Algorithmic approaches: overview

- "algorithmic approach", "machine learning", "data mining"
- dominated by computer scientists, business analysts, . . .
- Big Data
- Goals: predictive power, robustness, computational efficiency
- "Develop an algorithm" rather than "build a model"
- Techniques:

  - **ensembles** (bootstrap, cross-validation, random forests)
  - **regularization** or **penalization** (ridge regression, lasso)
  - **smoothing** (additive models)

Key references: (De'ath and Fabricius 2000; Hastie, Tibshirani, and Friedman 2009; Borcard and Legendre 2011; P. Legendre and Legendre 2012)

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{r} fortunes::fortune("machine learning")
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De'ath, Glenn, and Katharina E. Fabricius. 2000. "Classification and Regression Trees: a Powerful yet Simple Technique for Ecological Data Analysis." *Ecology* 81 (11) (November): 3178–3192. doi:10.1890/0012-9658(2000)081[3178:CARTAP]2.0.CO;2. http://www.esajournals.org/doi/abs/10.1890/0012-9658(2000)081%5B3178:CARTAP%5D2.0.CO%3B2.

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