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Sharpen decisions in Financial Services with explainable Deep Learning

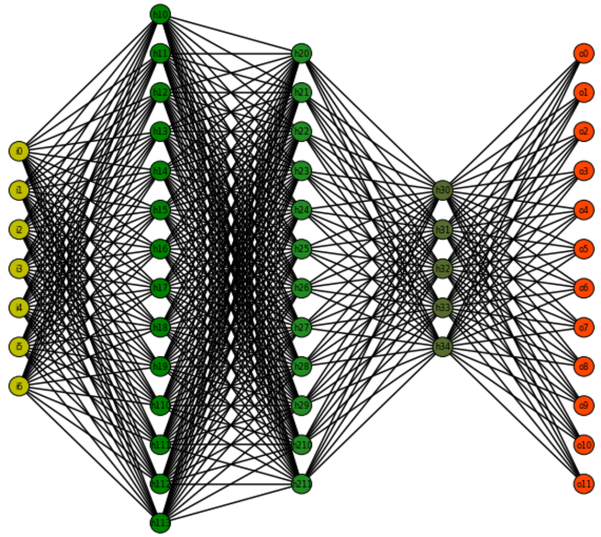
Artificial intelligence

Artificial intelligence is quickly growing domain of computer science with dozens/hundreds papers appearing on arxiv.org per day and with plenty of application areas:

1. **Healthcare** (medical diagnosis, mining medical records, design treatment plans, companion robots, drug creation etc.)
2. **Education** (intelligent tutorial and task assignment systems)
3. **Research** (biology, physics, chemistry etc.)
4. **Heavy industry**
5. **Communication** (Online and telephone customer service)
6. **Finance**
7. **Marketing**
8. **Aviation, navigation, self-driving cars...**
9. **… It is everywhere!**

Deep learning

Deep learning is a core domain of AI, which aims to solve the AI tasks by means of ***neural networks***



Deep learning became a leading approach for many technical fields such as ***computer vision, natural language processing, speech processing and generation etc.***

Among the most striking achievements:

1. **AlphaGo** (Google DeepMind, 2015), the first program which won against a professional Go player

2. **AlphaZero** (Google DeepMind, 2017), the program which learnt by playing with itself how to play chess with a human-like intuition

3. **WaveNet** (Google DeepMind, 2016), the neural network generating speech on the close to human level

Deep learning and mathematical physics

Building Deep Networks on Grassmann Manifolds

Zhiwu Huang[†], **Jiqing Wu**[†], **Luc Van Gool**[†‡]
[†]Computer Vision Lab, ETH Zurich, Switzerland [‡]VISICS, KU Leuven, Belgium

Learning Continuous Hierarchies in the Lorentz Model of Hyperbolic Geometry

Maximilian Nickel [1] **Douwe Kiela** [1]

ARTICLE
DOI: 10.1038/s41467-017-00705-2 OPEN

Efficient representation of quantum many-body states with deep neural networks

Xun Gao[1] & Lu-Ming Duan[1,2]

A Correspondence Between Random Neural Networks and Statistical Field Theory

S. S. Schoenholz, J. Pennington, and J. Sohl-Dickstein
Google Brain

The Dynamics of Learning: A Random Matrix Approach

Zhenyu Liao **Romain Couillet**

Spin-glass models of neural networks

Daniel J. Amit and Hanoch Gutfreund
Racah Institute of Physics, Hebrew University, 91904 Jerusalem, Israel

H. Sompolinsky
Department of Physics, Bar-Ilan University, 52100 Ramat-Gan, Israel

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Rated by Early Metrics

1. **A smart team**
   30 teams inc 8 PhD

2. **2 patents this year**
   On Deep learning Explainability and Automation

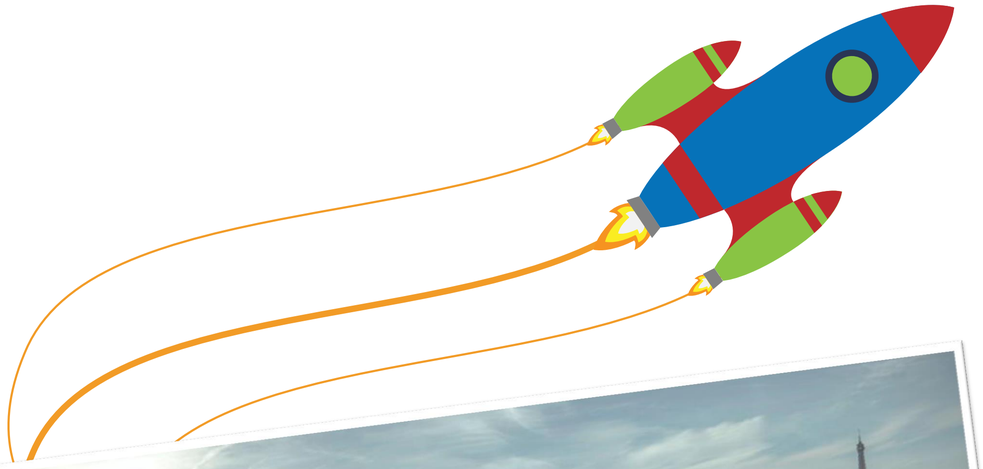
3. **+10 prestigious clients**
   BNP PARIBAS, GAN, CB, AG2R LA MONDIALE…

