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Deep Multi-Stream CNN to Learn a Deep Powerful Representation for Recognizing Writers

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ABSTRACT: Deep learning method called CNN for the handwritten Arabic pattern digit recognition. They performed their study on 45,000 samples. Deep CNN was used for the classification and proved to give more accurate results, i.e. 95.7% for the Arabic hand- written digit recognition. It took local handwritten patches as the input followed by training using the softmax classification loss. They designed and optimized multi stream structure with data augmentation learning and hence improved the performance of DeepWriter. For handling variable length text images, they created DeepWriter, a deep multi-stream CNN to learn a deep powerful representation for recognizing writers.

KEYWORDS: deep learning, CNN, recognition

I. INTRODUCTION

[2] presented a new method in which deep learning methods are used for the plant classification. It helps the botanists to identify the species very accurately and quickly. From raw representations of the leaf data, they extracted useful leaf features using CNN and Deep Networks. After their extensive study, they were able to extract hybrid feature extraction models that help in improving the discriminant capabilities of the plant classification system.

- Radio Wireless Networks

[4] proposed a method to increase the forecasting accuracies of licensed users in spectrum channels. The model was based on the long term short memory (LSTM) recurrent neural network. Results of the experiment proved that the accuracies achieved by LSTM outperformed the multi-layer perceptron network and adaptive neuro fuzzy inference systems. The method also allowed the implementation of the method in cognitive network with centralized physical topologies. [5]presented a framework for the spectrum prediction by taking two spectrum datasets of the real world. They employed Taguchi method for the determination of the optimized configuration and channel occupancy states of neural network, then they built LSTM for the spectrum prediction with perspectives like regression and the classification. In case of the second dataset, for the channel quality, they compared the prediction performance of MLP and LSTM. Results of the experiment proved that with the frequency bands, prediction performance varies. LSTM worked better in terms of stability and prediction with the classification aspect as compared to when taking both the regression and classification.

[6] put forward a systematic survey of the upbringing studies based on the deep learning based physical layer processing, redesigning of a module for the communicational system with the auto encoder. The new architecture of deep learning proved promising performance with excel- lent capacity and good optimization, for the communication and implementation.

- Remote Sensing

Deep learning techniques and deep nets have been successfully used in remote sensing applications in the physical models. These are complicated, nonlinear and difficult to understand and generalize. [8] proposed a technique of deep learning in remote sensing application for not only improving the volume and completeness of training data for any remote sensing datasets, but also uses the datasets to skill out convolutional neural network. The proposed method used three operations, which are the flipping, translation, and rotation to generate augmented data and produced a more descriptive deep model. The proposed method also introduced basic data augmentation operations to solve the data limitation problem for remote sensing image processing and contributed with potentially revolutionary changes in remote sensing scene classification. The results of the experiment significantly contributed and improved the diversity

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of the dataset in remote sensing. These also increased visual variability of each training in the remote sensing image by taking the intrinsic spectral and topological constraints and did not generate new information for the remote sensing image. [9] used deep neural nets that put in front of the users, the various opportunities for novel areas such as supervising global changes or finding out the strategies for the decreasing the resource consumption. Deep net- work has always been an incredible and challenged toolbox that assists researchers in the field of remote sensing to cross the boundaries and manipulate large-scale, real-life problems with implied models. They analyzed large scale remote sensing data by considering multi-modal, multi- aspect, geo located and multi-temporal aspects.

- Semantic Image Segmentation

[11] made efforts to put forward a semantic image segmentation problem with the facilities of deep neural network. The study presented three main contributions to the area. First they worked on convolution with up sampled filters that help to maintain the resolution. For the prediction task, responses from the features are calculated with convolution neural network. They did not enhance the amount of computation and effectively enlarged the view of filters. Then they proposed Atrous Spatial Pyramid Pooling (ASPP) system for the segmentation at the multiple scales. It can act as a convolutional feature layer by using filters at the multiple sampling rates and capturing objects and images at multiple scales. Then the localities of the object boundaries were integrated with the procedures for the deep convolutional networks and probabilistic models. The experiment reached the invariance with the localization accuracy with both quantitative and qualitative improvements. The dataset used by the team were PASCAL- Context, PASCAL Person-Part and the CitySpaces.

- Social Applications

Deep learning techniques are widely used for the sentiment analysis. [14] proposed a deep learning technique with surface approaches and is based upon the manually extracted features. For this experiment, they designed a deep learning based sentiment classifier that is dependent on the word embedding architecture and a linear machine learning method. Results can be compared using the classifier. Then they developed two ensemble techniques and two models that were responsible for combining the baseline classifier and the surface classifiers. They employed total 7 public datasets that were extracted from the micro blogging. They proved that performance of these models was really remarkable.

