

## Abstract

Neural Networks (NN) are important data mining tools used for classification and clustering. It is an attempt to build machines that can mimic brain activities and be able to learn. NN usually learns by examples. If a NN is supplied with enough examples, it should be able to perform classification and even discover new trends or patterns in data. Basic NN are composed of three layers - input, output and hidden layers. Each layer can have a number of nodes and nodes from the input layer are connected to the nodes of the hidden layer. Nodes from hidden layer are connected to the nodes from output layer. Those connections represent weights between nodes. This paper describes one of most popular NN algorithms, the Backpropagation (BP) Algorithm. The aim is to enhance this algorithm to make it more efficient in terms of speed and accuracy in training by applying new methods in weight adjustment and adding new variables and functions to regularize weight update and to improve the error rate detection to produce more reliable outputs. The idea behind BP algorithm is quite simple: output of the NN is evaluated against the desired output. If the results are not satisfactory, the connection (weights) between layers are modified and the process is repeated until the error margin is small enough. Simple BP examples are demonstrated in this paper with NN architecture also covered. The algorithm will also be applied to an Intelligent Personal Assistant Development Platform that can be used by developers and enthusiasts alike to develop their own smart agents. The platform will provide users the core components of an IPA: Speech to Text, Intent Recognition and Text to Speech, and at the same time serve as a medium for seamless integration of web services and as a conduit for devices in the ever-growing Internet of Things.