

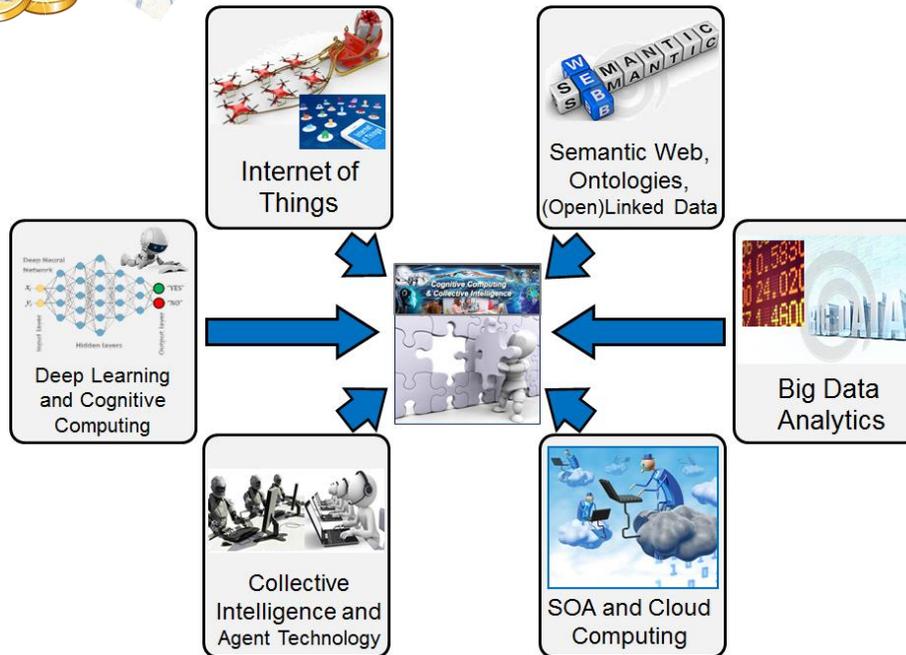


COIN: “Cognitive Computing and Collective Intelligence”

International Master Program

Faculty of Information Technology,

University of Jyväskylä, Finland



5 reasons why COIN has to be chosen:

1. **Emergent need** for professionals capable to design systems of Artificial Intelligence and with Artificial Intelligence;
2. Finland has excellent **international reputation** for its educational system and internationally recognized high(est) standards of quality in education;
3. Finland in general and Jyväskylä in particular is an excellent, **friendly, safe** and extremely **beautiful place** to stay for studies, working and living;
4. COIN program will share with you **unique experiences, knowledge and skills** you will need in your business, industrial or academic career not only in near future but even far beyond;
5. Our curriculum is designed and implemented by a **multinational and multicultural** team and therefore each international student will feel comfortable with us.



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Download pdf-file with this brochure here:

<http://www.mit.jyu.fi/ai/COIN.pdf>



"Students need to be prepared for jobs that do not yet exist ... using technologies that have not yet been invented ... in order to solve problems that we do not even know are problems yet".
 [Richard Riley, Secretary of Education under Clinton]

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Key Objective: “Smarter than us”: Designing intelligent software applications capable to interact naturally with various forms of intelligence to collaboratively address complex problems.

Program Mission (in achieving major learning outcomes): Students who graduate from the programme will think beyond the routine and will be able not just to adapt to a change but to help to create and control it. This means that our graduates will not be able only to “solve smart problems”, but in addition to it they will be able to “invent new and smart problems” and drive them by “designing artificial smart problem solvers”.

On completion of the programme, graduates will be able to:

- use, design and train complex self-managed and continuously evolving public and private industrial systems, digital ecosystems, cyber-physical systems, systems-of-systems, platforms, services and applications;
- will be able to connect their designs with publicly available Deep Learning and Big Data analytics and Web-based Cognitive Computing capabilities as services;
- will be able to figure-out and approach various challenging aspects of complex problems world-wide, which require collective intelligence and self-managing service-based architectures for their solutions;
- understand, and professionally utilize for that purpose, knowledge on enabling technologies and tools;
- perform research training and academic doctoral level studies;
- will be skillful in international communication due to the integrated language and communication studies.

Degree Structure (120 ECTS):

Compulsory Core Studies (75 ECTS):

1. Deep Learning for Cognitive Computing: Theory – 5
2. Semantic Web and Linked Data – 5
3. SOA and Cloud Computing – 5
4. Big Data Engineering – 5
5. Collective Intelligence and Agent Technology – 5
6. Self-Assessment on Study Progress – 0

7. **Cognitive Service Development Project** – 15
8. (Master Thesis) **Seminar** – 5
9. **Master Thesis** – 30
10. **Maturity Test** – 0

Elective Courses:

- Elective Major Subject Courses (20 ECTS):

1. Deep Learning for Cognitive Computing for Developers – 5
2. Semantic Technologies for Developers – 5
3. Agent Technologies for Developers – 5
4. Interface of Things – 5
- ...

- Other Optional Courses (15 ECTS):

1. Future Internet – 5
2. Data Mining – 5
3. Simulations – 5
4. Cross-Cultural Context Computing – 3
5. Research Ethics – 2
- ...

Language Studies (10 ECTS):

1. Finnish – 5
2. Integrated Research Communication – 5

Career Opportunities / COIN as a profession:

- Software Engineer (or Software Scientist or Software Analyst);
- Data Engineer (or Data Scientist or Data Analyst);
- Cognitive Computing Engineer;
- Software (Cloud) Service architects: designing the technical infrastructures of service enabled applications.
- Enterprise architects: architecting and aligning enterprises processes, structure, data and control.
- Web Service (IT) professionals: experts in the development and composition of Web services into enterprise applications.
- Big Data and Knowledge engineers, architects, modelers and analysts: experts in Big Data, metadata and ontology engineering, knowledge management, data and knowledge integration and evolution, in constructing data-as-a-service solutions, data-intensive applications, expert-systems and knowledge based-systems.
- Scientists (PhD program): graduates are well-prepared to successfully pursue a career in academia.

