Langmuir probes are used on our faculty to measure current-voltage characteristics of low-temperature weakly ionized plasma. From these measurements an electron temperature and an electron number density are obtained. Classical method of doing that is based on the linear least squares fitting. In this thesis we use neural networks as an alternative method of determining the plasma parameters. We train a feedforward neural network with a help of a stochastic gradient descent and a backpropagation algorithms together with a training data based on an analytical model the characteristic. We study network's accuracy, robustness and computational resources demands, all compared with the classical methods.