# Machine Learning
## R Brown Bag Series #6

Gary R Seamans

The MITRE Corporation

April 19, 2018

- Definition
- ML Techniques and Categories
- Examples
- Discussions

What is machine learning?

*"Machine Learning is the science of getting computers to learn and act like humans do, and improve their learning over time in autonomous fashion, by feeding them data and information in the form of observations and real-world interactions."What Is Machine Learning? - An Informed Definition* 2018

# Common ML Techniques

## ML Categories

- Supervised Machine Learning
- Unsupervised Machine Learning
- Reinforcement Machine Learning

## ML Techniques

- Naïve Bayes Classifier
- K Means Clustering
- Support Vector Machine
- Apriori
- Linear Regression

- Logistic Regression
- Artificial Neural Networks
- Random Forests
- Decision Trees
- Nearest Neighbours

*Top 10 Machine Learning Algorithms*

# Cancer Example

This example uses decision trees to determine tumor spread.

- Predicts tumor spread in this dataset of 97 men who had undergone a biopsy.

- Measures used for prediction: BPH, PSA, Gleason Score, CP, and size of prostate.
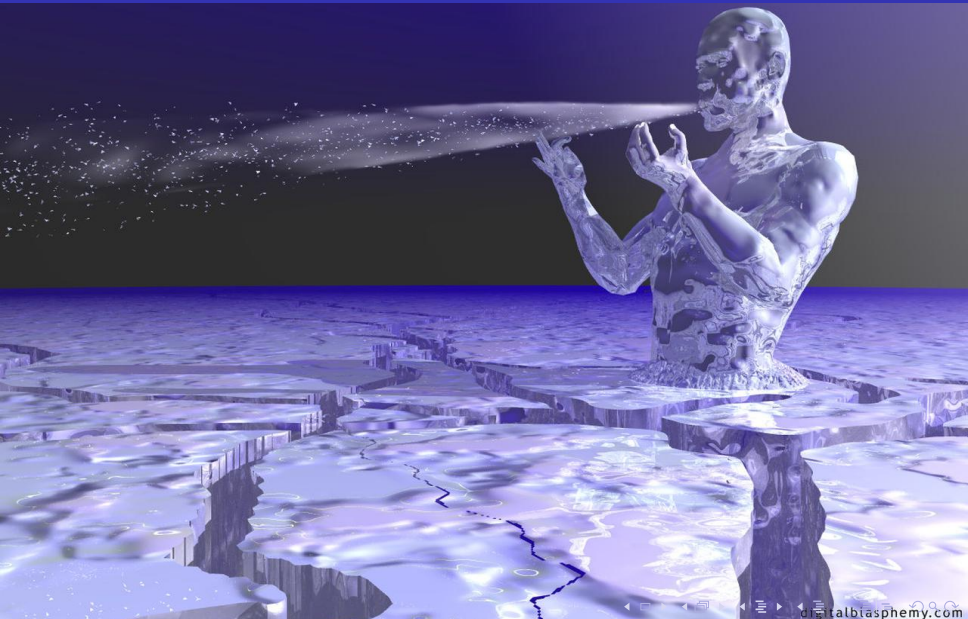
The goal is to use data from accelerometers on the belt, forearm, arm, and dumbell of 6 participants to predict the manner in which the participants did each exercise.

Three different methods were used: - Random Forests - Naive Bayes - Boosting with trees (gbm)

Gary R Seamans         Machine Learning

- The **caret** package
- Introduction to Machine Learning with R
- In-depth introduction to machine learning in 15 hours of expert videos
- Short discussion on Ensembles and Random Forests

Gary R Seamans       Machine Learning

📄 *Top 10 Machine Learning Algorithms*. URL:
  https://www.dezyre.com/article/top-10-machine-
  learning-algorithms/202 (visited on 04/19/2018).

📄 *What Is Machine Learning? - An Informed Definition* (Apr. 19,
  2018). URL: https://www.techemergence.com/what-is-
  machine-learning/ (visited on 04/19/2018).