What happens when machines become smarter than humans? Humans steer the future today not because we're the strongest or the fastest but because we're the smartest. When artificial intelligence becomes smarter than humans, can we instruct it to steer the future as we desire? What goals should we program into them? In a couple of years 2/3 of various industries worldwide will adopt AI technology in the form of intelligent assistants, cognitive computing, machine (deep) learning and intelligent business analytics. Today's industrial revolution sends us the clear message "as technology continues to accelerate and machines begin taking care of themselves, fewer people will be necessary". Artificial intelligence is already well on its way to making "good jobs" obsolete: many office workers and even computer programmers will be replaced by robots and smart software. Should we start to worry about it?... No, we must not! When designing this new Master Program for you, we strongly believe that "if you cannot stop the process, then you must lead and drive it".

The most powerful weapon in IT business today is the alliance between the Artificial Intelligence, or mathematical skills of self-learning machines, and the imaginative Human Intellect of great leaders. Together they make the Collective Intelligence, which is the major business model of the future.

Cognitive Computing focuses on self-learning and self-managing systems that use artificial intelligence to mimic the way the human brain works. Such systems cannot be simply programmed; they must be trained in a similar way as we train humans in schools and universities. Cognitive Computing enables various forms of intelligence interact naturally to collaboratively address complex problems.

Emergent profession around the Cognitive Computing and Collective Intelligence domains is a hybrid and natural evolution of popular professions such as Software Engineer and Data Scientist driven by Artificial Intelligence.

A Cognitive Computing Engineer is not only capable of designing smart software systems but also teaches them to autonomously discover and solve previously unknown complex problems. This means that such a professional is capable to automate the essential part of the duties from a software engineers and a data scientist. The simplified formula is as follows:

- A Software Engineer creates the systems that create the data;
- A Data Engineer builds systems that create the value out of the data which come from the various systems created by software engineers;
- A Cognitive Computing Engineer builds and trains the intelligent systems (models) that automatically create the systems, which create the data and pick the value out of it; i.e., it automates the essential part of the duties from software engineers and data engineers.

Why COIN specialists are needed now and will be needed in the future?

Currently the biggest IT giants (IBM, Google, Microsoft, Amazon, Facebook, Intel, etc.) in collaboration with other IT-companies, have created the emergent and fast-evolving market around the Cognitive Computing, in which they provide cloud-based cognitive services for the end-users, data scientists and application developers within many domains. There is a clear trend that these systems are becoming smarter every day enabling Intelligence-as-a-Service-and-a-Self-Service provision and consumption on the basis of the Deep Learning and smarter Big Data analytics. This domain appears to be the battlefield of the enormous competition among these companies and the need for qualified professionals in Cognitive Computing and Collective Intelligence is constantly growing.

National and Regional needs are manifested by the great interest of local business, industries and governmental institutions to the IBM Watson initiatives. Several bold initiatives within Central Finland, such as, e.g., Smart City, Health Hub, Smart Grids, etc., will make products, services and infrastructures around us much smarter. Emerging smart spaces and corresponding ecosystems require specialists who can utilize and further develop enabling technologies, i.e., collective intelligence, cognitive computing and related. The COIN Master's program strengthens the university's role of cognitive computing educator at the national level and supports the international recruitment. Leading industrial countries have classified cognitive computing as strategic knowledge, which has a significant impact on the country's competitiveness.

According to industry analyst Gartner, Cognitive Computing is a “disruptive platform with a shift more impactful than many other technologies in the past 20 years”. Majority of analysts estimate that demand for Collective Intelligence and Cognitive Computing will evolve synchronously with the ever growing human needs for automation. Nowadays Cognitive Computing is targeted as an essential element of competence area of industrial country's citizens. Competitors in Finland and around the world are focusing mainly on Data Science which is only the beginning of Cognitive Computing & Collective Intelligence evolution. This programme is a step further towards more advanced education. Rather than to simply train students to be skillful in, e.g., Data Science or Software Engineering, COIN programme will teach them to develop and train systems capable to perform such skills automatically and autonomously.

How to apply (admissions overview)

For the detailed information on the COIN program and on how to apply to it, please follow the link:

<https://opiskelu.jyu.fi/en/apply/programmes/coin>

Student Testimonials (from our previous WISE program)

	<p>Henry Efor, Nigeria</p> <p><i>"The thing I love most about the programme is the motto: "creating solutions to problems that do not yet exist"."</i></p>
	<p>Alamzeb Nasar, Pakistan</p> <p><i>"I would recommend anyone who wants to be innovative and creative and has a desire to be part of the future of IT to apply for the University of Jyväskylä WISE program because the knowledge gained here will give you a cutting edge advantage in the coming years."</i></p>
	<p>Liu YanJun, China</p> <p><i>"The true liberation of thoughts is a fortune to me for the rest of my life. No matter where I live in the future I wish to always keep this peace in my heart and it will lead me to the right path. I love Finland more than I can say."</i></p>
	<p>Uzair Zafar, Pakistan</p> <p><i>"The quality of the instruction is unparalleled; my professors not only have superb grasp of the issues raised by the respective courses, but also go to great lengths to provide me with extensive feedback on my ideas and work."</i></p>

Contact Information

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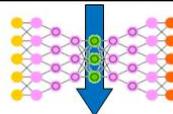
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Application period: starts 15 November 2017 with the deadline: 10 January 2018.



Welcome !

Jyväskylä is waiting for you!

