# **Cognitive Services**

LM Informatica & Data Science - 2<sup>nd</sup> semester - 6 CFU

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# The rise of Artificial Intelligence





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### Will AI Take Over The World?





Shep Hyken, CONTRIBUTOR FULL BIO V Opinions expressed by Forbes Contributors are their own.



### BENEFITS & RISKS OF ARTIFICIAL INTELLIGENCE

*"Everything we love about civilization is a product of intelligence, so amplifying our human intelligence with artificial intelligence has the potential of helping civilization flourish like never before – as long as we manage to keep the technology beneficial."* 

Max Tegmark, President of the Future of Life Institute

## Some success stories

### 1. Machine Translation



### Some success stories

### 2. Speech Recognition



## Some success stories

3. Face detection & identification / Visual Recognition



# **Cognitive Computing**

- Applied Machine Learning (e.g. Deep Learning)
- Natural Language Processing
- Speech Recognition
- Computer Vision

learn from & make sense of

• Big Data





Data-driven decisions

O Google Cloud Platform									Search	CONSOLE	
Why Google Product	Solutions	Launcher	Pricing	Customers	Documentation	Support	Partners		TRY IT FRE	CONTACT SA	

### CLOUD AI

Fast, large scale and easy to use AI services

TRY IT FREE

**GUIDES & RESOURCES** 

### Inject AI into Your Business

Google Cloud's AI provides **modern machine learning services**, with **pre-trained models** and a service to generate **your own tailored models**. Our neural net-based ML service has better training performance and **increased accuracy** compared to other large scale deep learning systems. Our services are fast, scalable and easy to use. Major Google applications use Cloud machine learning, including Photos (image search), the Google app (voice search), Translate, and Inbox (Smart Reply). Our platform is now available as a cloud service to bring **unmatched scale and speed** to your business applications.



Following



Fei-Fei Li @drfeifei

Why Go

An exciting @googlecloud CloudAl product is coming live tmrw. Many months of hard work! Check our blog tmrw! We've now got more than a dozen #AI products&services to help democratize AI & make AI/ML easy to use for developers & businesses. @lijiali\_vision & I at press conf today.



Jeff Dean 🥝

Today, Google Cloud is announcing the first of many AutoML products, AutoML Vision. It's the result of close collaboration between the Google Brain and Cloud AI teams. Automatically solve vision problems to high accuracy with no ML expertise required!

Following





### **API-driven services bring intelligence to any application**

Our intelligent services provide you with the ability to add intelligence to your applications through an API call to pre-trained services rather than reinventing-the-wheel by developing and training your own models.

#### **Vision Services**

### **Conversational chatbots**

#### Amazon Rekognition Image

Deep learning-based image analysis

#### Learn more »

Amazon Rekognition Video Deep learning-based video analysis

Learn more »

#### Amazon Lex

Build chatbots to engage customers

Learn more »

### Language Services

#### Amazon Comprehend

Discover insights and relationships in text

Learn more »

Amazon Translate Fluent translation of text

Learn more »

Amazon Transcribe Automatic speech recognition

Learn more »

#### **Amazon Polly**

Natural sounding text to speech

Learn more »

IBM					Market	olace	
Watson			About	Developers $\checkmark$	pers V Products & Serv		
Conversation	Discovery		Language			View	
Conversation	Discovery		Language Translator				
Virtual Agent	Natural Language Understanding		Natural La	nguage Classifier			
	Discovery News						
	Knowledge Studio						
Empathy	Vision		Speech				
Personality Insights	Visual Recognition		Speech to	Text			
Tone Analyzer			Text to Spe	ech			



### Use AI to solve business problems



#### Vision

Image-processing algorithms to smartly identify, caption and moderate your pictures.



#### Knowledge

Map complex information and data in order to solve tasks such as intelligent recommendations and semantic search.



#### Language

Allow your apps to process natural language with pre-built scripts, evaluate sentiment and learn how to recognize what users want.



#### Speech

Convert spoken audio into text, use voice for verification, or add speaker recognition to your app.



#### Search

Add Bing Search APIs to your apps and harness the ability to comb billions of webpages, images, videos, and news with a single API call.

# **Our class on Cognitive Services**

- This class teaches the basis of Cognitive Services, i.e. APIs, SDKs and services, typically available in the cloud, that help software developers to create artificial intelligent applications
- This class also teaches the skills and abilities needed to apply those concepts to the design and implementation of intelligent applications
- Students will face practical exercises in a computer lab that allow them to test the application of the acquired knowledge to small practical examples

# **Our class on Cognitive Services**

- P1 (Sperduti): "Applied ML & Cognitive Services"
  - Introduction: from human cognition to smart cognitive services; brief intro to AI and ML paradigms.
  - Cognitive Services: major services and API (IBM Watson, Microsoft, Google Cloud); enabling technologies.
  - Machine Learning and Application Issues; Representation learning; Training and testing; Evaluation measures.

### • P2 (Ballan): "Visual Recognition & Machine Perception"

- Computer Vision: "Teaching computers to see": extract rich information from visual data; designing visual features.
- Representation learning in vision and image understanding.
- What's in the box? How to build a visual recognition pipeline; combining different services in a multi-modal scenario.

### References

- Course info: <u>http://en.didattica.unipd.it/off/2017/LM/SC/</u> SC1176/000ZZ/SCP7079279/N0
- Alessandro Sperduti <<u>sperduti@math.unipd.it</u>>: <u>http://www.math.unipd.it/~sperduti/</u>
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 <u>http://www.research.ibm.com/software/IBMResearch/multimedia/</u> <u>Computing\_Cognition\_WhitePaper.pdf</u>