PAPER PRESENTATIONS – Track 1

Timing: 16:00 pm to 17:30pm, Venue: C.V. Raman College of Engineering, Auditorium 4

Paper #1 Title: Strategic Decision for Crowd-Sensing: An approach based on Markov Decision Process

Authors: Arpita Ray, Jadavpur University, India;Chandreyee Chowdhury, Jadavpur University, India ; Sarbani Roy, Jadavpur University, India.

Timings: 16:00 pm to 16:15pm

Abstract: With the surging of smartphone sensing and wireless networking, Mobile Crowd Sensing (MCS) has become a promising paradigm for cross-space and large scale sensing. In the smart city context, MCS can be extremely useful in pulling crowd data for better monitoring resource demand and planning. Since these devices are portable it is carried by almost every citizen thus making it ubiquitous. However, portability comes at the cost of limited energy consumption. Thus, the problem is that, how frequently a smartphone would lend itself for crowd-sensing while striking a balance between energy and incentive. In order to solve this problem, we propose a Markov decision process formulation of the problem and solve it to identify an optimal strategy for crowd-sensing depending on remaining energy, recharging probability and current load. The proposed approach is implemented in R and extensively evaluated for different scenarios.

Paper #2 Title: Dynamic Traffic Congestion Detection by K-means clustering on Arduino Interface

Authors: Urmila Bhanja, IGIT, Sarang, India; Sudipta Mahapatra, Indian Institute Technology, Kharagpur, India, Rajesh Kumar IGIT, Amlan Routray, IGIT, India, Shivashis Behura, IGIT, India.

Timings:16:15 pm to 16:30pm

Abstract: Vehicular traffic congestion poses a serious challenge to green environment by contributing to air pollution, noise pollution, and unnecessary fuel consumption. This paper aims to meet one of the requirements of a smart city that detects the traffic congestion in an area and diverts the traffic on an alternate route in vehicular adhoc network (VANET). VANET is a medium of wireless communication among vehicular commuters, which enables them to intimate their instantaneous physical characteristics such as speed, brake frequency, rain, fog, acceleration, position to surrounding vehicles within a periphery so as to determine the levels of congestion and find suitable ways to divert the traffic. The dynamic nature of vehicle nodes makes the topology unpredictable, which is constantly monitored using vehicular adhoc network (VANET). In this work, four different physical attributes such as rain or fog, speed and brake frequency are considered for traffic congestion detection in VANET. Furthermore, an integration of fuzzy inference rule based system (FRBS) and K-means clustering technique is explored to detect the traffic congestion on an Arduino platform under a dynamic traffic environment. This paper presents a detailed description regarding the co-ordination between vehicular units and a web server, which acts as a cloud database that preserves data for future use.

Paper # 3 Title: Secure Key-exchange for Implantable Sensors using Inductive Coupling

Authors: Priti Kumari,IIITB, India; Tricha Anjali, IIIT - Bangalore, India

Timings: 16:30 pm to 16:45 pm

Abstract: The usage of implantable sensors is imperative in Body Sensor Network. The challenges associated with its security are open research problems. Implantable sensors need a set of secret keys to communicate with other sensors or entities. Secret key generation and subsequent key exchange with other sensors are significant power consuming tasks. Therefore, we propose pre-distribution of keys. The drawbacks of a pre-distribution based method like higher memory consumption and difficulties in key refreshment have been overcome in this paper. The key generation process has been shifted from implantable sensor to an external device. An external device is paired with sensor through inductive coupling and is used for powering the sensor and keys transfer. A variant of Diffie-Hellman key exchange with physiological values is used to facilitate secure transfer of keys.

Paper #4 Title: Towards Policy-driven Power Management for Cloud Computing

Authors: Varsha Ram Thayal, Amrita University, India; Sriram Sankaran,Amrita University, India

Timings: 16:45 pm to 17:00pm

Abstract: Cloud computing enables users to rent computing resources on-demand towards meeting the needs of diverse applications. However, scaling of resources may incur significant impact on performance and power consumption which are the two key concerns for cloud service providers. The major goal of cloud providers is to develop policies for balancing the conflicting objectives of maximizing performance and minimizing energy consumption. Towards this goal, we analyze the impact of scale-up and scale-out techniques for varying cloud workloads through an OpenStack implementation. Our analysis reveals that these techniques vary with the nature of applications that run on the cloud as a result of which policies need to be developed on a per-application basis. We develop a threshold-based policy which determines the optimal trade-off depending on the application profile. Our proposed policy is generic and can be applied to other workloads thus facilitating efficient management of resources.

