**Ansökan om medel för fakultetsgemensam forskarutbildningskurs 2018**

*Application for funding of faculty common course 2018*

**Kursnamn:** Probabilistic Machine Learning  
*Name of course*

**Omfattning (högskolepoäng):** 5+3 (the extra 3 credits are obtained via a voluntary course project)  
*ECTS credits*

**Tidsperiod:** March – June, 2018  
*Course period*

**Antal platser:** 50  
*Maximum number of participants*

**Undervisningsspråk:** English  
*Language of instruction*

**Kursens syfte samt motivering till varför den bör vara fakultetsgemensam (max 150 ord)**  
*Aim of course and motivation as to why it should be considered “multidisciplinary” to the extent that the faculty should allocate extra financing.*

Data is becoming more and more widely available and the world is now in a situation where there is more data than we can handle. This clearly calls for new technology and this challenge has resulted in the rapid growth of the machine learning area over the past decade. This course will provide a PhD level introduction into the area of machine learning that is suitable for participants from many different departments. Machine Learning is becoming a knowledge required by many different branches of science due to the fact that it offers solutions to the ever-present problem of learning, acting and reasoning based on data. This is the main reason at to why the course will attract participants from several departments at UU.

**Kursinnehåll, kursens uppläggnings samt examinationsform (max 150 ord)**  
*Contents, study format and form of examination*

**Lecture series:** 11-12 lectures, (2 hours each). The lectures are given by the teachers.  
**Exercise sessions:** 10 in total. One of the senior PhD students will organize this.  
**Examination:** Written take-home exam (48h). Roughly half of the exam will be solved using the computer and the other half will be traditional pen and paper assignments.  
**Project (optional):** Successful projects will be awarded an additional 3 hp. This is a great mechanism to spark bigger projects and spin-off collaborations.  
**Course contents (technical):** Probabilistic modeling, Deep Learning, Gaussian processes, Support vector machines, Expectation Maximization, Variational inference, Graphical models, Message passing algorithms, and Probabilistic programming.

**Further information:** See the previous course website:  
[http://www.it.uu.se/research/systems_and_control/education/2016/sml](http://www.it.uu.se/research/systems_and_control/education/2016/sml)

**Målgrupp/er (specifera ämnen/inriktningar) samt rekommenderade förkunskaper**  
*Target group/s (specify, if possible, subject/specialization) and recommended background*

Our target audience is wide. The experience we have from earlier editions of this course shows that it is great to have a wide target audience for a course like this. More specifically, the audience includes PhD students, researchers, interested MSc students, companies and
others with an active interest in a PhD level course on Machine Learning.

**Recommended background:** Basic courses in linear algebra, probability, statistics and optimization.

**Huvudansvarig institution:** Department of Information Technology

**Andra inblandade institutioner (specifera hur).**
Other departments involved (specify how).

We expect PhD students from 5-8 departments based on previous experience.

**Kontaktperson/er (namn, e-postadress)**
Contact person (name, e-mail address)
Thomas Schön, thomas.schon@it.uu.se
Lawrence Murray, lawrence.murray@it.uu.se
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**Anmälan om kursdeltagande till**
Application from course participants should be sent to
Thomas Schön

**Senast**
Not later than
1 March 2018, but the first come, first served principle applies.