Exploiting Industrial Big Data Strategy for Load Balancing in Industrial Wireless Mobile Networks

Abstract—In the era of big data, traditional industrial mobile wireless networks cannot effectively handle the new requirements of mobile wireless big data networks arising from the spatiotemporal changes of a nodes traffic load. From the perspective of load balancing and energy efficiency, Industrial Big Data (IBD) brings new transmission challenges to Industrial Wireless Mobile Networks (IWMNs). Previous research works have not considered dynamic changes related to the traffic and mobility of IWMNs. In this paper, using an IBD technique, we propose a novel seconddeployment and sleep-scheduling strategy (SDSS) for balancing load and increasing energy efficiency, while taking the dynamic nature of the network into consideration. SDSS can be divided into two stages. In the first stage, changes in the traffic of every network grid its maximum traffic load at different times are calculated using big data analysis techniques. In the second stage, a second-deployment method for the Cluster Head Nodes (CHNs), based on each grids maximum traffic load, is adopted. To save energy, based on their position and traffic states, a sleep-wake scheduling is presented for the CHNs. Simulations results verify the effectiveness of this methodology to save energy and obtain a traffic balance which is more efficient than obtained through traditional methods.

CONCLUSION

The greatest challenges of wireless networks for big data in the context of a smart factory are a) mobile nodes and b) dynamically changing heavy traffic load. These can cause imbalances in traffic and energy consumptions of cluster head nodes in hierarchical networks. In this article, we introduced amethodology for incorporating deployment and sleep scheduling of such nodes in an industry 4.0

factory. Due to the movement of the mobile nodes, the traffic load of each grid will change dynamically with time. By analyzing the historical records of traffic load for each grid using an industrial big data strategy, network features can be extracted and the peak in traffic and the corresponding time can be identified. Using a distributed genetic algorithm to obtain an optimal traffic balance level, we second-deploy the cluster head nodes. At last, based on the service time model, we propose a novel sleep-wake scheduling method. Simulation results demonstrate that the proposed method performs better than traditional methods, and the performance advantages increase with an increase in the number of nodes. Aside from obtaining a good balance and effective communication, the proposed method is also able to decrease the network latency.

SYSTEM REQUIREMENTS:

HARDWARE REQUIREMENTS:

- System : Pentium IV 2.4 GHz.
- Hard Disk : 40 GB.
- Floppy Drive : 1.44 Mb.
- Monitor : 15 VGA Colour.
- Mouse : Logitech.
- Ram : 512 Mb

SOFTWARE REQUIREMENTS:

- Operating system : Windows 7/UBUNTU.
- Coding Language : Java 1.7 ,Hadoop 0.8.1
- IDE : Eclipse
- Database : MYSQL

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