Exploring the Efficiency of Data Collection Schemes in Wireless Sensor Networks

Abstract

- Being a core-enabling technology for next generation communication infrastructure, Wireless Sensor Networks(WSNs) are under heavy research curiosity since last couple of decades.
- Data collection and transmission are one of the fundamental operations in WSNs. Performance of data collection directly affects the efficiency and lifetime of WSNs.
- The comprehensive background knowledge of data collection schemes is essential for identification of possible future directions in the domain.
- In this paper, we provide a review of modern data collection schemes, organize them into appropriate classes and setup their taxonomy.
- We explore the performance of various data collection schemes and conduct comprehensive comparative analysis. Subsequently, we identify corresponding issues and challenges for further optimization of operating environments for WSNs

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- To address these problems, we propose a Hypertext-Induced Topic Search (HITS) based Topic-Decision method (TD-HITS), and a Latent Dirichlet Allocation (LDA) based Three-Step model (TS-LDA).
- TD-HITS can automatically detect the number of topics as well as identify associated key posts in a large number of posts.
- TS-LDA can identify influential spreaders of hot event topics based on both post and user information.

Existing system

- Consequently, it is a crucial platform for detecting newly emerging events and for identifying influential spreaders who have the potential to actively disseminate knowledge about events through micro blogs.
- However, traditional event detection models require human intervention to detect the number of topics to be explored, which significantly reduces the efficiency and accuracy of event detection.
- In addition, most existing methods focus only on event detection and are unable to identify either influential spreaders or key event-related posts, thus making it challenging to track momentous events in a timely manner.

DISADVANTAGE

- most existing methods focus only on event detection and are unable to identify either influential spreaders or key event-related posts, thus making it challenging to track momentous events in a timely manner.
- existing event detection models require human intervention to detect the number of topics, which greatly reduces the efficiency and accuracy of event detection.
- Furthermore, most existing methods focus only on event detection and fail to investigate the key posts or influential spreaders who play an important role in the dissemination of critical events. This makes it difficult for Internet watch officers to track critical events in a timely manner.

Proposed system

- The main contributions of this paper are as follows:
- We propose an HITS-based topic-decision method. This approach creates a smaller high-quality training dataset by selecting high-quality posts and influential users from among a collection of users and posts, which largely reduces the impact of irrelevant posts and ordinary users, and improves the efficiency and accuracy of event detection compared with those of existing methods. Moreover, the proposed approach can automatically detect the number of topics and identify key event-related posts from among a large number of posts, which further improves the efficiency and accuracy of event detection and outperforms existing methods
- We propose an LDA-based three-step model that detects critical events based on the number of topics and identifies influential spreaders involved in sharing these critical events. This model utilizes both post and user information, which can improve our understanding of who is involved in the secritical incidents.

- We conducted experiments to evaluate the performance of our proposed models. The experimental results on a Twitter dataset demonstrate the efficiency and accuracy of our models in event detection and the identification of influential spreaders.

ADVANTAGES

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- The experimental results, using a Twitter dataset, demonstrate the effectiveness of our proposed methods for both detecting events and identifying influential spreaders.

HARDWARE REQUIREMENTS

- Processor – Pentium –III
- Speed – 1.1 Ghz
- RAM – 256 MB(min)
- Hard Disk – 20 GB
- Floppy Drive – 1.44 MB
- Key Board – Standard Windows Keyboard
- Mouse – Two or Three Button Mouse
- Monitor – SVGA

SOFTWARE REQUIREMENTS

- Operating System : Windows 8
- Front End : Java /DOTNET
- Database : Mysql/HEIDISQL

CONCLUSION

- Inherent limitations like low bandwidth and energy con-straints challenge the research community to devise an opti-mum operating environment to extend network life of WSNs.
- Data collection and transmission process in WSNs consumes considerable amount of energy. In this paper, we conduct a comprehensive review of data collection domain for WSNs and setup a taxonomy for data collection schemes.
- Afterwards, we evaluate various classes of data collection schemes of WSNs, based upon comparative analysis.
- Lastly, we explore various parameters affecting efficiency of data collections and identify corresponding future directions to optimize the operating environment for WSNs.

FUTURE WORK

- Our experimental results for a Twitter dataset demonstrate the effectiveness of our proposed methods in event detection, key post detection, and the identification of influential spreaders.
- In particular, it excels in detecting the trend in the number of event changes over time.
- In future work, to better understand the transmission and control of events, we plan to further investigate the behaviors of influential spreaders and develop a dynamic community detection model that can evolve over time.

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