Introduction to Knowledge Graphs and Semantic Web Technologies

Eva Blomqvist (eva.blomqvist@liu.se)
Olaf Hartig (olaf.hartig@liu.se)
Patrick Lambrix (patrick.lambrix@liu.se)
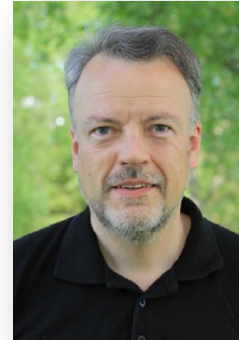Sebastián Ferrada (sebastian.ferrada@liu.se)

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The Semantic Web group @LiU
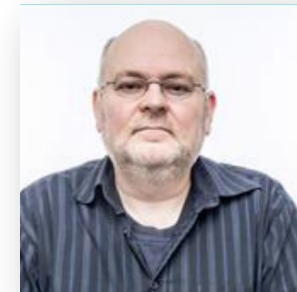
Faculty

Eva Blomqvist

Olaf Hartig

Henrik Eriksson

Patrick Lambrix

Postdocs

PhD students

Robin Keskisärkkä

Sebastian Ferrada

Huanyu Li

Riley Capshaw   Sijin Cheng

Ying Lee   Shahrzad Khayatbashi

Mina Nikooie   Javad Saeedizade

Mikael Lindecrantz

LiU LINKÖPING UNIVERSITY

Olaf Hartig

- Senior Associate Professor in Computer Science at LiU
- Amazon Scholar working with the Neptune team at AWS

- Teaching: database topics
- Research on problems related to the management of data and databases
- Graph data (RDF, RDF-star, Property Graphs)
- Data *on* the Web (Semantic Web, Linked Data)
- Federated database systems

http://olafhartig.de

@olafhartig

aws

Eva Blomqvist

- Senior Associate Professor in Computer Science at LiU

- Research on problems related ontologies and ontology engineering
- Methodologies for ontology engineering
- Ontology Design Patterns
- Applications in security, e-health and circular economy

https://www.evablomqvist.se

@evabl444

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Patrick Lambrix

- Professor in Computer Science at LiU
- Leads the Database and Web Information Systems Group at IDA
- Swedish e-Science Research Centre SeRC

- Description Logics
- Ontology engineering
- Ontology alignment
- Ontology completion and debugging

https://www.ida.liu.se/~patla00/

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Sebastián Ferrada

- Postdoc at LiU

- Research interests:
  - Semantic Web and Linked Data
  - Federated Database Systems
  - Multimedia Databases

 http://sferrada.com

Additional teachers

- Ying Li
  - PhD student in the group
  - Assistant for hands-on sessions
- Riley Capshaw
  - PhD student in the group
  - Lecture on ML for KG construction
- Daniel De Leng
  - Postdoc in AIICS
  - Assistant for hands-on sessions

Overview of the course

- Day 1 - Today
  - Introduction to KGs – Why graphs? Why ontologies?
  - RDF, SPARQL and data management

    Lecturer: Olaf

- Day 2 - Tomorrow
  - Description logics – foundations for ontologies

    Lecturer: Patrick
  - Web data management lecture - Olaf

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Overview of the course

- Day 3-4 – March 14-15
  - Introduction to OWL and ontology engineering
  - Several practical modelling exercises

    Lecturer: Eva, Assistant: Daniel

- Day 5 – March 16
  - Ontology alignment and debugging

    Lecturer: Patrick, Assistant: Ying

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Overview of the course

- Day 6 – March 21st
  - Ontology and KG visualisation (Olaf)
  - Mapping-based KG construction (Olaf)
  - ML-based KG construction (Riley)
  - SHACL – including hands-on (Sebastián)
  - Property graphs – including hands-on (Olaf)
  - RDF-start and SPARQL-start (Olaf)
  - Discussion of student project + wrap up

The course is an introduction

- We will not teach you everything about every standard/technology

  - Enough for you to understand the basics and be able to find more literature

  - Some practical experience with the basics, so that you could use the technologies correctly in a project

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Requirements to pass the course

- Main course – 3 credits
  - Attend lectures (or read material)
  - Attend the hands-on session and hand in solutions to the hands-on exercises specified on the course web page after completing them

- Course project – 3 credits
  - Propose (before March 21st) and carry out a project after the course sessions
  - Present your solution to your assigned supervisor

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Presentation & expectations of the course

- Say a few words on
    - Who you are and what you do for your PhD

    - Your prior knowledge and experience of Semantic Web Technologies (RDF, SPARQL, OWL, …)

    - Why you are taking this course

    - What you expect to take away from the course

Schedule Day 1

09:00-10:00 Welcome, introduction & motivation (Eva&Olaf)

10:00-10:45 Introduction to ontologies (Eva)

   15 min break

11:00-12:00 Introduction to RDF (Olaf)

   1-hour lunch break

13:00-13:30 Hands-on RDF (Olaf)

13:30-14:00 Triple stores and SPARQL endpoints (Olaf)

   30 min break

14:30-16:00 Introduction to SPARQL (Olaf)

16:00-17:00 Hands-on SPARQL (Olaf)

Schedule Day 2

09:00-12:00 Description Logics (Patrick)

  1-hour lunch break

13:00-14:00 Description Logics cont. (Patrick)

  15 min break

14:15-15:15 Publishing and querying KGs on the Web (Olaf)

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