Joy Chandra Mukherjee

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RESEARCH INTERESTS

Distributed Algorithms, Time-varying Network Algorithms, Intelligent Transportation Systems, Smart Grid.

EDUCATION

Ph.D. in Computer Science & Engineering (2011 - 2015)

Institute: Indian Institute of Technology Kharagpur, West Bengal, India

Thesis: Scheduling in Large Scale Mobile Systems

Supervisor: Prof. Arobinda Gupta

M.Tech. in Computer Science & Engineering (2009 - 2011)

Institute: Indian Institute of Technology Kharagpur, West Bengal, India

Thesis: Self-Diagnosis and Collaboration in Vehicular Ad-hoc Network with Misbehaving Nodes

Supervisor: Prof. Arobinda Gupta

CGPA: 9.77/10 **(Rank 2nd)**

GATE All India Rank (CS 2009): 125 (99.7 percentile, Score 753)

B.Tech. in Computer Science & Engineering (2000 - 2004)

Institute: Bengal Institute of Technology, University of Kalyani, West Bengal, India

Marks: 86.26%

Higher Secondary (Class XII Board Examination) (2000)

Board: West Bengal Council of Higher Secondary Education

Institute: Ramakrishna Mission, Rahara, West Bengal, India

Marks: 86.80%

Secondary (Class X Board Examination) (1998)

Board: West Bengal Board of Secondary Education

Institute: Ramakrishna Mission, Rahara, West Bengal, India

Marks: 85.37%

PUBLICATIONS

JOURNALS

J1 Joy Chandra Mukherjee and Arobinda Gupta, *Distributed Charge Scheduling of PEVs using Inter-Aggregator Collaboration*, IEEE Transactions on Smart Grid, DOI: 10.1109/TSG.2016.2515849, 2016.

J2 Joy Chandra Mukherjee, Arobinda Gupta, and Ravella Chaitanya Sreenivas, *Event Notification in VANET with Capacitated Roadside Units*, IEEE Transactions on Intelligent Transportation Systems, vol. 17, no. 7, pp. 1867–1879, 2016.

J3 Joy Chandra Mukherjee, Saurabh Shukla, and Arobinda Gupta, *Mobility Aware Scheduling for Imbalance Reduction through Charging Coordination of Electric Vehicles in Smart Grid*, Pervasive and Mobile Computing, Elsevier, vol. 21, pp. 104–118, 2015.

J4 Joy Chandra Mukherjee and Arobinda Gupta, *A Review of Charge Scheduling of Electric Vehicles in Smart Grid*, IEEE Systems Journal, vol. 9, no. 4, pp. 1541–1553, 2015.

CONFERENCES

C1   Joy Chandra Mukherjee and Arobinda Gupta, *Mobility Aware Event Dissemination in VANET*, 16th International Conference on Distributed Computing and Networks (ICDCN), Goa, India, pp. 22:1–22:9, 2015.

C2   Joy Chandra Mukherjee, Saurabh Agarwal, and Arobinda Gupta, *Distributed Event Notification in VANET with Multiple Service Providers*, 8th ACM International Conference on Distributed Event-Based Systems (DEBS), Mumbai, India, pp. 334–337, 2014.

C3   Joy Chandra Mukherjee and Arobinda Gupta, *A Mobility Aware Scheduler for Low Cost Charging of Electric Vehicles in Smart Grid*, 6th International Conference on Communication Systems and Networks (COMSNETS), Bangalore, India, pp. 1–8, 2014.

C4   Joy Chandra Mukherjee and Arobinda Gupta, *Mobility Aware Charge Scheduling of Electric Vehicles for Imbalance Reduction in Smart Grid*, 15th International Conference on Distributed Computing and Networks (ICDCN), Coimbatore, India, pp. 378–392, 2014.

C5   Joy Chandra Mukherjee and Arobinda Gupta, *A Publish-Subscribe Based Framework for Event Notification in Vehicular Environments*, 5th International Conference on Communication Systems and Networks (COMSNETS), Bangalore, India, pp. 1–10, 2013.

PH.D. THESIS

In this thesis, we primarily focused on designing scheduling algorithms for efficient resource allocation for some problems in two types of large scale mobile systems, vehicular ad hoc networks (VANET), and electric vehicles in smart grids.

In our first work, we investigated the use of the publish-subscribe framework for vehicular environments in which a service provider (SP) schedules the dissemination of events within some given deadlines through RSUs to a set of vehicles that subscribe to them. We formulated the problem of event notification to moving vehicles from RSUs under different constraints where a central SP has complete control of the RSUs, and designed centralized offline and online scheduling algorithms for low cost event dissemination. We also formulated the problem of event notification from RSUs with finite capacity under different constraints where there are multiple SPs in a city, each controlling a set of RSUs with limited information about other SPs, and designed distributed scheduling algorithms that SPs will run to collaborate among themselves for low cost event dissemination.

