

Impact of Machine Learning in Natural Language Processing: A Review

Tatwadarshi P. Nagarhalli
PhD Research Scholar,
Comp. Engg., Shri JJT University
Rajasthan, India
tatwadarshipn@gmail.com

Dr. Vinod Vaze
Dept. of Computer Sci & Engg.
Shri JJT University
Rajasthan, India
vinod.vaze@gmail.com

Dr. N. K. Rana
Principal
Theem College of Engineering
Mumbai, India
ranank@rediffmail.com

Abstract – The recent times have seen unprecedented growth in research and development in the field of Artificial Intelligence and its allied fields, subfields, like Machine Learning, Deep Learning and Natural Language Processing. The new found excitement in these fields of research is the availability of high powered computing devices at a cheaper costs and the wide range of applications of these research fields. It can be safely said that in the present times there are hardly any sectors of businesses which have not been positively impacted by artificial intelligence or its subfields.

Machine learning and deep learning, apart from having a positive impact on different sectors of businesses, machine learning and deep learning have also played a very important role in improving the efficiency of other subfields of artificial intelligence, including computer vision and natural language processing.

Natural Language Processing is the ability of computer systems to understand human languages, which is a difficult task where these learning techniques has played a very important role in proper analysis. The paper proposes to highlight this important role played by the learning techniques in improving the efficiency of natural language processing.

Keywords – Machine Learning, Deep Learning, Natural Language Processing, Artificial Intelligence, and Word Sense Disambiguation.

I. INTRODUCTION

The advancements witnessed in the computer hardware industry in the recent decades have been unprecedented. The advancements in hardware technology and the availability of very high performance computing device has helped the research and the development of advance computer software systems. One of the field which has thrived on this availability of high performance computing systems is Artificial Intelligence. As a matter of fact, now a days even the mobile devices come equipped with dedicated artificial intelligence chips [1].

Defining artificial intelligence is a very tricky task. The reason for this is the word 'intelligence', it has been defined and interpreted differently by different authors. Some define it as the ability of the machines or a computer to work better than the humans [2]. Others define it as a branch of computer science which deals with automation of intelligent behaviour [3]. At the very basic level it can be said that artificial

intelligence's endeavour is to enable machines to make smart and informed decisions [4].

Artificial intelligence works through the intelligent agent. Intelligent agent is a largely autonomous entity which performs in such a way that it can maximise its defined goals [4]. Generally, an artificial intelligence system is a collection of many such intelligent agents. These agents perceive or collect information from the environment through sensors. This information is analysed by these intelligent agents and a decision is reached. These informed decisions are then executed on the environment through actuators. Figure 1 shows the general working of an intelligent agent.

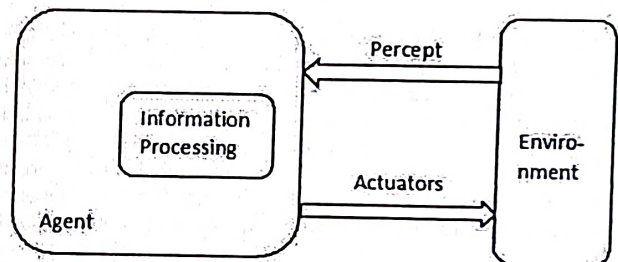


Figure 1: Intelligent Agent

There are three important components in an intelligent agent, perceiving, processing of information and acting on the environment. Many subfields of artificial intelligence have taken birth, or in other words it can said that many subfields of artificial intelligence strive to make these three components of intelligent agent better. Subfields of artificial intelligence like Computer Vision and Natural Language Processing strive to make information collection as intuitive and informational as possible. Whereas, the subfields like Machine Learning and Deep Learning help in making the agent process information in an informed manner, so that the decisions taken are as accurate as possible. Deep learning is a specialisation and subset of machine learning. So, whenever the term machine learning has been used it implies both machine learning and deep learning techniques. On the other hand another subfield of artificial intelligence, Robotics and the allied fields helps the agent act on the environment in an accurate way. It can also be said that the field of natural language processing provides a

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