

MINING TECHNIQUES FOR STREAMING DATA

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ABSTRACT

The huge explosion in using real time technology leads to infinite flow of data which known as data streams. The characteristics of streaming data require different techniques for processing due its volume, velocity and volatility, beside issues related to the limited storage capabilities. Hence, this research highlights the significant aspects to consider when building a framework for mining data streams. It reviews the methods for data stream summarizing and creating synopsis, and the approaches of processing these data synopsis. The goal is to present a model for mining the streaming data which describes the main phases of data stream manipulation.

KEYWORDS

Data Stream, Data Mining, Data Synopsis, Information.

1. INTRODUCTION

The amounts of the existed data globally almost reached to 64 zettabytes by the end of 2020, and the forecasts indicate that it will grow to 175 zettabytes by the end of 2025 [1]. This is encouraging the data mining to become an integral part in many sectors such as businesses, financial, medical, manufacturing, media, and many others. It helps to extract knowledge that improve several processes like decision making, goals defining, customer personalizing, decreasing risk and fraud.

The great interest in data mining leads to produce new data mining techniques that could process huge infining data flows that come from different sources such as sensors, network traffic, call center records, social media posts, ATM and credit card operations, web searches, etc. All these sources produce continuous sequences of massive data that generated in high speed rate and known as data stream [2].

A data stream consists of infinite sequence of elements that keep flowing with high speed rate. Every element of a stream is a pair of (X_i, T_i) , where X_i is a dimensional vector arrives at time stamp T_i . The time stamp identifies when the element occurred [3]. Mining such type of data streams is a continuous process of extracting knowledge and valuable insights from infinite and rapid data signals. The main goal is to predict the class or the value of the new elements using machine learning techniques such as clustering, classification, regression, etc [2].

Data stream is much related to the Big Data concept, since the big data comes as result of streaming the data. The continuous flow of fast data causes too large volume of data which is known as big data. It is important to clarify that streaming data growth and produce big data, but it is not necessary that all big data comes from data stream. Big data usually reflects data of pet mode even if it was petabytes while streaming data reflects data that in motion mode which need a different technology to handle it [3].

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Proceedings of the Third International Conference on Trends in Information, Telecommunication and Computing Vinu V. Das, 2012-09-14 Third International Conference on Recent Trends in Information Telecommunication and Computing ITC 2012 ITC 2012 will be held during Aug 03 04 2012 Kochi India ITC 2012 is to bring together innovative academics and industrial experts in the field of Computer Science Information Technology Computational Engineering and Communication to a common forum The primary goal of the conference is to promote research and developmental activities in Computer Science Information Technology Computational Engineering and Communication Another goal is to promote scientific information interchange between researchers developers engineers students and practitioners *Advanced Data Mining and Applications* Xue Li, Shuliang Wang, 2005-07-12 This book constitutes the refereed proceedings of the First International Conference on Advanced Data Mining and Applications ADMA 2005 held in Wuhan China in July 2005 The conference was focused on sophisticated techniques and tools that can handle new fields of data mining e g spatial data mining biomedical data mining and mining on high speed and time variant data streams an expansion of data mining to new applications is also strived for The 25 revised full papers and 75 revised short papers presented were carefully peer reviewed and selected from over 600 submissions The papers are organized in topical sections on association rules classification clustering novel algorithms text mining multimedia mining sequential data mining and time series mining web mining biomedical mining advanced applications security and privacy issues spatial data mining and streaming data mining

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Information Systems Engineering WISE 2005 held in New York NY USA in November 2005 The 30 revised full papers and 20 revised short papers presented together with 18 poster papers were carefully reviewed and selected from 259 submissions The papers are organized in topical sections on Web mining Web information retrieval metadata management ontology and semantic Web XML Web service method Web service structure collaborative methodology P2P ubiquitous and mobile document retrieval applications Web services and e commerce recommendation and Web information extraction P2P grid and distributed management and advanced issues The presentation is rounded off by 14 industrial papers and the abstracts of 4 tutorial sessions

