A Course in Machine Learning

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Machine learning is the study of algorithms that learn from data and experience. It is applied in a vast variety of application areas, from medicine to advertising, from military to pedestrian. Any area in which you need to make sense of data is a potential consumer of machine learning.

CIML is a set of introductory materials that covers most major aspects of modern machine learning (supervised learning, unsupervised learning, large margin methods, probabilistic modeling, learning theory, etc.). It's focus is on broad applications with a rigorous backbone. A subset can be used for an undergraduate course; a graduate course could probably cover the entire material and then some.

You may obtain the written materials by <u>purchasing a (\$55)</u> <u>print copy</u>, by <u>downloading the entire book</u>, or by downloading <u>individual chapters</u> below. If you find the electronic version of the book useful and would like to <u>donate a small amount</u> to support further development, that's always appreciated! You can get the source code for the book, labs and other teaching materials on <u>GitHub</u>. The current version is 0.99 (the "beta" pre-release). [You can view <u>v0.9</u> if you prefer.

Support and Mailing Lists:

If you would like to be informed when new versions of CIML materials are released, please join the <u>CIML mailing list</u>. If you find errors in the book, please fill out a <u>bug report</u>. If you're the first to submit an error, you'll get listed in the acknowledgments!

Individual Chapters:

- 0. Front Matter
- 1. Decision Trees
- 2. Limits of Learning
- 3. Geometry and Nearest Neighbors
- 4. The Perceptron
- 5. Practical Issues
- 6. Beyond Binary Classification
- 7. Linear Models
- 8. Bias and Fairness
- 9. Probabilistic Modeling
- 10. Neural Networks

- 11. Kernel Methods
- 12. <u>Learning Theory</u>
- 13. Ensemble Methods
- 14. Efficient Learning
- 15. <u>Unsupervised Learning</u>
- 16. Expectation Maximization
- 17. Structured Prediction
- 18. <u>Imitation Learning</u>
- 19. Back Matter

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