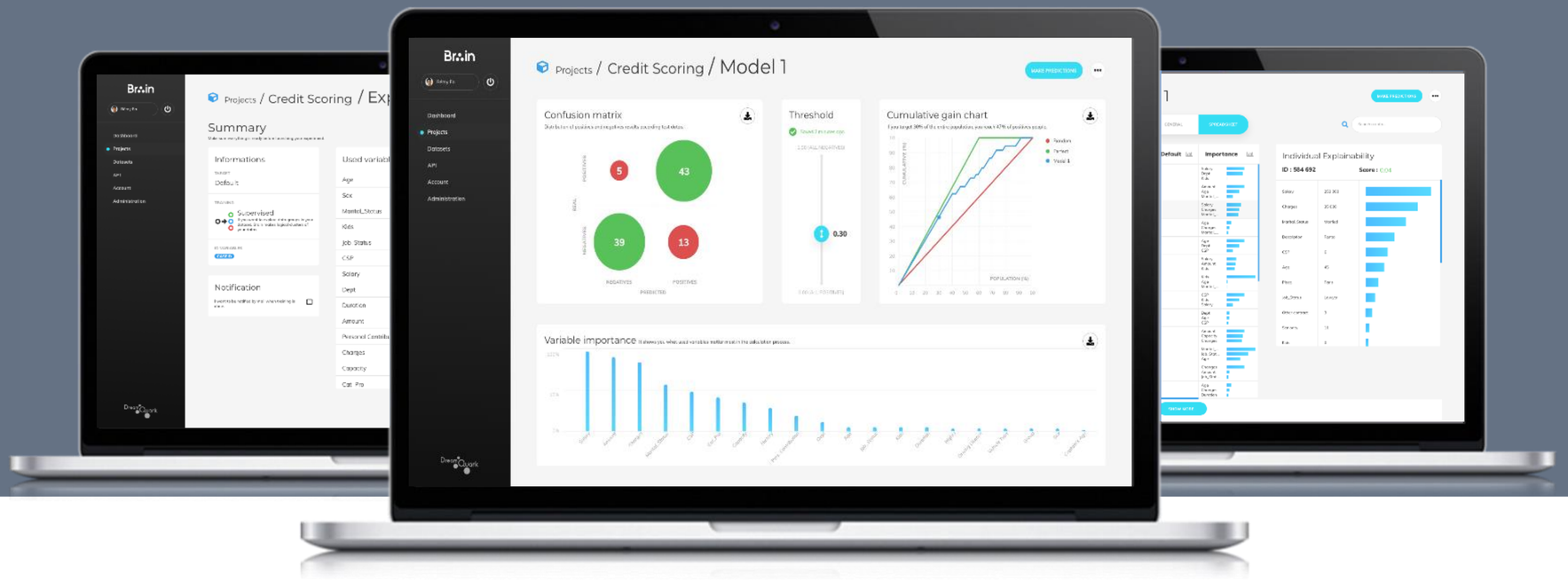
4. **Press recognition**

5. **International & community**
   EUROPE, USA…

AI for humanity contribution

6. **Prized technology**





Sales & Marketing

Product upsell / cross-sell
Product recommendation
Satisfaction & anti-churn
Customer segmentation

Risk & Fraud

Credit scoring
Fraud detection
Fragile clients detection
Recovery prevention

Compliance & AML

Compliance
AML

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Secondments

What can we propose

Short-term projects:

1. Implementation of promising papers and ideas

2. Adapting deep learning techniques from public to real-life datasets

Long-term projects:

1. Formulating and resolving ambitious problems with a goal to publish papers

What do we expect

1. Motivation!

2. Basic knowledge of programming on **Python!**

3. Understanding of elementary deep learning techniques (preferably)