27, Fri, May 15, 2015

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**EPSON** CHCESZ NAJLEPSZEJ ROZRYWKI? WYBIERZ EPSON WIĘCEJ INFORMACJI

The bulbous self-driving vehicle does not require a steering wheel to drive

The Californian search giant claims its latest vehicle is the first to be built from scratch for the purpose of self-driving

*...Ty, prosto pobudzasz swoją kreatywność :)*

Czas na przerwę, czas na KitKat

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Menu Terminal Google car - w... EARINL16 wyklad2.odp - ... 1 2 09:37

# Example application fields

Speech Recognition Technology On The Move | Emerging Technologies | Voice Recognition Solutions | Digital Dictation Services | Speech IVR & Telephony Solutions - Mozilla Firefox

www.em-t.com/articles/speech-recognition-technology-move

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Enter keyword

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## Speech Recognition Technology On The Move

It is no surprise that speech recognition software, is taking off at such a high pace in the world today. Everyone wants to excel and exceed their ability to communicate, store and retrieve some sort of data or media. Worldwide, everyone is mobile or going mobile. It is such a convenient and easier means of staying in touch and getting tasks accomplished.

Our modern environment is a very busy visual place with many hands on applications, which at times can slow us down when it comes to taking care of business. Having voice control and voice command as a means of functioning operations for data input and record keeping is essential. This technology also includes voice dialing, search options as well as the ability to control all the other features of handsets.

Mobile **speech recognition technology** is the answer to the global problem of hand set use and the hazards that can develop from the use of handsets when the mind really should focus wholeheartedly on other imperative matters, such as operating a vehicle. In fact, this is one of the leading reasons for the marketing push surrounding the development of mobile speech recognition software.



The reason for this marketing push of mobile speech recognition technology directly relates to the global outcry for restricting use of handheld controls while operating a moving vehicle. This outcry for a just means of eliminating hazards while operating a vehicle is evident in various countries, including some states in the United States, Chile, and Australia, the Philippines and Britain as well as many others.

The operational use of such mobile technology is a straightforward and practical approach to solving the problems related to the use of hands while operating other applications, again for instance, such as operating a moving vehicle. Interestingly, studies show that the use of such mobile devices will triple within the next five years.

Datamonitor, an independent market analyst, predicts that the value globally of mobile advance speech recognition applications will increase from the 2009 totals of more than \$32 million to more than \$99 million in the year 2014. Datamonitor also anticipates the growth of ASR in-vehicle telematics to increase from more than \$64 million to more than \$208 million in the next five years. They also anticipate that popular app retailers will allow other smaller companies that specialize in *speech recognition technology* into the marketplace and the increase use of other embedded and hybrid speech recognition applications.

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View Larger Map

Menu Terminal Speech Recogn... EARINL16 wyklad2.odp - ... wyklad1.odp - ...

1 2 09:43

# Example application fields

Free Online OCR - convert scanned PDF and images to Word, JPEG to Word - Mozilla Firefox

www.onlineocr.net

ocr

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## ONLINE OCR

### FREE ONLINE OCR SERVICE

Use Optical Character Recognition software online. Service supports 46 languages including Chinese, Japanese and Korean

### CONVERT SCANNED PDF TO WORD

Extract text from PDF and images (JPG, BMP, TIFF, GIF) and convert into editable Word, Excel and Text output formats



**1 STEP - Upload file**    **2 STEP - Select language and output format**    **3 STEP - Convert**

Select file...    ENGLISH    Microsoft Word (docx)    CONVERT

Max file size 5 mb.

**Use OCR software**  
without installation on your computer. Recognize text and characters from PDF scanned documents (including multipage files), photographs and digital camera captured images.

**Convert PDF to Doc**  
Convert text and images from your scanned PDF document into the editable DOC format. Converted documents look exactly like the original - tables, columns and graphics.

**Free Service**  
OnlineOCR.net is a free OCR service in a "Guest mode" (without registration) that allows you to convert 15 images per hour. Registration will give you ability to convert multipage PDF documents and other features.

Menu Terminal Free Online OC... EARINL16 wykład2.odp - ... wykład1.odp - ... 1 2 09:44



# Example application fields

The image shows a screenshot of the Wolfram|Alpha website in a Mozilla Firefox browser. The browser's address bar shows the URL <https://www.wolframalpha.com> and the search bar contains the text "wolfram alpha". The website's header features the Wolfram|Alpha logo and the tagline "computational knowledge engine". Below the logo is a search input field with the placeholder text "Enter what you want to calculate or know about:". Underneath the search field are icons for voice search, image search, and a menu icon, along with links for "Examples" and "Random".

