Chapter 23
An Insight Into Deep Learning Architectures

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ABSTRACT

Information retrieval can be visualized as the extraction of the desired information from the flooded resources that spread over world wide web. Image retrieval is the fundamental and critical problem that arises in the retrieval activities. In this regard, it is considered to be a challenging task which requires utmost care. Diverse characteristics of data such as noisy, heterogeneity impose a great barrier over image retrieval applications. This chapter aims to come up with a state-of-the-art approach for overcoming these problems by clubbing together widely recognized deep architecture along with natural language processing. This novel design methodology utilizes the latent query features, deep belief network, restricted Boltzmann machine for learning tasks. This collaborative work can be used to reduce the epoch in the learning periods whereas the rest of the methods fail to achieve the constraints.

INTRODUCTION

For molding the world to incredible amplitude, appropriate learning of computers has inevitable participation. This ability of the computer of deploying the world can be referred as intelligence. For making a machine intelligent, it has to go through a series of training processes where the information is stored in an organized way making it easier to relate the so gathered information with the real life scenarios. Storing all the information in the machine manually is a troublesome task, especially when the information is abundant like in the case of sophisticated artificial intelligence tasks. This is why the learning algorithms have gained attention among researches to store huge information at a stretch. Many learn-

ing algorithms are established and capable of understanding the view, but failed to express efficiently in natural language. Semantic understanding of these algorithms was restricted by some degree which is the necessity and should be expanded. So it was figured out that the prior algorithms were incapable of maintaining the interaction towards the humans through various semantic and visual mediums. To resolve this problem of AI task, Deep architectures were introduced, so that the machines can be trained and can be made efficient in the areas they are lacking.

Information retrieval have widely classified into two subdivisions: image retrieval and the text retrieval (A.G. Abby, 2000). Both approaches were emerged in the mid 60-70's. In order to carry out the several tasks like indexing, searching and retrieval data has to be well organized. In this work, the focus is on the image retrieval perspective. Image retrieval is divided into query or text based and content based approach (P.A. Vikhar, 2010). Our investigation is centralized around the first methodology .Text based image retrieval is basic and fundamental one which makes use of searching through simple query word (T.Westrveld,, J.C Gemert,., R. Cornacchia,, D Hiemstra., A. P. Vries 2005). Earlier work to this text based approach was database management systems which binds the images with text. Multi-dimensional indexing, data modeling and query evaluation are the exemplary research lines. But the fore mentioned procedures turned out ineffectual for the complex data link structures, language pairs, sophisticated image data characteristics, question answering, annotation and context retrieval. These made a way to design a new approach that addresses the various issues.

The basic question found out while natural language processing is " Is there exists any analog program loaded in computer which converts a portion of textual data represented in English into a computer understandable data model that clearly depict the actual text meaning?" . While taking care of this problem, computer specialists have to get down for fewer objectives that represent lesser aspects of text data. Natural language processing is a flexible architecture which focuses on learning representations useful for the specific tasks. The NLP had evolved in a way for seeking a model which converts human understandable language (English in the beginning) into a machine friendly data representation that conveys the meaning of text without any ambiguity. The earlier times the evolutionary idea behind the NLP seemed to be very broad and vast for the researchers so they settled down for lesser goals of representing limited textual information by extracting simpler representations. Text processing in natural language processing encompasses by bag-of-words, removal of frequent words from the input text query (stop words), identifying the root words (stemming), spell check, text and controlled vocabulary mapping and named entity recognition.

BACKGROUND

The concept of neural networks derived from the human nervous system by the way of answering to a question which seems to be simple yet more complex while approaching "can a computer mimic the human nervous system?". Human brain is highly complex nonlinear parallel computer. Structural constituents of human brain are known as neurons which are interconnected in complex way (Lee, T.S.,, Mumford, D.2003). The task of recognition through a neural network achieved by teaching the computer what to do in each and every step with a set of pre-defined procedures that is it is more like if a computer has to identify a photograph first it has to be taught by feeding various photographs then it go for a matching with the original photograph with the ones which it stores in the large database repository. It gives out the picture which carries a best resemblance with original one. While answering to the question another

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