

# Welcome to Maastricht University

## Department of Data Science and Knowledge Engineering



# MSc Artificial Intelligence & MSc Data Science for Decision Making

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Programme Director of the BA & MA programmes at DKE

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# Data Science & Artificial Intelligence in the news

**DATA**

## Data Scientist: The Sexiest Job of the 21st Century

by Thomas H. Davenport and D.J. Patil

FROM THE OCTOBER 2012 ISSUE

SUMMARY SAVE SHARE COMMENT **7** TEXT SIZE PRINT **\$8.95** BUY COPIES

**W**hen Jonathan Goldman arrived for work in June 2006 at LinkedIn, the business networking site, the place still felt like a start-up. The company had just under 8 million accounts, and the number was growing quickly as existing members invited their friends and colleagues to join. But users weren't seeking out connections with the people who were already on the site at the rate executives had expected. Something was apparently missing in the social experience. As one LinkedIn manager put it, "It was like arriving at a conference reception and realizing you don't know anyone. So you just stand in the corner sipping your drink—and you probably leave early."

**WHAT TO READ NEXT**

**Breaking Out of the Innovation**

**VIEW MORE FROM THE October 2012 Issue**

**Harvard Business Review**

GETTING CONTROL OF **BIG DATA**

EXPLORE THE ARCHIVE

Display a menu 3/4 FREE ARTICLES LEFT REGISTER FOR MORE SUBSCRIBE + SAVE!

## Why 2017 Is the Year to Invest in Artificial Intelligence Stocks

AI is reaching an inflection point -- and investors should take notice now.

Chris Neiger (TMFNewsie)  
Jan 16, 2017 at 1:16PM

IMAGE SOURCE: GETTY IMAGES.

The other day, I sat in a coffee shop across from a student who was studying a complex math problem. The equation took up the entire page, and he sat there staring at it for quite a while. After I thought about how glad I am to not be in school anymore, I started thinking about how jumping into a new investing market can be intimidating. Like the math equation, it can be hard to make sense of all the information that's out there.

Display a menu

# What can I become /make ?

## “Designer of Intelligent Products”

- Data Scientist / Analyst
- Knowledge Engineer
- Project Manager
- Researcher
- Business Analyst
- Software Engineer
- ...

### Sample products:

- medical devices
- mobile apps
- intelligent user interfaces
- gaming
- social/cognitive robots
- scheduling/planning tools
- data mining tools
- ...

# Artificial Intelligence

- **Design** intelligent systems capable of learning and autonomous decision-making (“agents”)
- **Apply** these systems in order to solve complex problems efficiently and automatically



# Data Science for Decision Making



- **Extract useful** information from large data sets to recognise patterns and anomalies
- **Providing** the mathematical tools to model and handle this information

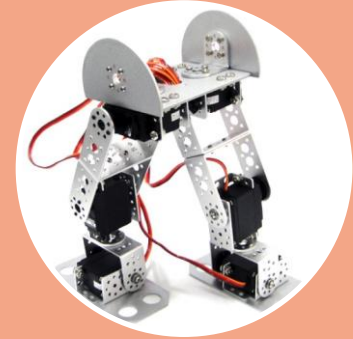
# What will I learn?



**Convert data into  
knowledge and  
information...**  
*(shopping behaviour)*



**Formalizing human  
knowledge into a computer  
usable format...**  
*(modelling heart behaviour)*



**Using knowledge to design  
efficient solutions**  
*(development of an efficient  
modular working robotic  
platform)*

# Project Centred Learning (PCL)

## Working in small groups

- Project management
- Group dynamics
- Deadlines, deliverables, products
- Communication: reports, presentations

## Specific Group Topics

- Academic challenge
- Research / Business question
- individual Project Supervisor





# Recent Project Topics

- Finding “Banksy” through Image Processing
- Solving Combinatorial Games
- Multi-agent Parking Place Allocation
- Localization for Robotic Soccer
- Identification of Ion Channels





# Organisation of Education

- Both programmes; 2 years!
- International student population
- Full-time programme

