Annotated Bibliography

Sumaiya Hashmi

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[CF01] Kumar Chellapila and David B. Fogel. Evolving an expert checkers playing program without using human expertise. *IEEE Transactions On Evolutionary Computation*, 5:422–428, 2001.

Describes an evolutionary artificial neural network for evaluating checkers boards, used to train an expert player.

[DAlTH12] Samarjit Das, Breogan Amoedo, F. De la Torre, and Jessica Hodgins. Detecting parkinsons' symptoms in uncontrolled home environments: A multiple instance learning approach. In *Annual International Conference of the IEEE*, pages 3688–3691, 2012.

Describes a weakly supervised multiple instance learning approach to detecting symptoms of Parkinson's Disease. This approach addresses the issue of self-reporting resulting in inaccurate or incomplete labels.

[Det89] R Detrano. International application of a new probability algorithm for the diagnosis of coronary artery disease. *American Journal of Cardiology*, 64:304–310, 1989.

Derives a model from the Cleveland Clinic heart disease data set (also available at UCI ML Repository) and compares it to the CADENZA Bayesian algorithm. Both models are found to overpredict heart disease, though this occurs more with CADENZA.

[DG97] Gulsen Demiroz and H. Altay Guvenir. Classification by voting feature intervals. In *Machine Learning: ECML-97, 9th European Conference on Machine Learning, Prague, Czech Republic, April 23-25, 1997, Proceedings*, pages 85–92. Springer, 1997.

Provides a description of the VFI (Voting Feature Intervals) algorithm, on which VF15 is based.

[FA10] A. Frank and A. Asuncion. UCI machine learning repository. `http://archive.ics.uci.edu/ml`, 2010.

An online repository of data sets across various fields. Can search by domain as well as attribute types and quantities. Particular attention was paid to data sets within the life sciences category with greater than 100 instances.

[FS95] Yoav Freund and Robert E. Schapire. A decision-theoretic generalization of on-line learning and an application to boosting. In *Proceedings of the Second European Conference on Computational Learning Theory*, EuroCOLT '95, pages 23–37, London, UK, UK, 1995. Springer-Verlag.

The first introduction of AdaBoost, an ensemble learning algorithm that uses adaptive boosting.

[GAD98] H. Altay Guvenir, Burak Acar, Glsen Demirz, and Ayhan ekin. A supervised machine learning algorithm for arrhythmia analysis. In *In: Proc. Computers in Cardiology Conference*, pages 433–436, 1998.

Presents a novel ML approach to diagnosing and classifying cardiac arrhythmia, called the VF15 algorithm. It uses a genetic algorithm to learn feature weights. Then, each feature 'votes' on a class prediction. The algorithm has a 62% accuracy on this particular task and is found to outperform Naive Bayes.

[GM09] David Gil and Devadoss Johnson Manuel. Diagnosing parkinson by using artificial neural networks and support vector machines. *Global Journal of Computer Science and Technology*, 9(4), 2009.

Trained and tested on data from the UCI Machine Learning Repository Parkinson's Disease dataset. Used a multilayer neural network, and SVMs with linear and Pearson VII function kernels.

[GMCL05] Dayong Gao, Michael Madden, Des Chambers, and Gerard Lyons. Bayesian ann classifier for ecg arrhythmia diagnostic system: A comparison study. In *Proc. of Int. Joint Conf. on Neural Networks*, 2005.

Compares various ML algorithms for arrhythmia diagnosis based on ECG data, with an emphasis on minimizing false positives and dealing with noisy data. Highlights need to improve on VF15's 62% accuracy. Uses the UCI ML Repository Arrhythmia dataset. Evaluates a Bayesian artificial neural network classifier as compared to Naive Bayes, decision trees, logistic regression, and neural networks.

[Gre07] Robert A. Greens. *Clinical Decision Support: The Road Ahead.* Academic Press, 2007.

An overview of clinical decision support systems, and a discussion of challenges to their advancement.

[Joa98] Thorsten Joachims. Text categorization with suport vector machines: Learning with many relevant features. In *Proceedings of the 10th European Conference on Machine Learning*, ECML '98, pages 137–142, London, UK, UK, 1998. Springer-Verlag.

Describes how SVMs work, explains why they are well-suited to text categorization, and applies them to a specific problem.

[KKG+99] Matjaz Kukar, Igor Kononenko, Ciril Groselj, Katarina Kralj, and Jure Fettich. Analysing and improving the diagnosis of ischaemic heart disease with machine learning. *Artificial Intelligence in Medicine*, pages 25–50, 1999.

