HAGENBERG CAMPUS

Summer School in Modern Computing Paradigms for Information Security

9th – 20th July 2018

School of Informatics, Communications and Media, Hagenberg

www.fh-ooe.at/international-summer-school-2018

FH OBERÖSTERREICH
UNIVERSITY OF APPLIED SCIENCES UPPER AUSTRIA

Summer School in Modern Computing Paradigms for Information Security

This Summer School, held on **9th - 20th July 2018** at our School of Informatics, Communications & Media in Hagenberg, gives you an excellent opportunity to enhance your knowledge on **IT Security** and at the same time explore Upper Austria, meet new people, and expand your network internationally.

We are inviting **Master's students from partner universities with a Bachelor's Degree in Computer Science** to join us for this event! You can earn **6 ECTS** by attending.

Students from partner institutions are free of charge!

Main Focus

New programming paradigms have led to big advances in recent years. Machine Learning is a promising new way to solve problems, also related to security questions, that are hard to tackle using classical computing approaches. This is due to two factors: the availability of powerful hardware to do the learning, and the availability of large amounts of data to learn from.

From a programming paradigm point of view, by using algorithms that learn from examples, machine learning enables a computer to gain insights without being explicitly programmed.

Quantum Computing promises to solve many hard problems more efficiently than classical computation. Computation is preparing a quantum system, transforming it, and finally measuring the system thus producing an output. A clever combination of transformations makes use of properties of quantum superposition and entanglement.

What to expect

Learn about the theoretic background needed to understand the methods used in machine learning and quantum computing in the lectures.

Apply your theoretical knowledge and learn to use the tools to solve small problems in exercise sessions. Implement machine learning solutions using TensorFlow on a GPU-accelerated machine. Learn how to model quantum circuits. Depending on the availability of the simulation hardware at the time of the Summer School, we plan to let you simulate these circuits on a quantum computer simulator.

Work on a more advanced problem related to security questions, in a small group, implement your ideas and evaluate, present and discuss your solution.

Some experience with the Python programming language is expected, but no knowledge about neural networks, TensorFlow, and quantum computing. Basic linear algebra and calculus will be helpful for understanding the mathematical concepts behind both Deep Learning and Quantum Computing.

Programme

In addition to lectures, workshops and laboratory tutorials, our programme will include site visits and two days filled with social and cultural activities.

Week 1: Monday, 9th July - Sunday, 15th July 2018
» **Welcome Dinner**
» **Lectures/Lab:** Quantum Computer Programming and TensorFlow/Neural Network Programming
» **Excursions** to Linz and Hallstatt/Salzkammergut (Friday, Sunday)
Week 2: Monday, 16th July - Friday, 20th July 2018
» **Project Work:** Quantum Computer Programming or Neural Network Programming/Artificial Intelligence
» **Ars Electronica Center visit** and **Dinner** at Cubus
» **Project Presentations**

How to apply

Once you decide to apply for our **Summer School**, please send an e-mail to **international@fh-hagenberg.at** You will then receive a personalised registration link to our online application portal.

Application deadline: 20th May 2018.

Please note that due to limited capacities a maximum of four students per institution can be accepted. Acceptance decisions will be made exclusively based on the students' qualifications.

Applicants will be notified about the outcome of the review and selection process by the **end of May 2018**.

Please note that it is the student's obligation to take care of **visa arrangements** for entry and the duration of their stay in Austria. For details, check **https://oead.at/en/to-austria/entry-residence-and-employment/**

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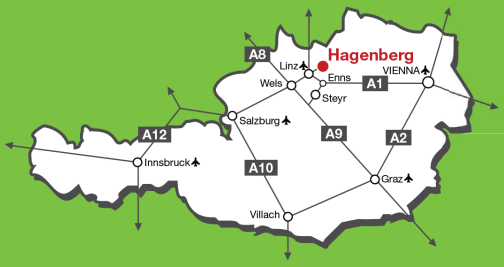

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