Period 1		Period 2		Period 3		Period 4		Period 5		Period 6	
7 weeks	E x a m s	7 weeks	E x a m s	3 weeks	R e s i t s	7 weeks	E x a m s	7 weeks	E x a m s	3 weeks	R e s i t s
2 courses		2 courses		Full time Project work		2 courses		2 courses		Full time Project work	
----- Research Project 1 -----						----- Research Project 2 -----					

# Courses

## Artificial Intelligence

### CORE COURSES

- Foundations of Agents
- Multi Agent Systems
- Intelligent Search and Games
- Advanced Concepts in Machine learning
- Autonomous Robotic Systems

## Data Science for Decision Making

### CORE COURSES

- Data Mining
- Model Identification and Data Fitting
- Algorithms for Big Data
- Planning and Scheduling



### ELECTIVE COURSES (both programmes)

- Information Retrieval and Text Mining
- Computer Vision
- Dynamic Game Theory
- Knowledge Graph Learning (new !)
- Deep Learning (new !)
- Digital Image & Video Processing (new !)
- Symbolic Computation and Control
- Mathematical Optimization
- Stochastic Decision Making
- Signal and Image Processing
- Information Security (new !)

# Examples of Specializations

AI

**Machine Learning Expert**

AI-core  
+  
Algorithms for Big Data  
Text Mining  
Deep Learning

**Intelligent Systems Developer**

AI-core  
+  
Dynamic Game Theory  
Planning and Scheduling  
Computer Vision

DSDM

**Data Scientist**

DS-core  
+  
Signal and Image Processing  
Machine Learning  
Knowledge Graph Learning  
Text Mining

**Decision Support Expert**

DS-core  
+  
Stochastic Decision Making  
Video Processing  
Dynamic Game Theory  
Computation and Control

# Organisation of Education



Medtronic



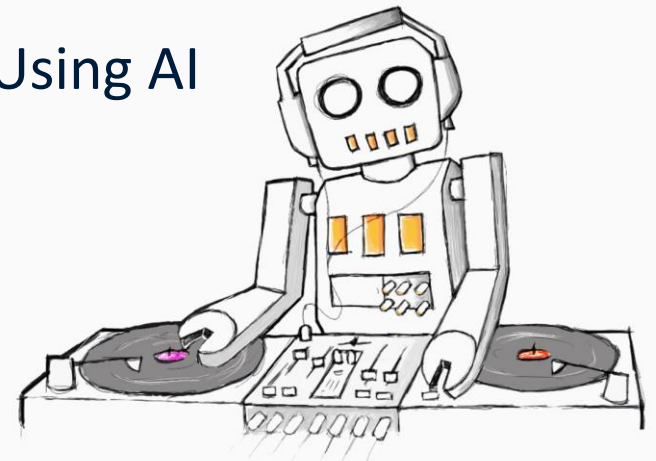
Year 2



Period 1	Period 2	Period 3	Period 4	Period 5	Period 6
<p><b>Elective Semester</b></p> <ul style="list-style-type: none"> <li>- 4 elective courses (internal, external) + research project</li> <li>- electives at another Faculty of Maastricht University (FPN, SBE), taking courses such as sensorimotor processing or Intellectual Property Rights in a Digital Economy</li> <li>- semester abroad</li> <li>- internship (business or scientific)</li> </ul>			<p><b>Master Thesis</b> (at DKE, companies, or other faculties)</p>		

# Examples of Recent Thesis Topics

- Automated Composing of Counterpoint Music Pieces
- General AI for Video Game Playing
- Recognizing and Predicting Flow State while Studying
- Modification of a Quadcopter Platform for Vision-Based SLAM
- Identification of Tissue with Cancer Cells Using AI Techniques



# Admission Requirements

## Bachelor of Science in

Data Science and Knowledge Engineering

(or equivalent in related field, e.g. Artificial Intelligence, Mathematics, Computer Science)

or

## Bachelor of Science in

Data Science and Knowledge Engineering

(or equivalent in related field) from a University of Applied Sciences (HBO) or equivalent

### Deadlines:

- 1 May/1 June  
Fall Semester
- Nov 30/Jan 1  
Spring Semester

**Premaster Programme is available!**

**Exemptions Request  
> Board of Examiners**

# Questions ?

**Contact us via:**

**[info-dke@maastrichtuniversity.nl](mailto:info-dke@maastrichtuniversity.nl)**