



University of Pretoria Yearbook 2021

Adaptive computation and machine learning 803 (NEP 803)

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| Qualification | Postgraduate |
| Faculty | Faculty of Natural and Agricultural Sciences |
| Module credits | 15.00 |
| NQF Level | 09 |
| Programmes | MSc eScience (Coursework) |
| Prerequisites | No prerequisites. |
| Language of tuition | Module is presented in English |
| Department | Statistics |
| Period of presentation | Semester 1 or Semester 2 |

Module content

Introduction: Basic concepts. Supervised learning setup: Least means squares, logistic regression, perceptron, exponential family, generative learning algorithms, Gaussian discriminant analysis, naïve Bayes, support vector machines, model selection and feature selection. Learning theory: bias/variance tradeoff, union and Chernoff/Hoeffding bounds, VC dimension, worst case (online) learning. Unsupervised learning: clustering, k-means, expectation maximisation, mixture of Gaussians, factor analysis, principal components analysis, independent components analysis. Reinforcement learning and control: Markov decision processes, Bellman equations, value iteration and policy iteration, Q-learning, value function approximation, policy search, reinforce, partially observable Markov decision problems.

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