

ABSTRACT

This work investigates a novel detection method based on Artificial Immune Systems, specifically on a self/non-self recognition technique called negative selection algorithm (NSA). A representation scheme based on hyperspheres with variable center and radius and a model that is able to generate detectors, based on that representation scheme, have been used. This model employs Genetic Algorithms where each chromosome gene represents an index to a point in a quasi-random distribution, which serves as a detector center, and a decoder function that determines the appropriate radius. The chromosome fitness is given by an estimation of the covered volume, which is calculated through a Monte Carlo integral. This algorithm had its performance evaluated for different dimensions, and more suitable genetic operators for the used representation, techniques of reducing self-points number and a pre-processing method based on bitmap time series have been therefore implemented. Evaluations with synthetic data and experiments with real data demonstrate the performance of the proposed algorithm and the decrease in execution time.

Keywords: Artificial Immune Systems. Negative Selection. Novelty Detection