The main content area is titled "Explore some of the things Wolfram|Alpha can do:" and displays a grid of 30 application fields, each with an icon and a label:

Mathematics	Step-by-step Solutions	Words & Linguistics	Units & Measures	Statistical & Data Analysis
People & History	Dates & Times	Chemistry	Culture & Media	Money & Finance
Physics	Art & Design	Socioeconomic Data	Astronomy	Music
Health & Medicine	Engineering	Places & Geography	Food & Nutrition	Education
Materials	Earth Sciences	Life Sciences	Weather & Meteorology	Technological World
Sports & Games	Computational Sciences	Transportation	Web & Computer Systems	Surprises

The bottom of the screenshot shows the Linux Mint desktop environment with a taskbar containing icons for Menu, Terminal, and several open applications including Wolfram|Alpha, EARINL16, and two lecture files (wyklad2.odp and wyklad1.odp). The system tray on the right shows the date and time as 09:45.



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# Applications of artificial intelligence

From Wikipedia, the free encyclopedia

**Artificial intelligence** has been used in a wide range of fields including [medical diagnosis](#), [stock trading](#), [robot control](#), [law](#), [remote sensing](#), scientific discovery perceived as AI: "A lot of cutting edge AI has filtered into general applications, often without being called AI because once something becomes useful enough a "Many thousands of AI applications are deeply embedded in the infrastructure of every industry."<sup>[2]</sup> In the late 90s and early 21st century, AI technology became credited for these successes.

## Contents

[\[hide\]](#)

- [Computer science](#)
- [Finance](#)
- [Hospitals and medicine](#)
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## Computer science [\[ edit \]](#)

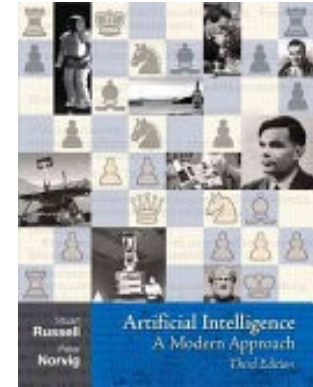
AI researchers have created many tools to solve the most difficult problems in computer science. Many of their inventions have been adopted by mainstream c According to [Russell & Norvig \(2003, p. 15\)](#), all of the following were originally developed in AI laboratories: [time sharing](#), [interactive interpreters](#), [graphical user interface](#), [linked list data structure](#), [automatic storage management](#), [symbolic programming](#), [functional programming](#), [dynamic programming](#) and [object-oriented programming](#).

# Methods of AI

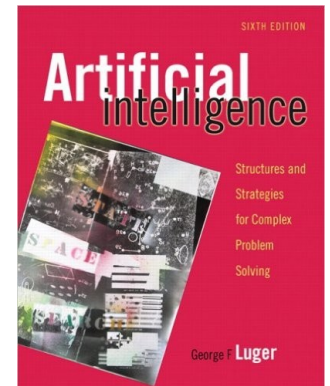
- Turing test is based on the interaction with the system (or on the system actions)
- No clear understanding what are AI methods and what are not
- Closely related areas (incomplete list)
  - Logic
  - Statistics
  - Calculus
  - Numerical methods

# Textbooks

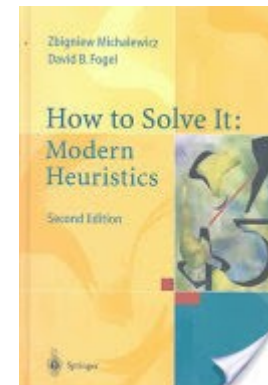
S. Russell, P. Norvig, *Artificial Intelligence: a Modern Approach*, Prentice Hall, 2010.  
*(search oriented perspective)*



G. Luger, *Artificial Intelligence: Structures and Strategies for Complex Problem Solving*, Addison-Wesley, 2008.  
*(knowledge oriented perspective)*



Z. Michalewicz, D. Fogel, *How to solve it: modern heuristics*, Springer, 2004.  
*(computational intelligence)*



# EARIN course

- Lecture

- Problem solving by searching
- Inference in predicate logic
- Building models from data

exam 55 points

## Project

- Solving puzzles in R  
(15 points)
- Simple predicates in PROLOG  
(15 points)
- Using packages in R to build classifiers  
(15 points)

# EARIN grading

- Min. 10 points from the exam to pass
- Grading rules:
  - 91-100 → 5
  - 81-90 → 4.5
  - 71-80 → 4
  - 61-70 → 3.5
  - 51-60 → 3