Paper #5 Title: A Survey of Scheduling Policies in Software Defined Networks

Authors: Anuradha Banerjee,Kalyani Govt. Engg. College, India;Flavio Esposito,Saint Louis University, USA

Timings: 17:00 pm to 17:15 pm

Abstract: In the present era of Software Defined networks (SDNs), multi-policy resource management is extensively used to deliver ready-to-use media-optimized applications. Switches, ports etc. resources are allocated to different flows based on priority. Priority can be either externally set or computed depending upon various factors like flow package size, priority set by the user (if any), age in the queue (time period for which the process has been waiting in the queue) etc.This facilitates high speed communication under large scale distribution, efficiently manages the network bandwidth, and makes the resources available on demand while ensuring their efficient utilization. Keeping in mind the heterogeneity of network resources (differences in capacity of handling workload, cost, energy consumption etc.)& exponential distribution of flows granularity, a significant number of scheduling strategies has evolved in the literature of SDN. This article is dedicated to the discussion of those strategies along with their advantages and disadvantages. To the best of authors' knowledge this is the first article to focus on particularly scheduling strategies in SDN.

Paper #6 Title: FSNRP: Fuzzy-controlled Priority Scheduling of Non-Real Time Data Packets in Mobile Ad-hoc Networks

Authors: Anuradha Banerjee,Kalyani Govt. Engg. College, India;Abu Sufian,University of Gour Banga, India

Timings: 17:15 pm to 17:30pm

Abstract: Mobile ad hoc networks (MANETs) is an infrastructure less networks where topology is very dynamic and nodes are energy constrained. Therefore, scheduling for data packets transfer is very important. We can classify all the data packets into two categories - real time and non-real time. Scheduling of non-real time data packets should be different to real time data packet. Here timely delivery is not an important criterion to be met. The main intention here is to reduce the number of route request messages, as much as possible, through the scheduling policy. Therefore, high priorities are given to those packets which are travelling along fragile paths compared to those traveling along the stable paths. Moreover, when a communication session is on the verge of completion, its packets should be forwarded urgently. This scheduling algorithm FSNRP is designed to considering all these factors. The performance improvement it produces is very significant compared to other scheduling protocols.

PAPER PRESENTATIONS – Track 2

Timing: 16:00 pm to 17:30pm, Venue:

Paper #7 Title: Performance Analysis of Integrated SAC-OCDMA and OFDM Technique over FSO

Authors: Urmila Bhanja IGIT, Sarang, India;Arpita Khuntia,Indira Gandhi Institute of Technology, India;Swati Alamasety,Indira Gandhi Institute of Technology, India

Timings: 16:00 pm to 16:15pm

Abstract: Recently, the free space optical communication (FSO) is gaining popularity because of its high data rate, license free spectrum, less power. The major drawbacks of FSO are absorption, scattering and atmospheric turbulence that affect the performance of FSO in terms of bit error rate (BER) and hence, limits the transmission distance. In this paper, novel integrated spectral amplitude coding optical code division multiple access (SAC-OCDMA) code is proposed referred in this work as pulse transposition-zero cross correlation (PT-ZCC) code. Orthogonal Frequency Division Multiplexing (OFDM) is of prime significance these days in long-haul communication systems because of its immunity to multipath fading, higher bandwidth proficiency, and its flexibility to interference. Therefore, the proposed PT-ZCC code is furthermore, integrated with the OFDM technique so as to improve the performance of the FSO system in terms of BER. In this work, the proposed PT-ZCC code is implemented over an integrated SAC-OCDMA and OFDM technique over FSO communication and is tested under several weather conditions. The proposed integrated scheme is evaluated for different data rates and different number of active users. The proposed work is validated using Optisystem version 14.

Paper #8 Title: Adaptive Freezing of Backoff in LAA-LTE

Authors: NagaPriyanka Parvathareddy College of Engineering, Pune, India, Varada Potnis Kulkarni, College of Engineering Pune, India

Timings: 16:30 pm to 16:45 pm

Abstract: The rapid increase in cellular data with the use of smart devices creates the demand for more licensed spectrum. Extending the carrier aggregation (CA) technique of long term evolution (LTE) to unlicensed band is considered as one of the promising solutions. The major concern is to attain the fair coexistence with the technologies that operate in these bands. In this paper, at first we have analyzed the effect of LTE on the performance of WiFi with listen before talk (LBT) coexistence mechanism. An LBT scheme with adaptable freezing time of backoff count based on negative acknowledgments (NACKs) is proposed which gives a substantial increase in throughput of both LTE and WiFi as compared to the LBT scheme. The proposed scheme is simulated for low, medium and high spatial density scenarios. It is seen to provide better throughput in the medium and the high dense networks while found to be not necessary for the low dense networks.