Collects data on ischemic heart disease consisting of signs and symptoms, ECG, and scintigraphy. Applies Naive Bayes, neural networks, k-nearest neighbors, and two decision tree algorithms, and compares these to clinicians' diagnoses. Naive Bayes has the best sensitivity (recall), whereas clinicians, followed by neural nets, have the highest specificity.

[Kon01] Igor Kononenko. Machine learning for medical diagnosis: history, state of the art and perspective. *Artificial Intelligence in Medicine*, 23:89–109, 2001.

Describes the history of machine learning for medical diagnosis with an emphasis on Naive Bayes, neural networks, and decision trees. Emphasizes the need for ML algorithms in this domain to be able to handle noisy and missing data, rely on relatively few medical tests, and complement the role of physicians. Seven

ML algorithms are evaluated on several criteria in general, as well as when applied to ischemic heart disease diagnosis.

[Moo01] George B. Moody. The impact of the mit-bih arrhythmia database. *Engineering in Medicine and Biology Magazine, IEEE*, 20(3):45–50, 2001.

Describes the MIT-BIH database which provides ECG recordings from 47 subjects. Also discusses other ECG databases including the AHA Database for Evaluation of Ventricular Arrhythmia Detectors and the European ST-T Database.

[MP43] W. S. McCulloch and W. Pitts. A logical calculus of the ideas immanent in nervous activity. *Bulletin of Mathematical Biophysics*, 5:115–133, 1943.

Describes an early artificial neuron model, strongly based on biological neurons. The artificial neuron receives several weighted inputs and produces an output, based on a threshold.

[MP69] M. Minsky and S. Papert. *Perceptrons*. Cambridge, MA: MIT Press, 1969.

Describes the perceptron model and demonstrates its weaknesses, including its inability to implement non-linearly separable functions such as XOR.

[MS12] Indrajit Mandal and N. Sairam. Accurate telemonitoring of parkinson's disease diagnosis using robust inference system. *International Journal of Medical Informatics*, 2012.

Provides an approach for Parkinson's disease diagnosis using speech tests. Applies logistic regression, Bayesian networks, neural networks, SVMs, AdaBoost, and ensemble methods.

[Pla98] John C. Platt. Sequential minimal optimization: A fast algorithm for training support vector machines. Technical report, Advances in Kernel Methods - Support Vector Learning, 1998.

Describes the SMO algorithm for faster training of SVMs.

[Pod12] V. Podgorolec. Analyzing eeg signals with machine learning for diagnosing alzheimer's disease. *Electronics and Electrical Engineering*, 18:61–64, 2012.

Uses a machine learning algorithm trained on EEG data to diagnose Alzheimer's disease.

[Ros58] Frank Rosenblatt. The perceptron: A probabilistic model for information storage and organization in the brain. *Psychological Review*, 65(6):386–408, 1958.

Describes a single-layer perceptron model with a learning rule.

[SK84] Dj Spiegelhalter and Rp Knilljones. Statistical and knowledge-based approaches to clinical decision-support. systems, with an application in gastroenterology. *Journal of the Royal Statistical Society, Series A: Statistics in Society*, 147:35–77, 1984.

Compares knowledge-based and statistical clinical decision support systems.

[TK01] S. Tong and D. Koller. Support vector machine active learning with applications to text classification. *Journal of Machine Learning Research*, 2:45–66, November 2001.

Describes a pool-based active learning model for SVMs which does not require a large set of labeled data. Applies this approach to a text classification problem.

[TLMR10] Athanasios Tsanas, Max A. Little, Patrick E. McSharry, and Lorraine O. Ramig. Accurate telemonitoring of parkinsons disease progression by noninvasive speech tests. *IEEE Transactions on Biomedical Engineering*, 57(4):884–893, 2010.

Proposes monitoring Parkinson's disease using speech tests, due to vocal impairment being a common symptom and early indicator. The test results are passed through signal processing algorithms and a classification and regression tree to predict a rating on the unified PD rating scale.

[YC96] R.H. Yap and D.M. Clarke. An expert system for psychiatric diagnosis using the dsm-iii-r, dsm-iv and icd-10 classifications. In *AMIA Annual Symposium Proceedings Archive*, 1996.

Describes a system for diagnosis of mental health disorders using constraint-based reasoning and user input.