A Summary of Literature Review: Convolutional Neural Networks

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Abstract **- Convolutional neural networks (CNNs) used for the extraction of information from different kind of datasets of different dimensions. Nowadays, deep learning is using in the wide range of fields. In deep learning, Usually in deep learning systems, Convolutional Neural Networks(CNN) give more accurate results in solving high end systematic problems in all the engineering fields such as wireless communications, medical signal processing , biomedical applications. On this paper a brief review over the basic concepts of CNN applications is presented.**

Index Terms **– Artificial Intelligence, Convolutional Neural Networks, Machine Learning.**

INTRODUCTION

John McCarthy introduced the term Artificial intelligence initially in 1956 and defined it as " The science and engineering of making intelligent machines, especially intelligent computer programs " , the intelligence mentioned here is the computational part of the ability to achieve goals in the world [1].On considering the recent period of time, The applications which are using the Artificial intelligence is rapidly growing. Also the fields related to AI, such as machine learning , natural language processing, image processing and data mining [2].Tom M. Mitchell defined as " Machine learning is the study of computer algorithms that allow computer programs to automatically improve through experience" where the machine language is a subset of AI [3].Where the Deep Learning algorithms are the subsets of Machine Learning which involve learning representations to enable building complex concepts out of simpler ones [4].

Convolutional Neural Network (CNN) is a kind of Neural Networks which used to capture the attention beyond the academia and it shows good performance in several competitions related to Computer vision and Image Processing [5].The major applications of CNN are Image classification and segmentation, Object detection, Video Processing and Speech recognition. Because CNN is considered as the Best learning algorithms for understanding image content and it have high accuracy in image segmentation, classification as well as detection [6].The internationally acclaimed companies like Google, Microsoft, AT&T NEC and Facebook developed already some research groups for exploring new architectures of CNN [7]. Nowadays, The most of the image processing as well as computer vision (CV) competitors are working with Deep CNN based models [8].

APPLICATIONS OF CNNS

CNNs successfully applied to different kind of machine learning tasks such as recognition, object detection, classification, regression, segmentation etc., [9,10]. Some of the application are included below.

NATURAL LANGUAGE PROCESSING (NLP)

Convolutional Neural Networks are applying in the field of Computer Vision. It is useful for natural language processing [11].CNN models gives great results in text categorization, semantic parsing [12], search query retrieval[13], sentence modeling[14] and classification [15], prediction [16], text categorization[17] and also diversified traditional natural language processing jobs[11].

CNN BASED COMPUTER VISION AND RELATED APPLICATIONS

Computer Vision (CV) focused on improving an artificial system that can process the any type of visual data which can understand and extract useful information from it [8].CV provides many application like face recognition, pose estimation, activity recognition etc.

It is very difficult to detect face from distorted images in the C.V Proposed Deep CNN enable the system to identify from occluded faces [18].While considering the work of Zhang et al who performed face detection using a new type of multitasking cascaded CNN resulted good comparing with state of the art technique [20].Action recognition is an important area of activity recognition but it vulnerable to many difficulties as well. Experimental results proved that Wang's technique outperforms other activity based techniques [21, 22]. Thus another three dimensional CNN based action recognition system is proposed by et al [23].

CNN BASED IMAGE CLASSIFICATION

CNN also using for image classification [25].One of the best application of CNN is in medical Images, mainly for the diagnosis of cancer using the histo pathological images [26].CNN systems is recently used by Spanhol et al. for the diagnosis of breast cancer images and results are compared against a network trained on a data set containing handcrafted descriptors [27].

CHALLENGES

Deep CNNs have achieved good performance on data that either is of the time series nature or follows a grid-like topology. However, there are also some other challenges, where optimization algorithms which should be applied to achieve comprehensive and reliable results for a developed visualization models.

CNN achieved good performance on data that is in the time series as well as grid-like topology. Some of the challenges faced are optimization algorithms should be applied to achieve comprehensive and reliable results for a developed visualization models.

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