

Use of Artificial Neural Networks for projection of Population of India

Pandurang Thatkar¹, J. P. Tonde² and Vikas N. Mahandule²

Abstract- Today India is having second largest population in the world and in recent decades it will be on top in the world. Population censuses provide us with the total number of peoples, age-sex distribution, marital status, distribution as well as characteristics of population as enumerated on the census data. Generally, the censuses are conducted once in a decade. In a few countries, censuses are conducted once in a five years. So population totals and other characteristics are available only for one time in five or ten years. However, in many situations, government as well as non-governmental agencies requires population totals or population in specific age-sex group for any time, either for the past dates or for any future dates. This research focuses on population estimates on past and future dates using artificial neural networks. Present study develops a Multilayer Perceptron Model with Generalized Delta Learning to predict the population of India and the prediction has been found sufficiently accurate. The prediction is better as compared to traditional interpolation techniques.

Key Words – Behavioral evolution, evolutionary artificial neural networks, evolutionary programming, module combination, population-based learning. Population of India. Male population, female population, total fertility rate, life expectancy, prediction, chaos.

1 INTRODUCTION:

Each year India adds more people to the world's population than any other country. Indian population trend is complex attributable to various reasons. The reasons can be summarized as follows:

- Fertility rate has declined but the number of women in their reproductive age has increased rapidly
- States of India vary significantly with respect to fertility, mortality and contraceptive use.
- Since independence, average life expectancy has increased substantially
- Infant mortality rate has decreased over the years since independence
- India is facing increased rate of HIV and other sexually transmitted disease cases like other developing countries

2 NEURAL NETWORK:

Neural network theory grew out of Artificial Intelligence research, of the research in designing machines with cognitive ability. A neural network is a computer program or hardwired machine that is designed to learn in a manner similar to the human brain. Haykin (1994) describes neural networks as an adaptive machine or more specifically: A neural network is a massively parallel distributed processor that has a natural propensity for storing experiential knowledge and making it available for use. It resembles the brain in two respects: Knowledge is acquired by the network through a learning process and interneuron connection strengths known as synaptic weights are used to store the knowledge. The basic building block of a brain and the neural network is the neuron. The basic human neuron adapted from Beale and Jackson (1990) is shown below in Figure 1.

Mr. Pandurang Thatkar, Statistician cum Assistant Professor, MGM Medical College, Kamothe, Navi Mumbai, Mr. J. P. Tonde, & Mr. Vikas N. Mahandule, Assistant Professor of Computer Science, MIT Arts Commerce Science College, Alandi (D), Pune