

## CS 434 – Machine Learning and Data Mining

**Catalog Description:** Introduction to machine learning and data mining algorithms (supervised learning, unsupervised learning, and reinforcement learning) tools that are widely employed in industrial and research settings.

**Credits:** 4                   **Terms Offered:** Fall

**Prerequisites:** CS325

**Courses that require this as a prerequisite:** None

**Structure:** Three 50-minute lectures per week

**Instructors:** Xiaoli Fern

### Course Content:

- Supervised learning for prediction problems (learn to predict)
- Unsupervised learning for clustering data and discovering interesting patterns from data (learn to understand)
- Reinforcement learning for learning to select actions based on positive and negative feedback (learn to act)

### Measurable Student Learning Outcomes:

At the completion of the course, students will be able to...

1. **Apply** supervised learning algorithms to prediction problems and **evaluate** the results (Level 3; Abet outcomes: a, b c)
2. **Apply** unsupervised learning algorithms to data analysis problems and **evaluate** results (Level 3; Abet outcomes: a, b, c)
3. **Apply** reinforcement learning algorithms to control problem and **evaluate** results (Level 3; Abet outcomes: a, b, c)
4. **Decide** what kind of problem (supervised, unsupervised, or reinforcement) it is, given a description of a new problem (Level 4; Abet outcomes: b, c)

### Learning Resources:

- Ethem Alpaydin, *Introduction to Machine Learning* (MIT Press 2004), required
- Ian H. Witten and Eibe Frank, *Data Mining: Practical Machine Learning Tools and Techniques*, (2nd edition Elsevier, 2005), optional

### Students with Disabilities:

Accommodations are collaborative efforts between students, faculty and Services for Students with Disabilities (SSD). Students with accommodations approved through SSD are responsible for contacting the faculty member in charge of the course prior to or during the first week of the term to discuss accommodations. Students who believe they are eligible for accommodations but who have not yet obtained approval through SSD should contact SSD immediately at 737-4098.

**Link to Statement of Expectations for Student Conduct:**  
<http://oregonstate.edu/admin/stucon/achon.htm>

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