

# An adaptive genetic algorithm for selection of blood-based biomarkers for prediction of Alzheimer's disease progression

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## Abstract

**Background:** Alzheimer's disease is a multifactorial disorder that may be diagnosed earlier using a combination of tests rather than any single test. Search algorithms and optimization techniques in combination with model evaluation techniques have been used previously to perform the selection of suitable feature sets. Previously we successfully applied GA with LR to neuropsychological data contained within the The Australian Imaging, Biomarkers and Lifestyle (AIBL) study of aging, to select cognitive tests for prediction of progression of AD. This research addresses an Adaptive Genetic Algorithm (AGA) in combination with LR for identifying the best biomarker combination for prediction of the progression to AD. **Results:** The model has been explored in terms of parameter optimization to predict conversion from healthy stage to AD with high accuracy. Several feature sets were selected - the resulting prediction models showed higher area under the ROC values (0.83-0.89). The results has shown consistency with some of the medical research reported in literature. **Conclusion:** The AGA has proven useful in selecting the best combination of biomarkers for prediction of AD progression. The algorithm presented here is generic and can be extended to other data sets generated in projects that seek to identify combination of biomarkers or other features that are predictive of disease onset or progression.

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