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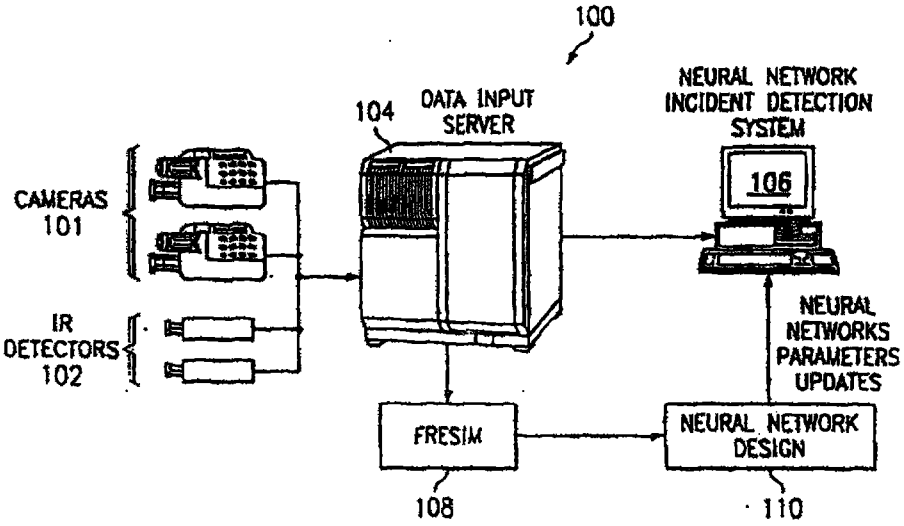
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(54) Title: AUTOMATIC FREEWAY INCIDENT DETECTION SYSTEM USING ARTIFICIAL NEURAL NETWORKS AND GENETIC ALGORITHMS



(57) Abstract

Design of a neural network for automatic detection of incidents on a freeway is described. A neural network is trained using a combination of both back-propagation and genetic algorithm-based methods for optimizing the design of the neural network. The back-propagation and genetic algorithm work together in a collaborative manner in the neural network design. The training starts with incremental learning based on the instantaneous error and the global total error is accumulated for batch updating at the end of the training data being presented to the neural network. The genetic algorithm directly evaluates the performance of multiple sets of neural networks in parallel and then use the analyzed results to breed new neural networks that tend to be better suited to the problems at hand.