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Mining and Detection of Emerging Topics from Social Network Big Data

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ABSTRACT: ***As enhancement we propose Detection of emerging topics from social networks of big data. Conventional-term-frequency-based approaches may not be appropriate in this context. We focus on emergence of topics signaled by social aspects of theses networks. Specifically, we focus on mentions of user links between users that are generated dynamically (intentionally or unintentionally) through replies, mentions, and retweets. We propose a probability model of the mentioning behavior of a social network user, and propose to detect the emergence of a new topic from the anomalies measured through the model. Aggregating anomaly scores from hundreds of users, we show that we can detect emerging topics only based on the reply/mention relationships in social-network posts. We demonstrate our technique in several real data sets we gathered from Twitter. The experiments show that the proposed mention-anomaly-based approaches can detect new topics at least as early as text-anomaly-based approaches, and in some cases much earlier when the topic is poorly identified by the textual contents in posts.***

I.INTRODUCTION

Generally, data mining (sometimes called data or knowledge discovery) is the process of analyzing data from different perspectives and summarizing it into useful information - information that can be used to increase revenue, cuts costs, or both. Data mining software is one of a number of analytical tools for analyzing data. It allows users to analyze data from many different dimensions or angles, categorize it, and summarize the relationships identified. Technically, data mining is the process of finding correlations or patterns among dozens of fields in large relational databases.While large-scale information technology has been evolving separate transaction and analytical systems, data mining provides the link between the two. Data mining software analyzes relationships and patterns in stored transaction data based on open-ended user queries. Several types of analytical software are available: statistical, machine learning, and neural networks. Stored data is used to locate data in predetermined groups. For example, a restaurant chain could mine customer purchase data to determine when customers visit and what they typically order. This information could be used to increase traffic by having daily specials. Data items are grouped according to logical relationships or consumer preferences. For example, data can be mined to identify market segments or consumer affinities. Data can be mined to identify associations. The beer-diaper example is an example of associative mining. Data is mined to anticipate behavior patterns and trends. For example, an outdoor equipment retailer could predict the likelihood of a backpack being purchased based on a consumer's purchase of sleeping bags and hiking shoes. Extract, transform, and load transaction data onto the data warehouse system. Store and manage the data in a multidimensional database system. Provide data access to business analysts and information technology professionals. Analyze the data by application software. Present the data in a useful format, such as a graph or table. Non-linear predictive models that learn through training and resemble biological neural networks in structure. Optimization techniques that use process such as genetic combination, mutation, and natural selection in a design based on the concepts of natural evolution. Tree-shaped structures that represent sets of decisions. These decisions generate rules for the classification of a dataset. Specific decision tree methods include Classification and Regression Trees

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(CART) and Chi Square Automatic Interaction Detection (CHAID). CART and CHAID are decision tree techniques used for classification of a dataset. They provide a set of rules that you can apply to a new (unclassified) dataset to predict which records will have a given outcome. CART segments a dataset by creating 2-way splits while CHAID segments using chi square tests to create multi-way splits. CART typically requires less data preparation than CHAID.A technique that classifies each record in a dataset based on a combination of the classes of the *k* record(s) most similar to it in a historical dataset (where *k*=1). Sometimes called the *k*-nearest neighbor technique. The extraction of useful if-then rules from data based on statistical significance. The visual interpretation of complex relationships in multidimensional data. Graphics tools are used to illustrate data relationships. It's one of the most effective services that are available today. With the help of data mining, one can discover precious information about the customers and their behavior for a specific set of products and evaluate and analyze, store, mine and load data related to them An analytical CRM model and strategic business related decisions can be made with the help of data mining as it helps in providing a complete synopsis of customers An endless number of organizations have installed data mining projects and it has helped them see their own companies make an unprecedented improvement in their marketing strategies (Campaigns).Data mining is generally used by organizations with a solid customer focus. For its flexible nature as far as applicability is concerned is being used vehemently in applications to foresee crucial data including industry analysis and consumer buying behaviors.Fast paced and prompt access to data along with economic processing techniques have made data mining one of the most suitable services that a company seek.

