

SDAS Previous Seminars 2018

Patrick Emami (PhD student - Computer Science)

Title: Deep Reinforcement Learning: An Overview

Abstract: Deep Reinforcement Learning has received a lot of attention lately due to Google DeepMind's successes in Go and Atari. In essence, reinforcement learning is a framework for training intelligent agents to solve complex tasks by interacting with their environment. Fundamental to reinforcement learning is the concept of decision-making under uncertainty. Deep neural networks have enabled many of the classic reinforcement learning algorithms to be applied to more complex and high-dimensional domains. In this talk, an overview of the major milestones in deep reinforcement learning will be presented, along with a brief introduction to various state-of-the-art algorithms. February 23, 2018

Parker Edwards (PhD Student, Mathematics)

Title: The topology of cyclo-octane's configuration space

Abstract: In a 2010 paper, Shawn Martin, Aidan Thompson, Evangelos Coutsias, and Jean-Paul Watson describe how they applied a battery of exploratory data analysis techniques to data modelling the configuration space of the molecule cyclo-octane (C₈H₁₆). They uncover an intriguing result: the configuration space in question consists of two pieces. One piece is a sphere, the other is a Klein bottle, and the two pieces intersect along two distinct circles. Their process is illustrative of how various data analysis tools can be combined to obtain robust information about complex data sets. I will present an overview of their techniques. March 2, 2018

Scott Siegel (Ph.D. Student, BME)

Title: Improving Autonomy and Intelligence in Healthcare with Machine Learning

Abstract: The focus of this presentation will be to outline two recent projects within the "Intelligent Health Lab" (i-Heal). The first project involves automatic detection and categorization of 15 common cognitive distortions in written text. Cognitive psychologists define cognitive distortions as self-reinforcing irrational thought patterns. If left unchecked, patients can get stuck in negative feedback loops of unhealthy thinking. Online therapy programs often require patients to maintain mental health journals and need such a tool to meet a rapidly growing patient population. The second project involves real-time tracking of patient health data in intensive care units to reduce response times and predict potential complications before they occur. A subset of patients authorized our lab to continuously record video and clinical data during their postoperative recovery period. Our goal is to develop a context-aware system for intelligent decision making and risk assessment. March 23, 2018

Dhruv Patel (Ph.D. Student, Math)

Title: Connections Between Persistence and Curvature

Abstract: Geometric shapes constructed by gluing triangles together (simplicial complexes) arise frequently in geometric data analysis. We are interested in connecting persistence for simplicial complexes, a method for determining the size of holes in spaces, to spaces' curvatures. First, we will discuss spaces of constant curvature and how to sample points uniformly in such spaces. We then construct a statistical model to estimate curvature given a topological summary of persistence called the persistence landscape.

March 30, 2018

Patrick Emami (PhD student - Computer Science)

Title: Machine Learning for Intelligent Transportation Systems

Abstract: The field of intelligent transportation systems (ITS) involves the development of computational methods for improving the quality of transportation; key applications include autonomous vehicles, traffic surveillance, and traffic network optimization. ITS has been revolutionized by advances in machine learning (ML), partly due to the availability of large-scale datasets and scalable algorithms that can extract insights from data. For example, deep learning has significantly improved our ability to perform vehicle and pedestrian detection and tracking. In this seminar, I will broadly survey applications of ML within ITS and provide details on projects within the UF Transportation Institute that are using ML. The talk will also include a discussion on the sensors used for data collection and real-time decision-making.

September 6, 2018

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Tyler Richards (DSI President and Industrial and Systems Engineering graduate)

Title: Analytic Frameworks for Student Organizations: Exploring 3 Years of Data at DSI

Abstract: DSI is a Data Science Organization hyper focused on teaching and growing a data science community at UF. For the past three years, it has been hosting workshops on everything from machine learning in R or Python to Natural Language Processing. Over the course of the past semester, DSI has generated analytic capabilities focused on the over two thousand workshop attendances for visualization and predictive purposes to increase the organization's effectiveness. This talk will cover both the analytic insights (workshop creation, timing, etc.) from the data and also the learnings from practical applications of data science. November 8, 2018