- Speech Recognition

[16] proposed a novel method and used DBNs for acoustic modeling. They used standard TIMIT dataset with a phone error rate (PER) of 23.0%. They used back propagation algorithm with the network and called BP- DBN and the associative memory DBN called as AM-DBN architecture. The effect of depth of the model and the size of the hidden layer were investigated and different techniques, were adopted to reduce over fitting. Bottlenecks in the last layer of the BP-DBN also helped in avoiding the over fit- ting. The discriminative and hybrid generative training also contributed in preventing the over fitting in the associative memory DBN. The results given by the architecture of DBN have recorded as the best in comparison with the other. The experiment was performed on the TIMIT corpus and used 1 with 462 speaker training set. Total 50 speakers were used for model tuning and the results were shown using the 24-speaker core test set. The speech was understood using a 25-ms hamming window with 10-ms between the left edges of successive frames. For all experiments, the Viterbi decoder parameters were optimized on the development set and to compute the phone error rate (PER) for the test set.

[18] presented an approach which used deep neural network (DNN) and Hidden Markov Model (HMM) for the speech recognition. They used Convolutional Neural Network models by updating speaker code based adaptation method that would be better for CNN structure. [22] proposed a novel utilization of deep neural networks in audio visual speech recognition. It is used specially in the cases when the quality of audio is damaged by the noise. Under diverse conditions, deep neural networks are able to extract latent and robust features. Their work involved connectionist Hidden Markov Model for the noised audio visual speech recognition system. By employ- ing auto-encoders and the CNN, they were able to achieve 65% word recognition rate under 10 decibel signal to noise ratio. [24] proposed a method for statistical para- metric speech synthesis (SPSS) by considering adaptability and controllability with a change in speaker characteristics and speaking style. They conducted an experiment for the speaker adaptation for speech synthesis with DNN and at diverse levels. For the input, they took the low dimensional speaker specific vectors with the linguistic features which would represent the speaker identity. The model systematically analyzed the various adaptation techniques. They also found that feature transformation at the output layer worked well and the adaptation performance can be improved by combining with model based adaptation. [28] also presented a deep learning model with Hidden Markov Model (HMM) to construct a speech recognition system with a heterogeneous group of speakers. They used DNN and vocal tract length normalization (VTLM) for the experiment. First they separately performed the

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experiment and then hybrid approach was used. Combination of approaches proved the improvement in the baseline phone error rate by 30 to 35% and baseline word error rate by 10%.

[29] presented an adaptation scheme with the deep neural network. Here discriminating cods were used which are directly fed to the pre trained DNN through connection weight. They also proposed many training methods to learn connection codes as well as the adaptation methods for every test condition. They used three methods to use the adaptation scheme based on the codes. Three ways were nonlinear feature normalization in feature space, direct model adaptation of DNN based on speaker codes and last one was joint speaker adaptive training with speaker codes. They checked the proposed method with two standard speech recognition tasks and from these two, one was TIMIT phone recognition and the other was large vocabulary speech recognition in the Switchboard task. Results proved that all three methods were quite effective with 8 to 10% of error reduction. [30] presented a method in which the team selected DNN in automatic Russian speech recognition. They used CNN, LSTM and RCNN for their experiment. For the dataset, they used extremely large vocabulary of Russian speech and got remarkable results with 7.5% reduction in word error rate

II. CONCLUSION

Experimental results proved very good in terms of performance and accuracies. Experimental results clearly showed that the adaptability and listening tests of DNN generated better adaptation performance than the hidden Markov model (HMM). The method also proved that the feature transformation done at the output layer were also worked well.

