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A Feature Interaction Model for High order dimensional data using Hopfield Network

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Puducherry.

ABSTRACT

Discovering Feature interaction in the high dimensional data is the most challenging task in the research area of feature selection. "A Feature Interaction Model for High order dimensional data using Hopfield network" is based on recurrent neural network approach for feature selection which performs feature interaction using Hopfield network in a cloud based environment. The proposed model consists of Feature Pattern Associator and Feature Pattern Interactor. The Feature Pattern Associator associates the given feature pattern with the pattern stored in cloud Feature Memory database using Feature Cue Collector and Feature Auto Associator. Feature Pattern Interactor intends to achieve high-order feature interaction. The Experimental results on the four AWS cloud medical databases show that a proposed Feature Interaction Model achieves feature interaction better than existing Feature Selection Models.



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A Comparative Study of Cloud Service Providers Services in Education

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Abstract

Advances in the rapid growing IT industry in the last several decades have led to convenient, cost effective and secured environment for Education. The cloud is a bridge from the desktop to a world of devices, from the average on-campus school day to remote services anywhere and anytime. Today's IT professionals in educational institutions need to respond quickly to increasing demands from students and faculty, while coping with fixed or declining budgets and staff. In this challenging environment, cloud-based computing has become an increasingly attractive option for delivering education services more securely and reliably. The major cloud service providers like Microsoft, Google identified the possibility of realizing paperless school and open the real Cloud era for educational environment. The paper defines clouds, explains the benefits of cloud computing in education as well as in the higher education, and outlines the services of the three major cloud service providers namely Microsoft, Google App, Salesforce.com. This paper also presents a comparative study of these service providers services based on the different parameters like interoperability, cost, security, and data sharing.

Key words: Cloud Computing, Higher Education, Microsoft, Google Apps, Salesforce.com

1) Introduction

Every school, college or university has its own specific needs and implementation preferences. In order to satisfy the needs of this heterogeneous environment, a wide range of solutions and services are provided in the cloud environment. In a cloud computing environment, the entire data reside over a set of networked resources, enabling the data to be accessed through virtual machines which eliminate the requirements for setting up of high cost computing infrastructure for the IT-based solutions and services that the industry uses. A Working Definition of Cloud Computing from Mell [1] of NIST is as follows: *Cloud computing is a model for enabling convenient, on-demand network access to a shared pool of configurable computing resources (e.g., networks, servers, storage, applications, and services) that can be rapidly provisioned and released with minimal management effort or service provider interaction.* This cloud model promotes availability and is defined in terms of i) essential characteristics, ii) Deployment models and iii) Service models.

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EDITORIAL NOTE

This book is a collection of selected contributions made by the Research scholars, Academicians, Industry Experts of colleges in various countries in the role of cutting edge technologies in National development. This book would not have been possible without the support, cooperation and encouragement of researchers and would like to acknowledge their contribution towards this assignment possible.

We express our sincere thanks to Shri D Lakshminarayanan, Chief patron and Managing Trustee, Shri R Sundar, Chief patron and Joint Managing Trustee, Sri Ramakrishna Educational Institutions for the persistent support. We thank Dr.B.L.Shivakumar, Patron and Principal and Secretary, Sri Ramakrishna College of Arts & Science for his directions and guidance. The conference organizing team of Sri Ramakrishna College of Arts & Science deserves special thanks for extending their support in bringing out this book.

In this conference more than 200 participants from various countries have attended. We have received more than 150 papers from the researchers. The selected research papers are published in this book. The papers are classified based on the theme of the conference. The researchers discussed on various issues in cutting edge technologies in Computing in National Development.

We strongly believe that the papers of this book attempts to address the critical research issues in Image processing, Machine & Deep Learning, Cloud Computing, Networking, Artificial Intelligence, Biometrics, Software Engineering, Big data and Neural networks.

