



# Motivation and pre-requisites

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# About this course

- This course covers the basic ideas behind machine learning/prediction
  - Study design - training vs. test sets
  - Conceptual issues - out of sample error, ROC curves
  - Practical implementation - the caret package
- What this course depends on
  - The Data Scientist's Toolbox
  - R Programming
- What would be useful
  - Exploratory analysis
  - Reporting Data and Reproducible Research
  - Regression models

# Who predicts?

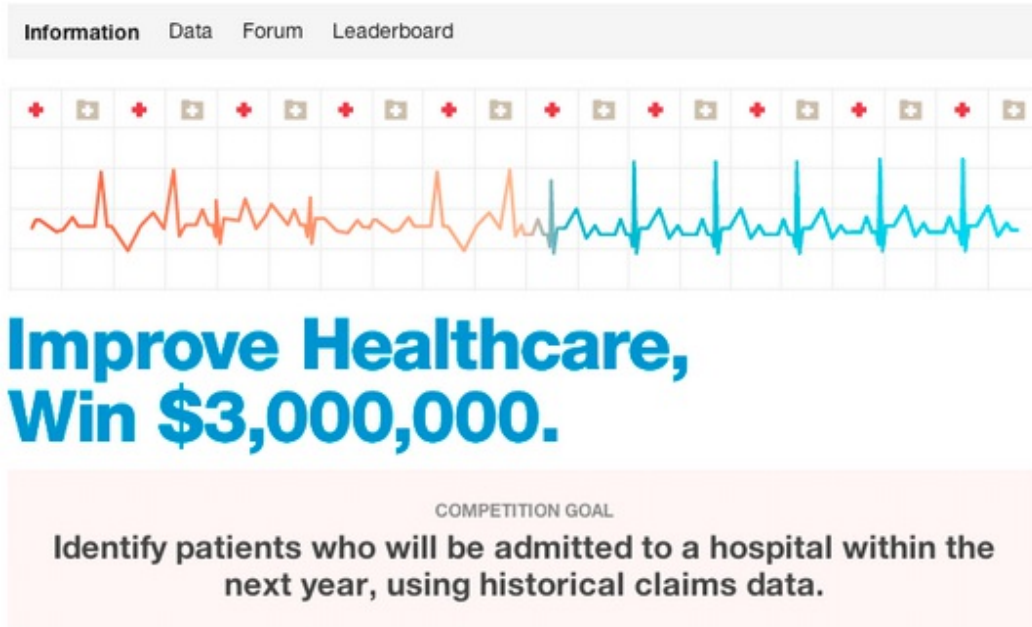
- Local governments -> pension payments
- Google -> whether you will click on an ad
- Amazon -> what movies you will watch
- Insurance companies -> what your risk of death is
- Johns Hopkins -> who will succeed in their programs

# Why predict? Glory!



<http://www.zimbio.com/photos/Chris+Volinsky>

# Why predict? Riches!



<http://www.heritagehealthprize.com/c/hhp>

# Why predict? For sport!

kaggle

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## What's in your data?

### Participate in competitions

Kaggle is an arena where you can match your data science skills against a global cadre of experts in statistics, mathematics, and machine learning. Whether you're a world-class algorithm wizard competing for prize money or a novice looking to learn from the best, here's your chance to jump in and geek out, for fame, fortune, or fun.

[Join as a participant](#)

(Need convincing?)

### Create a competition

Kaggle is a platform for data prediction competitions that allows organizations to post their data and have it scrutinized by the world's best data scientists. In exchange for a prize, winning competitors provide the algorithms that beat all other methods of solving a data crunching problem. Most data problems can be framed as a competition.

[Learn more about hosting](#)

<http://www.kaggle.com/>

# Why predict? To save lives!

**Oncotype DX® reveals  
the underlying biology that  
changes treatment decisions  
37% of the time**

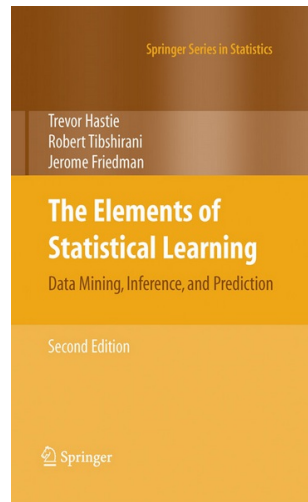
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Uncover the Unexpected™



<http://www.oncotypedx.com/en-US/Home>

# A useful (if a bit advanced) book



[The elements of statistical learning](#)



# A useful package

the caret package



The **caret** package (short for Classification And REgression Training) is a set of functions that attempt to streamline the process for creating predictive models. The package contains tools for:

## Links

[train Model List](#)

## Topics

[Main Page](#)

[Data Sets](#)

[Visualizations](#)

[Pre-Processing](#)

<http://caret.r-forge.r-project.org/>

# Machine learning (more advanced material)

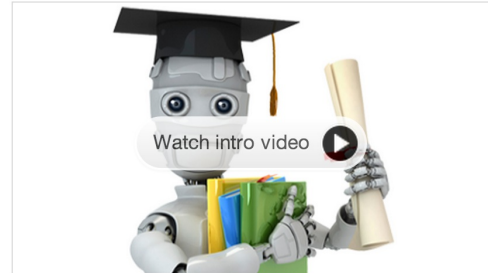
**Stanford**

## Machine Learning

Andrew Ng

**Taught In:** English

**Subtitles Available In:** English



**Sessions:**

Oct 14th 2013 (10 weeks long) ⌵

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<https://www.coursera.org/course/ml>

# Even more resources

- [List of machine learning resources on Quora](#)
- [List of machine learning resources from Science](#)
- [Advanced notes from MIT open courseware](#)
- [Advanced notes from CMU](#)
- [Kaggle - machine learning competitions](#)