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# Brain Emotional Learning-Inspired Models

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## Abstract

In this thesis the mammalian nervous system and mammalian brain have been used as inspiration to develop a computational intelligence model based on the neural structure of fear conditioning and to extend the structure of the previous proposed amygdala-orbitofrontal model. The proposed model can be seen as a framework for developing general computational intelligence based on the emotional system instead of traditional models on the rational system of the human brain. The suggested model can be considered a new data driven model and is referred to as the brain emotional learning-inspired model (BELIM). Structurally, a BELIM consists of four main parts to mimic those parts of the brain's emotional system that are responsible for activating the fear response. In this thesis the model is initially investigated for prediction and classification. The performance has been evaluated using various benchmark data sets from prediction applications, e.g. sunspot numbers from solar activity prediction, auroral electroject (AE) index from geomagnetic storms prediction and Henon map, Lorenz time series. In most of these cases, the model was tested for both long-term and short-term prediction. The performance of BELIM has also been evaluated for classification, by classifying binary and multiclass benchmark data sets.