

PSY 607 F2018 – Sem Introduction to Neural Networks

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Office Hours: by appointment

Time: Mon 2:00-3:50 in 417 LISB

CRN: 16797

There has been a recent resurgence of interest in and research on artificial neural networks. Artificial neural networks are biologically-inspired computer programs which learn from input data. The purpose of this seminar is to introduce core concepts of neural networks, including modern techniques for deep learning. Readings will include basic background material as well as applications to real world problems (e.g., pattern recognition, goal-oriented learning).

The course is offered for variable credit (3-4 credits). All participants are expected to come prepared with questions and comments on each week's readings. *Class attendance and participation is critical. If you have to miss a class, inform me ASAP before class.* Style of participation is flexible – you can bring up questions and comments in class or send these to me via e-mail before or after class; participants are also encouraged to present current research related to the readings. Participants taking the course for 3 or 4 credits must make a presentation and lead a discussion on one of the topics. Participants taking the course for 3 credits must also write a short 1-page single-spaced reaction essay describing their insights and opinions of the research covered in the seminar and possible directions for future research. Those taking the course for 4 credits are, instead, required to write a research proposal paper. The research proposal should be 5-7 pages long on a topic related to the seminar. It should be written like a grant application, where you propose a model and outline how that model will be implemented. It should have an introduction, description of the proposed model (including details about implementation), possible results, and discussion.

Participant input is welcome regarding possible papers or topics for discussion not listed in the syllabus. The syllabus, readings, and presentations will be posted on the course website (<http://canvas.uoregon.edu>).

Schedule and Topics:

Week 1 (Sept 24) Introduction and Organizational Meeting

Week 2 (Oct 1) Overview & Historical Perspective

Week 3 (Oct 8) Background & Early Models

Week 4 (Oct 15) Gradient Descent Algorithms & Multi-Layer Networks

Week 5 (Oct 22) Deep Convolutional Neural Networks: Background

Week 6 (Oct 29) Deep Convolutional Neural Networks: Applications

Week 7 (Nov 5) No Class (SFN conference Nov 3-8)

Week 8 (Nov 12) Recurrent Neural Networks

Week 9 (Nov 19) Deep Reinforcement Learning: Background

Week 10 (Nov 26) Deep Reinforcement Learning: Applications

Essays/Papers Due: 4:00 Friday November 30th.