Dr.G.Maria Priscilla

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A Novel Feature Interaction RNN Model for Cloud Databases

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Abstract - Detection of Feature interaction is the demanding task particularly for high dimensional database in the research field of feature selection which plays a major role in Machine Learning. "A Novel Feature Interaction RNN Model for Cloud Databases" is a Recurrent Neural Network based approach in the Cloud environment which detects both positive and negative feature interaction. The proposed Feature Interaction RNN model consists of Associatory Feature Pattern Organizer and Feature Interaction Detector. The Associatory Feature Pattern Organizer associates the given feature pattern with the pattern stored in Feature Memory Cloud database using Feature Cue Creator and Auto Feature Associator. The Associatory Feature Pattern produced from the Associatory Feature Pattern Organizer achieves high-order feature interaction using Feature Interaction Detector. The performance of the proposed Feature Interaction RNN Model is evaluated using four Medical Databases retrieved from AWS Cloud. The experimental and evaluation results obtained on these Cloud databases show that a proposed Feature Interaction RNN Model performs feature interaction with significant improvement in classification accuracy better than conventional Feature Selection Models.

Keywords- *Feature Interaction, Cloud database, Recurrent Neural Network, Hopfield Neural Network*

I. INTRODUCTION

The rapid growth in computer advancement tends to the accumulation of massive quantities of high-dimensional data. Machine learning techniques provide computers with the ability to learn these high-dimensional data efficiently and the learning performance is highly increased only with the relevant data. A commonly used technique to retrieve relevant data is Feature selection and this has been a challenging research area in Machine Learning, text categorization, pattern recognition, and data mining. The process of feature selection involves the subset selection of input variables by removing features with less or no predictive capacity. The advantage of feature selection for learning lies in a reduction of feature subset to realize effective learning, improvement of predictive accuracy, and reduction of execution time. Unfortunately, the accuracy of performance predictions may be degraded when considering features only in isolation. The classification accuracy of feature selection algorithm can be highly enhanced when one or more features interact with each other in the feature subset. The features that are visible to be irrelevant or

imperceptibly relevant with the class individually, but when it joined with other features, it may highly associate to the target class are called Interacting features. Achieving feature interaction is an exigent task in feature selection.

Recent advancement in Machine learning makes the computers to learn automatically and improve their performance without being explicitly programmed. The development of unsupervised learning using neural networks that can teach themselves is the major focus of Machine learning. Machine learning models are easily overfitted with real world dataset which contain high dimensional input features. A neural network is a computational model that aims to simulate the functional part of biological neural networks. A neural network approach can be followed over traditional programming to find solution to the problems that do not have algorithmic solution or the available solution is too difficult to be found. The neural network demonstrates the behaviour of the Feed Forward network and recurrent network. Most of the machine learning methods has been used feed forward neural network and Hopfield network for feature interaction.

Associative memory is the general idea of accessing memory through content rather than by address or location. Since recurrent network has the capacity of arranging the interconnected factors in a best way, it has been used in the optimization problems and associative memories. Pattern association involves associating a new pattern with a stored pattern. Associative memory can be a feed forward or recurrent whereas auto associative memory cannot hold an infinite number of patterns.

A recurrent neural network model with auto-associative property is called Hopfield networks and it is used to recognize a partial or incomplete input pattern as one of its previously memorized pattern and to output the correct and complete memorized pattern.

Cloud computing is an on-demand self service computing technology that can be metered based on utility and consumption of computing resources. A cloud database is a database that has been created and accessed from cloud environment. Many extensive database services are offered by Database-as a Service model in Cloud Computing. In the proposed model cloud data base offers the services of providing required datasets and also offers the cloud feature patterns during feature interaction.

ABOUT THE DEPARTMENT

The Department of Computer Science was established in the year 1987. The department offers following Programmes B.Sc CS, M.Sc CS, M.Phil (CS) & Ph.D (CS). The Department has signed MoU's with the leading Industries like IBM for course integration with specialization with artificial intelligence. The students are benefitted with international certification on AP Skills. The department has various other MoU's like Hackup Technologies and Robotic Process Automation. The department conducts various job oriented courses and value added courses on the currents trends and requirements of the industry. Various webinars seminar and workshops are conducted to enrich the knowledge of the students. The department has produced nearly 100 research scholars and has benefitted in the research activity like writing books, chapters, sponsored projects and proposals. The department has well experienced, qualified, committed faculty members who produce excellent results and good research publications. The Department is supported by well equipped air-conditioned computer Labs, with latest configuration systems and internet facilities. The Students are not only taught the curriculum but also interpersonal skills. They are also trained for their placements. Our students are motivated and trained to face the modern competitive technological environment to compete professionally. The department is equipped with quality resources for imparting need and carrier based education using contemporary teaching techniques by the motivated faculty team.

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