REFERENCES

1. Anitha Eemani, “A Comprehensive Study on Relocating the Learning Knowledge”, International Journal Of Multidisciplinary Research In Science, Engineering and Technology (IJMRSET), Volume 2, Issue 7, July 2019
2. Anitha Eemani, “A Comprehensive Review on The History of Wireless Networks”, International Journal of Scientific Research in Science and Technology, Volume 7, Issue 4, July-August 2020
3. Anitha Eemani, “Future Trends, Current Developments in Network Security and Need for Key Management in Cloud”, International Journal of Innovative Research in Computer and Communication Engineering, Vol. 6, Issue 10, October 2018
4. Anitha Eemani, “PNC Architecture of Security Services”, Journal of Advances and Scholarly Researches in Allied Education, Vol. 13, Issue No. 2, July-2017
5. Anitha Eemani, “A Study on The Usage of Deep Learning in Artificial Intelligence and Big Data”, International Journal of Scientific Research in Computer Science, Engineering and Information Technology (IJSRCSEIT), Volume 5, Issue 6, November-December 2019.
6. Anitha Eemani, “Benefits of Wireless Data Services and Wireless Technologies”, International Journal of Physical Education and Sports Sciences, Vol. 14, Issue No. 01, January-2019
7. Anitha Eemani, “A Study on Encryption and Confidentiality in WLAN”, International Journal of Advanced Research in Electrical, Electronics and Instrumentation Engineering (IJAREEIE), Volume 9, Issue 11, November 2020
8. Anitha Eemani, “A Comprehensive Review on Network Security Tools”, Journal of Advances in Science and Technology, Vol. 11, Issue No. 22, May-2016
9. Anitha Eemani, “Achieving Network Security and Security Mechanisms at Networking Layers”, International Journal of Information Technology and Management”, Vol. 11, Issue No. 17, November-2016
10. Anitha Eemani, “Network Optimization and Evolution to Bigdata Analytics Techniques”, International Journal of Innovative Research in Science, Engineering and Technology, Vol. 8, Issue 1, January 2019
11. Bhagya Rekha Kalukurthi, “Risk Analysis of Putting Attacks into Perspective and Conducting a Vulnerability Assessment”, International Journal of Scientific Research & Engineering Trends, Volume 7, Issue 1, Jan-Feb-2021.
12. Bhagya Rekha Kalukurthi, “A Comprehensive Review on Machine Learning and Deep Learning”, International Journal of Advanced Research in Electrical, Electronics and Instrumentation Engineering, Vol. 8, Issue 6, June 2019
13. Bhagya Rekha Kalukurthi, “Regulatory Compliance and Supervision towards Artificial Intelligence”, International Journal of Innovative Research in Computer and Communication Engineering, Vol. 7, Issue 12, December 2019
14. Bhagya Rekha Kalukurthi, “A REVIEW ON THE KEY PROPERTIES OF DATA MINING”, Wutan Huatan Jisuan Jishu, Volume XIV, Issue IX, SEPTEMBER 2018
15. Bhagya Rekha Kalukurthi, “ IMPLEMENTATION OF BIG DATA ANALYTICS AND BIG DATAGOVERNANCE”, The International journal of analytical and experimental modal analysis, Volume VII, Issue I, May 2015
16. Bhagya Rekha Kalukurthi, “A Comprehensive Review on Challenges and Types of Big Data”, International Journal of Innovative Research in Science, Engineering and Technology, Vol. 7, Issue 1, January 2018

