

Chapter 7

Self-Learning System for Child Development Using Conversational AI and Natural Language Processing (NLP)

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ABSTRACT

Education and learning are the most important aspects of the evolution of societies. They have been a favorite subject for philosophers and psychologists to work upon. Same questions are now being re-dealt by computer scientists in current scenarios. Although evolution is a continuous process, the pace of evolution is not a linear graph. Children acquire a huge amount of knowledge with very little input from teachers, friends, parents, and surroundings. Understanding how human brain works and more precisely, how the child brain actually functions is opening the path of researches in artificial intelligence (AI).

INTRODUCTION

Several researchers and companies are working intensely on machine learning and related applications. They worked to realize robots as partners for people (T. Kanda et al. 2004). The concept of a partner robot is really emerging as favorite topic of research for data scientists. These are visually human like robots equipped with human like skeleton body and various sensors used to interact with people in possibly most natural way. This way the partner robots imitate as a peer for day to day life.

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Artificial Intelligence (AI) scientists (Sakagami et al. 2002) elaborated on use of humanoid robots in the field of hotel industry, office visitors, hospitals etc. to do human like interactions with visitors arriving and needing guidance. It is more to replace the front office today or “May I help you desk?”. It interacts not only with speech but also through eye contacts, hand gestures etc. But these humanoids are with very limited capabilities or with limited intelligence.

Current discussion is next level of advancement in the sense to have trained machines with real child like learnings in different environments. Later these learned machines become capable of propagating the learning they got in most natural way to peer children. Based on the activities and speeches of human children robot will decide exhibiting the suitable aged behavior. Final aim of the research discussion is to develop humanoid child intelligent robot. However, in the first phase of the discussion will focus only on the intelligent software module. This software module will be equipped for speech recognition and scene recognition capabilities which will help to train the system with these as training data. In this phase, of development the system will be a software which will interact with child through a computer or tab like screen with suitable dummy photo. Once, building blocks are read, the final development can be extended. Training of the system would be done by neural networks using deep learning algorithms.

CONVERSATIONAL AI AND SERVICE ROBOTS

Going through the available literature around the subject, several works have been done in the field of Artificial Intelligence (AI). In year 2002 NEC Corporation has done a prototype personal robot. Trained and equipped to deploy in a specific family. It had the capabilities to recognize faces of family members, greets and entertains family members. It does some personal works of family members, set TV channels suitable to individual's interest. In the same year (Dautenhahn and Werry, 2002) robots were used to treat people with developmental disorders, so a kind of robotic autism therapy. With this in place now many at times robots start to work as partner and participating as agent in human society. They perform several functions which human partners are expecting to their robot partner.

There are researches where robots are used not only to teach students but also entered to the next levels. That is robots acting as teacher for teachers with the concept of train the trainers. Human and computer interaction is consistently the most important factor. Specially in robot-based learning, it plays a crucial role in learning. Turing test determines the degree of machine response imitating human, and to distinguish robots from human two main functions were suggested by (Sakagami et al. 2002). These two functions are Mobility and Human Robot Interaction (HRI).

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