Paper #9 Title: Polling vs No Polling: QoS driven performance analysis of IEEE 802.15.6 for varying data rate in WBAN

Authors: Suparna Biswas,Maulana Abul Kalam Azad University of Technology WB, India;Rajni Gupta,Maulana Abul Kalam Azad University of Technology WB, India;Gitanjali Pradhan,Maulana Abul Kalam Azad University of Technology WB, India

Timings: 16:45 pm to 17:00pm

Abstract: This work presents an evaluation of IEEE 802.15.6 standard using CSMA/CA with polling in the considering the priority in terms of the different contention window length for heterogeneous data traffic in health care monitoring. Data delivery time is crucial for timely assistance needed by the patient during emergency and threshold set for latency in medical application is 250 ms. Simulation has been done using Castalia 3.3 and OMNeT++ to analyse QoS parameters e.g. latency, energy consumption, packet received per node etc. for varying size, rate and priority of medical data traffic. The simulation results show that the increase in the slot length from 2 to 15 doubles the energy consumption. During emergency when the packet rate increases then ≈ 83% packets received by contention with polling at 100 packets/second/node for different priorities and slot lengths in compare to ≈ 20% packets received by contention without polling within the desired time limit for medical application.

Paper #10 Title: EECP: An Energy Efficient Coverage Preserving Protocol for Heterogeneous Sensor Networks

Authors: Sonam Maurya,PDPM-Indian Institute of Information Technology, Design and Manufacturing, Jabalpur, India;Vinod Kumar Jain,PDPM Indian Institute of Information Technology, Design and Manufacturing Jabalpur, India

Timings: 16:45 pm to 17:00pm

Abstract: Wireless sensor networks (WSNs) are deployed to monitor the environmental conditions of a specific area. In many applications, sensors are required to ensure the proper coverage of entire network area for longer duration. The fuzzy based energy efficient sensor network protocol (FB-EESNP) was developed to provide efficient coverage to entire network area by deploying sensors into various specified regions. The region-wise random node deployment strategy of FB-EESNP ensures efficient coverage as compared to the random node deployment over the entire network field. However, only the node deployment strategy is not sufficient to provide coverage for longer period of time. So in this paper, we propose an energy efficient coverage preserving (EECP) protocol which prolongs the coverage lifespan of the heterogeneous sensor network. We present a novel cluster head selection mechanism to preserve the coverage of

various points of interest (POIs) which needs to be monitored continuously. The EECP protocol also proposes an improved hybrid routing concept to achieve better network lifespan by minimizing intra-cluster communication cost of cluster member nodes. The simulation results show that the proposed EECP protocol enhances the coverage and network lifespan both by 98.32% and 42.27% respectively as compared to FB-EESNP.

Paper #11 Title: A Finite Jitter Buffer Model for Time Division Multiplexing Over Packet Networks

Authors: Usha Rani Seshasayee,Madanapalle Institute of Technology and Science, Andhra Pradesh, India; Manivasakan R IIT, Chennai, India

Timings: 17:00 pm to 17:15 pm

Abstract: Jitter buffer at the receiver of a Time Division Multiplexing over packet network is modelled as a M/G/1/K queue with a vacation for the first packet arriving at an empty queue. Subsequent packets are served at a service time which is constant. The parameters of the queue considered are the update probability, buffer size and delay of the first packet arriving at the empty queue. A similar queue model is used for application layer jitter control in case of VoIP, in terms of Mean Opinion Score. Whereas this work involves the analysis of such a queue for its different performance measures such as mean waiting time, variance of the inter-departure times and probability of loss of packets in the queue for layer-2 jitter control. The measures are computed numerically to gain insight into the performance of the jitter buffer in controlling the jitter, while simultaneously keeping the delay suffered by the packet in the queue minimum. The third performance measure, the loss probability is also introduced in the optimization problem and the queue is analyzed for a suitable operating point in terms of the queueing parameters to suit its application as a receiver jitter buffer in a TDM over packet network.

Paper #12 Title: Secrecy Performance Analysis of Relay Selection in Adaptive DF Relaying Network with Active Adversary

Authors: Sarbani Ghose,Indian Statistical Institute Kolkata, India;Sushmita Ruj,Indian Statistical Institute, Kolkata, India

Timings: 17:15 pm to 17:30pm

Abstract: In this paper, we derive and compare the performance of relay selection strategies presence of an active adversary under a cooperative setting. The system consists of a source, a destination, multiple decode-and-forward relays and an active eavesdropper. These DF relays correctly decode source message, if their signal-to-noise ratio is above a certain threshold. The channels experience independent but not identical Rayleigh fading. We assume both source and eavesdropper can exploit direct and relaying channel. Two relay selection schemes are performed by the eavesdropper, which is assumed to be a part of the system and active. A conventional all-performing relays (using maximal ratio combining) scheme is compared with the above mentioned schemes. We obtain closed-form expressions for the secrecy outage probability of these three strategies. An asymptotic analysis is presented only when relay selection is performed by the eavesdropper. From numerical results, it is observed that relay selection performed by the active eavesdropper proves to be the worst from the perspective of legitimate receiver. Also restriction on either of the two hops results in flooring of secrecy performance.