| ISSN: 2582-7219 | www.ijmrset.com | Impact Factor: 4.988

| Volume 4, Issue 5, May 2021 |

17. Bhagya Rekha Kalukurthi, "Big Data Classification and Methods of Data Mining, Big Data", International Journal of Scientific Research in Science, Engineering and Technology, Volume 3, Issue 5, July-August-2017
18. Bhagya Rekha Kalukurthi, "Security Vulnerabilities, Security Threats, and Advance Network Security Policies", Journal of Interdisciplinary Cycle Research, Volume VI, Issue I, Jan- June 2014
19. Bhagya Rekha Kalukurthi, "A Study on The Big Data Characteristics", International Journal of Scientific Research in Computer Science, Engineering and Information Technology, Volume 1, Issue 1, July-August 2016
20. Bhagya Rekha Kalukurthi, "A Comprehensive Overview on WLAN Security Exploits and WLAN Security for 802.11", "International Journal of Advanced Research in Electrical, Electronics and Instrumentation Engineering", Vol. 4, Issue 11, November 2015
21. Bhagya Rekha Kalukurthi, "Ml Platform Architecture and Components of Cloud-Based Ml Framework", "International Journal Of Multidisciplinary Research In Science, Engineering and Technology (IJMRSET)", Volume 3, Issue 6, June 2020
22. Bhagya Rekha Kalukurthi, "SOLVING MULTIPLE OPTIMIZATION PROBLEMS USING HADOOP AND THE ROLE OF BIG DATA ANALYTICS IN OPTICAL NETWORKS", The International journal of analytical and experimental modal analysis, Volume XIII, Issue I, January 2021
23. Bhagya Rekha Kalukurthi, "Data Mining Strategy for Discovering Intriguing Patterns and Challenges with Bigdata for Global Pulse Development", International Journal of Scientific Research in Science and Technology, Volume 3, Issue 3, March-April 2017
24. Malyadri. K, "Architecture and Components of Cloud-Based ML Framework", International Journal of Advanced Research in Electrical, Electronics and Instrumentation Engineering, Vol. 8, Issue 1, January 2019
25. Malyadri. K, "An Overview towards the Different Types of Security Attacks", International Journal of Innovative Research in Computer and Communication Engineering, Vol. 2, Issue 8, August 2014
26. Malyadri. K, "Security Threats, Security Vulnerabilities and Advance Network Security Policies", International Journal of Innovative Research in Science, Engineering and Technology, Vol. 2, Issue 9, September 2013
27. Malyadri. K, "Need for Key Management in Cloud and Comparison of Various Encryption Algorithm", International Journal of Scientific Research in Computer Science, Engineering and Information Technology , volume 1, issue 1, July-August 2016
28. Malyadri. K, "Cloud-Based Ml Framework Working with Analytic Tools", International Journal of Scientific Research in Science and Technology, Volume 6, Issue 6, November-December-2019
29. Malyadri. K, "Integration of Appropriate Analytic tools towards Mobile Technology Development", International Journal of Innovative Research in Computer and Communication Engineering, Vol. 6, Issue 6, June 2018
30. Malyadri. K,"A STUDY ON EXPERIENCES ANDLIMITATIONS OF MOBILE COMMUNICATION", Alochana Chakra Journal, Volume VI, Issue VIII, August 2017
31. Malyadri. K, PUSHPAVATHI MANNAVA, "A COMPREHENSIVE REVIEW ON MOBILE E-SERVICETECHNOLOGY", Alochana Chakra Journal, Volume IX, Issue II, February 2020
32. Malyadri. K,"CHALLENGES CONCERNING MOBILEDEVELOPMENT AND MODEL-DRIVEN DEVELOPMENT OF MOBILE APPS", Airo International Research Journal, volume XVI, Nov 2018
33. Malyadri. K, "Architectures and Needs in Advanced Wireless Technologies", International Journal for Scientific Research & Development, Vol. 8, Issue 7, 2020
34. Malyadri, N. Surya Teja, "Related technologies and the role of mobile app development life cycle", International Journal of Research and Applications, Volume 5, Issue 17, Jan-Mar 2018.
35. Malyadri K, Surya Teja N, "Key characteristics of mobile applications and trends in mobile app Industry", International Journal of Research and Applications, Volume 7, Issue 25, Jan-Mar 2020.
36. Rakesh Rojanala, "A STUDY ON BIG DATA-ORIENTED STREAM DATA MINING AND STREAMED DATA MANAGEMENT", The International journal of analytical and experimental modal analysis, Volume X, Issue III, March 2018
37. Rakesh Rojanala, "Algorithms, Models and Applications on Artificial Intelligence", International Journal of Scientific Research in Computer Science, Engineering and Information Technology (IJSRCSEIT) ", Volume 5, Issue 4, July-August 2019
38. Rakesh Rojanala, "Generic Working of an Artificial Neuron and Its Output Mathematical Representation", "International Journal of Innovative Research in Science, Engineering and Technology", Vol. 8, Issue 1, January 2019
39. Rakesh Rojanala, "An Overview of Intrusion Detection System and the Role of Data Mining in Information Security", "International Journal of Advanced Research in Electrical, Electronics and Instrumentation Engineering", Vol. 6, Issue 3, March 2017
40. Rakesh Rojanala, "Cloud-Based ML Framework Built Using Apache Ecosystem", "International Journal of Scientific Research in Science, Engineering and Technology", Volume 7, Issue 1, January-February 2020
41. Rakesh Rojanala, "AN OVERVIEW ON CLOUD COMPUTING MODELS AND CLOUD DELIVERY MODELS", The International journal of analytical and experimental modal analysis, VolumeIV, Issue I, JAN-JUNE 2012
42. Rakesh Rojanala, "Cloud Computing Characteristics and Deployment of Big Data Analytics in The Cloud", International Journal of Scientific Research in Science and Technology, Volume VIII, Issue II, March-April 2014