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Web Communities Yanchun Zhang, Jeffrey Xu Yu, Jingyu Hou, 2006-03-28 Due to the lack of a uniform schema for Web documents and the sheer amount and dynamics of

Web data both the effectiveness and the efficiency of information management and retrieval of Web data is often unsatisfactory when using conventional data management techniques Web community defined as a set of Web based documents with its own logical structure is a flexible and efficient approach to support information retrieval and to implement various applications Zhang and his co authors explain how to construct and analyse Web communities based on information like Web document contents hyperlinks or user access logs Their approaches combine results from Web search algorithms Web clustering methods and Web usage mining They also detail the necessary preliminaries needed to understand the algorithms presented and they discuss several successful existing applications Researchers and students in information retrieval and Web search find in this all the necessary basics and methods to create and understand Web communities Professionals developing Web applications will additionally benefit from the samples presented for their own designs and implementations

Information Security and Ethics: Concepts, Methodologies, Tools, and Applications Nemati, Hamid, 2007-09-30 Presents theories and models associated with information privacy and safeguard practices to help anchor and guide the development of technologies standards and best practices Provides recent comprehensive coverage of all issues related to information security and ethics as well as the opportunities future challenges and emerging trends related to this subject

Web Intelligence and Security Mark Last, Abraham Kandel, 2010 *Machine Learning: Concepts, Methodologies, Tools and Applications* Management Association, Information Resources, 2011-07-31 This reference offers a wide ranging selection of key research in a complex field of study discussing topics ranging from using machine learning to improve the effectiveness of agents and multi agent systems to developing machine learning software for high frequency trading in financial markets Provided by publishe

Innovations and Approaches for Resilient and Adaptive Systems De Florio, Vincenzo, 2012-09-30 Our society continues to depend upon systems that are built in a way that they end up being inflexible and intolerant to change Therefore there is an urgent need to investigate innovations and approaches to the management of adaptive and dependable systems These studies are usually implemented through design development and the evaluation of techniques and models to structure computer systems as adaptive systems *Innovations and Approaches for Resilient and Adaptive Systems* is a comprehensive collection of knowledge on increasing the notions and models in adaptive and dependable systems This book aims to enhance the awareness of the role of adaptability and resilience in system environments for researchers practitioners educators and professionals alike

Research and Development in Intelligent Systems XXVI Richard Ellis, Miltos Petridis, 2009-10-28 The most common document formalisation for text classification is the vector space model founded on the bag of words phrases representation The main advantage of the vector space model is that it can readily be employed by classification algorithms However the bag of words phrases representation is suited to capturing only word phrase frequency structural and semantic information is ignored It has been established that structural information plays an important role in classification accuracy 14 An alternative to the bag of words phrases representation is

a graph based representation which intuitively possesses much more expressive power. However, this representation introduces an additional level of complexity in that the calculation of the similarity between two graphs is significantly more computationally expensive than between two vectors. See, for example, [16]. Some work, see, for example, [12], has been done on hybrid representations to capture both structural elements in the graph model and significant features using the vector model. However, the computational resources required to process this hybrid model are still extensive.

AI 2005: Advances in Artificial Intelligence Shichao Zhang, 2005-11-21. This book constitutes the refereed proceedings of the 18th Australian Joint Conference on Artificial Intelligence AI 2005 held in Sydney, Australia, in December 2005. The 77 revised full papers and 119 revised short papers presented together with the abstracts of 3 keynote speeches were carefully reviewed and selected from 535 submissions. The papers are categorized in three broad sections: namely, AI foundations and technologies; computational intelligence; and AI in specialized domains. Particular topics addressed by the papers are logic and reasoning; machine learning; game theory; robotic technology; data mining; neural networks; fuzzy theory and algorithms; evolutionary computing; Web intelligence; decision making; pattern recognition; agent technology; and AI applications.

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