II.RELATED WORK

Dynamic networks have recently being recognized as a powerful abstraction to model and represent the temporal changes and dynamic aspects of the data underlying many complex systems. Significant insights regarding the stable relational patterns among the entities can be gained by analyzing temporal evolution of the complex entity relations. This can help identify the transitions from one conserved state to the next and may provide evidence to the existence of external factors that are responsible for changing the stable relational patterns in these networks. This paper presents a new data mining method that analyzes the time-persistent relations or states between the entities of the dynamic networks and captures all maximal non-redundant evolution paths of the stable relational states. Experimental results based on multiple datasets from real-world applications show that the method is efficient and scalable. Web crawlers are essential to many Web applications, such as Web search engines, Web archives, and Web directories, which maintain Web pages in their local repositories. In this paper, we study the problem of crawl scheduling that biases crawl ordering toward important pages. We propose a set of crawling algorithms for effective and efficient crawl ordering by prioritizing important pages with the well-known PageRank as the importance metric. In order to score URLs, the proposed algorithms utilize various features, including partial link structure, inter-host links, page titles, and topic relevance. We conduct a large-scale experiment using publicly available data sets to examine the effect of each feature on crawl ordering and evaluate the performance of many algorithms. The experimental results verify the efficacy of our schemes. In particular, compared with the representative Rank Mass crawler, the FPR-title-host algorithm reduces computational overhead by a factor as great as three in running time while improving effectiveness by 5 % in cumulative PageRank. Identifying social influence in networks is critical to understanding how behaviors spread. We present a method that uses in vivo randomized experimentation to identify influence and susceptibility in networks while avoiding the biases inherent in traditional estimates of social contagion. Estimation in a representative sample of 1.3 million Facebook users showed that younger users are more susceptible to influence than older users, men are more influential than women, women influence men more than they influence other women, and married individuals are the least susceptible to influence in the decision to adopt the product offered. Analysis of influence and

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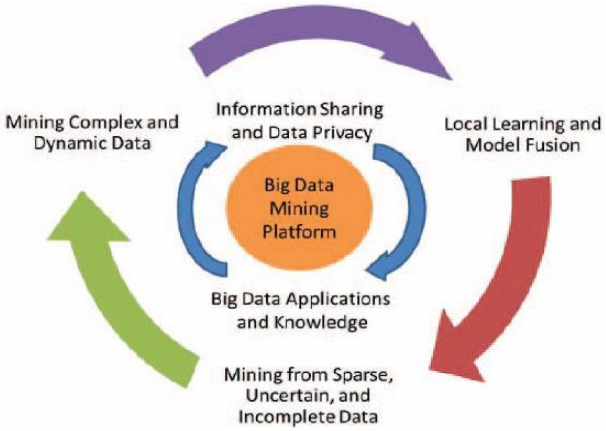
susceptibility together with network structure revealed that influential individuals are less susceptible to influence than noninfluential individuals and that they cluster in the network while susceptible individuals do not, which suggests that influential people with influential friends may be instrumental in the spread of this product in the network. A tremendous amount of data about individuals – e.g., demographic information, internet activity, energy usage, communication patterns and social interactions – are being collected and analyzed by many national statistical agencies, survey organizations, medical centers, and Web and social networking companies. Wide dissemination of microdata (data at the granularity of individuals) facilitates advances in science and public policy, helps citizens to learn about their societies, and enables students to develop skills at data analysis. Often, however, data producers cannot release microdata as collected, because doing so could reveal data subjects' identities or values of sensitive attributes. Failing to protect confidentiality (when promised) is unethical and can cause harm to data subjects and the data provider. It even may be illegal, especially in government and research settings. For example, if one reveals confidential data covered by the U. S. Confidential Information Protection and Statistical Efficiency Act, one is subject to a maximum of $250,000 in fines and a five year prison term. With the rapid growth of the availability and popularity of interpersonal and behavior-rich resources such as blogs and other social media avenues, emerging opportunities and challenges arise as people now can, and do, actively use computational intelligence to seek out and understand the opinions of others. The study of collective behavior of individuals has implications to business intelligence, predictive analytics, customer relationship management, and examining online collective action as manifested by various flash mobs, the Arab Spring (2011) and other such events. In this article, we introduce a nature-inspired theory to model collective behavior from the observed data on blogs using swarm intelligence, where the goal is to accurately model and predict the future behavior of a large population after observing their interactions during a training phase. Specifically, an ant colony optimization model is trained with behavioral trend from the blog data and is tested over real-world blogs. Promising results were obtained in trend prediction using ant colony based pheromone classier and CHI statistical measure. We provide empirical guidelines for selecting suitable parameters for the model, conclude with interesting observations, and envision future research directions.