The second work that we explored in this thesis was scheduling the charging of electric vehicles (EVs) in smart grids. We formulated the problem of charge scheduling of EVs by a single aggregator under different user and aggregator constraints, and designed centralized offline and online scheduling algorithms to optimize different objectives. We also formulated the problem of charge scheduling of EVs under different user and aggregator constraints where there are multiple aggregators in a city, each controlling a set of charging stations and EVs with limited information about other aggregators, and designed distributed scheduling algorithms for inter-aggregator collaboration to optimize different objectives.

PROFESSIONAL EXPERIENCE

Assistant Professor: School of Electrical Sciences in the discipline of Computer Science & Engineering at IIT Bhubaneswar (June 2016 – Till date)

Research Associate: Department of Computer Science & Engineering at IIT Kharagpur (November 2015 – May 2016)

Assistant Systems Engineer: Tata Consultancy Services (September 2007 – October 2008)

Associate: Cognizant Technology Solutions (September 2006 – September 2007)

Programmer Analyst: Cognizant Technology Solutions (November 2004 – September 2006)

TEACHING ASSISTANTSHIPS	**Theory Courses**: Programming & Data Structures, Algorithms-I, Algorithms-II, Theory of Computation, Operating Systems, Distributed Systems. **Laboratory Courses**: Programming & Data Structures, Algorithms-I, Operating Systems.

PROJECT ASSIGNMENTS

1. **Self-Diagnosis and Collaboration in VANET with Misbehaving Nodes (M.Tech. Thesis, IIT Kharagpur, May 2010 - May 2011)**

   This project addressed two problems. In a vehicular ad hoc network (VANET), a vehicle sends out messages with its position, velocity and heading information, which are used by other vehicles. Incorrect data broadcast by a vehicle can even cause road accidents. We proposed a self-diagnosis scheme that a car uses to check the truthfulness of its own information based on spatio-temporal consistency checks with information of other vehicles. The second problem investigates how a set of cars can collectively arrive at a global common agreement from their local decisions in presence of malicious vehicles.

2. **Global HR Translation for Johnson and Johnson (Tata Consultancy Services)**

   Global HR Translation Project was a major initiative taken by J&J to globalize their HR systems integrating the HR data of all J&J operating companies. The project is implemented in ASP.NET 2.0, and Oracle 9i as a backend database.

3. **OCD Insite Redesign for Johnson and Johnson (Tata Consultancy Services)**

   Ortho-Clinical Diagnostics (OCD) leverages a global intranet site for internal corporate communications, called InSite. The project redesigned OCD in Microsoft SharePoint 2007 for the OCD Worldwide Communications.

4. **MetaReward for Experian (Cognizant Technology Solutions)**

   The MetaReward system is developed for pre-screening applicants for different credit offers based on their personal information, and generates the offers the applicant is eligible for. The system is designed to interact with the Credit Bureau Engine to obtain the applicants credit information for Post-Bureau decision making through web service.

5. **Interim Solution for Bank of America Dealer Financial Services (DFS) (Cognizant Technology Solutions)**

   This program interfaces between Magellan System of Bank of America and Transact. It is designed to facilitate retail loan financing services to automobile, marine, and recreational vehicle dealerships by retrieving the credit bureau data of a dealer and verifying against Transact rule engine.

6. **Risk based Pricing Excel Hook for Bank of America (Cognizant Technology Solutions)**

   A C++ library is designed for Bank of America that is used to get credit reports of a potential borrower from different Bureaus through Transact Strategy Manager, and depending on different vehicle-loan strategies (auto, marine, Residential Vehicle and motorcycle), and other risk based parameters, the buy rate of the vehicle is determined.

TECHNICAL SKILLS

Programming Languages: C, C++, C#.NET, Java, ASP.NET
Databases: Oracle 9i(SQL & PL/SQL), SQL Server 2005
Middle Tier Tools: IBM Websphere MQ 5.x

CERTIFICATIONS

1. Microsoft .NET Framework 2.0 - Application Development Foundation
2. Microsoft .NET Framework 2.0 - Web Based Client Development
3. Microsoft Windows SharePoint Services 3.0 - Application Development
4. Microsoft Office SharePoint Server 2007, Application Development

ADDITIONAL ACTIVITIES

As a member in the organizing committee of **ACM International Collegiate Programming Contest** in 2012, 2013 and 2014 for IIT Kharagpur, I have participated in setting up question papers and have written codes for some of the problems given in the contest.

COMMUNICATION ADDRESS

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