| ISSN: 2582-7219 | www.ijmrset.com | Impact Factor: 4.988

| Volume 4, Issue 5, May 2021 |

43. Rakesh Rojanala, "CLOUD COMPUTING ARCHITECTURAL FRAMEWORK", Journal of Interdisciplinary Cycle Research, Volume V, Issue I, Jan- June 2013
44. Rakesh Rojanala, "A COMPREHENSIVE STUDY ON THECHALLENGES OF STREAM DATA MINING AND BIG DATA-ORIENTED STREAM DATA MINING", The International journal of analytical and experimental modal analysis, Volume VII, Issue II, July-December 2015
45. Rakesh Rojanala, "Machine Learning: Intersection of Statistics and Computer Science", "International Journal of Innovative Research in Computer and Communication Engineering", Vol. 5, Issue 8, August 2017
46. Rakesh Rojanala, "Components of Data Mining and Big Data Analytics in Intra-Data Center Networks", "International Journal of Advanced Research in Electrical, Electronics and Instrumentation Engineering", Vol. 5, Issue 7, July 2016
47. Yeshwanth Valaboju, "IOT Communication Technologies and Future of Internet of Things", International Journal of Scientific Research in Computer Science, Engineering and Information Technology, Volume 2, Issue 6, November-December 2017
48. Yeshwanth Valaboju, "Design Models and Components of Artificial Intelligence", International Journal of Scientific Research in Science, Engineering and Technology, Volume 7, Issue 6, November-December 2020
49. Yeshwanth Valaboju, "A Study on Cryptosystem Types and Cryptographic Principles", "International Journal of Advanced Research in Electrical, Electronics and Instrumentation Engineering", Vol. 5, Issue 6, June 2016
50. Yeshwanth Valaboju, "Capabilities and Key Benefits of Sap NetWeaver Gateway", International Journal of Innovative Research in Computer and Communication Engineering, Vol. 7, Issue 1, January 2019
51. Yeshwanth Valaboju, "A COMPREHENSIVE STUDY ON IOT ARCHITECTURES AND IOT SECURITY", Parishodh Journal, Volume VIII, Issue X, October 2019
52. Yeshwanth Valaboju, "AN OVERVIEW ON THE TYPES OF PASSWORD AND DOS ATTACKS", Journal of Interdisciplinary Cycle Research, Volume IX, Issue XI, November 2018
53. Yeshwanth Valaboju, "A Study on SAP Fiori Apps and Fiori Design Principles", "International Journal of Innovative Research in Science, Engineering and Technology (IJIRSET)", Volume 9, Issue 6, June 2020
54. Yeshwanth Valaboju, "Routing and Vulnerabilities in MANETS", "International Journal Of Multidisciplinary Research In Science, Engineering and Technology (IJMRSET)", Volume 1, Issue 2, December 2018
55. ANUMANDLA MOUNIKA, "THREATS, OPPORTUNITIES OF THE CLOUD AND PROVISION OF APPLICATION SERVICES", JASC: Journal of Applied Science and Computations, Volume 2, Issue 1, Jan-June 2015
56. ANUMANDLA MOUNIKA, "DATA SECURITY IN THE CLOUD", The International journal of analytical and experimental modal analysis, Volume 1, Issue 4, July-December-2012
57. ANUMANDLA MOUNIKA, "CLOUD COMPUTING INFRASTRUCTURE AND CLOUD ADOPTION CHALLENGES", Journal of Interdisciplinary Cycle Research, Volume VI, Issue II, July-December 2014
58. ANUMANDLA MOUNIKA, "AN OVERVIEW ON THE ARCHITECTURAL COMPONENTS OF CLOUD", International Journal of Research, Volume 6, Issue 12, December 2017
59. ANUMANDLA MOUNIKA, "PROCESS OF MIGRATING INTO A CLOUD AND ISSUES IN CLOUD COMPUTING", Journal of Interdisciplinary Cycle Research, Volume 2, Issue 1, January-June-2010
60. ANUMANDLA MOUNIKA, "SECURITY AND PRIVACY ISSUE TOWARDS DATA SECURITY IN CLOUD COMPUTING", JASC: Journal of Applied Science and Computations, Volume 1, Issue 1, January-June 2014
61. ANUMANDLA MOUNIKA, "TECHNICAL BENEFITS AND ARCHITECTING CLOUD APPLICATIONS IN THE AWS CLOUD", Parishodh Journal, Volume VIII, Issue III, March-2019
62. ANUMANDLA MOUNIKA, "A STUDY ON CLOUD COMPUTING STRATEGY PLANNING AND SLA MANAGEMENT IN CLOUD", International Journal of Research, Volume 7, Issue VII, JULY 2018
63. ANUMANDLA MOUNIKA, "A REVIEW ON CLOUD COMPUTING PLATFORMS AND ENTERPRISE CLOUD COMPUTING PARADIGM", The International journal of analytical and experimental modal analysis, Volume III, Issue II, July-November-2011
64. ANUMANDLA MOUNIKA, "Developments of Intelligent Machines and the Current State of AI", International Journal Of Multidisciplinary Research In Science, Engineering and Technology, Volume 3, Issue 12, December 2020