SYSTEM ARCHITECTURE:



III.SYSTEM PREMELIES

A.Integrating and Mining Biodata:

We have integrated and mined biodata from multiple sources to decipher and utilize the structure of biological networks to shed new insights on the functions of biological systems. We address the theoretical underpinnings and current and future enabling technologies for integrating and mining biological networks. We have expanded and integrated the techniques and methods in information acquisition, transmission, and processing for information networks. We have developed methods for semantic-based data integra-tion, automated hypothesis generation from mined data, and automated scalable analytical tools to evaluate simulation results and refine models.

B.Big Data Fast Response:

We propose to build a stream-based Big Data analytic framework for fast response and real-time decision making.Designing Big Data sampling mechanisms to reduce Big Data volumes to a manageable size for processing,Building prediction models from Big Data streams. Such models can adaptively adjust to the

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dynamic changing of the data, as well as accurately predict the trend of the data in the future; and A knowledge indexing framework to ensure real-time data monitoring and classification for Big Data applications.

C.Pattern matching and mining:

We perform a systematic investigation on pattern matching, pattern mining with wildcards, and application problems as follows:Exploration of the NP-hard complexity of the matching and mining problems,Multiple patterns matching with wildcards,Approximate pattern matching and mining, and Application of our research onto ubiquitous personalized information processing and bioinformatics.

D.Key technologies for integration and mining:

We have performed an investigation on the availability and statistical regularities of multisource, massive and dynamic information, including cross-media search based on information extraction, sampling, uncertain informa-tion querying, and cross-domain and cross-platform information polymerization. To break through the limitations of traditional data mining methods, we have studied heterogeneous information discovery and mining in complex inline data, mining in data streams, multigranularity knowledge discovery from massive multisource data, distribution regula-rities of massive knowledge, quality fusion of massive knowledge.

E.Group influence and interactions:

Employing group influence and information diffusion models, and deliberating group interaction rules in social networks using dynamic game theory Studying interactive individual selection and effect evaluations under social networks affected by group emotion, and analyzing emotional interactions and influence among individuals and groups, and Establishing an interactive influence model and its computing methods for social network groups, to reveal the interactive influence effects and evolution of social networks.The rise of Big Data applications where data collection has grown tremen dously and is beyond the ability of commonly used software tools to capture, manage, and process within a "tolerable elapsed time." The most fundamental challenge for Big Data applications is to explore the large volumes of data and extract useful information or knowledge for future actions. In many situations, the knowledge extraction process has to be very efficient and close to real time because storing all observed data is nearly infeasible.The unprecedented data volumes require an effective data analysis and prediction platform to achieve fast response and real-time classification for such Big Data.

IV.CONCLUSION

Driven by real-world applications and key industrial stakeholders and initialized by national funding agencies, managing and mining Big Data have shown to be a challenging yet very compelling task. While the term Big Data literally concerns about data volumes, our HACE theorem suggests that the key characteristics of the Big Data are 1) huge with heterogeneous and diverse data sources, 2) autonomous with distributed and decentralized control, and 3) complex and evolving in data and knowledge associations. Such combined characteristics suggest that Big Data require a "big mind" to consolidate data for maximum values.

To explore Big Data, we have analyzed several challenges at the data, model, and system levels. To support Big Data mining, high-performance computing platforms are required, which impose systematic designs to unleash the full power of the Big Data. At the data level, the autonomous information sources and the variety of the data collection environments, often result in data with complicated conditions, such as missing/uncertain values. In other situations, privacy concerns, noise, and errors can be introduced into the data, to produce altered data copies. Developing a safe and sound information sharing protocol is a major challenge. At the model level, the key challenge is to generate global models by combining locally discovered patterns to form a unifying view. This requires carefully designed algorithms to analyze model correlations between distributed sites, and fuse decisions from multiple sources to gain a best model out of the Big Data. At the system level, the essential challenge is that a Big Data mining framework needs to consider complex relationships between samples, models,

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and data sources, along with their evolving changes with time and other possible factors. A system needs to be carefully designed so that unstructured data can be linked through their complex relationships to form useful patterns, and the growth of data volumes and item relationships should help form legitimate patterns to predict the trend and future.

We regard Big Data as an emerging trend and the need for Big Data mining is arising in all science and engineering domains. With Big Data technologies, we will hopefully be able to provide most relevant and most accurate social sensing feedback to better understand our society at real time. We can further stimulate the participation of the public audiences in the data production circle for societal and economical events. The era of Big Data has arrived.

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