INTERNET OF THINGS: ARCHITECTURE, CHALLENGES AND TRENDS

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DR. MOHAMMED ATIQUZZAMAN OBTAINED HIS M.S. AND PH.D. IN ELECTRICAL ENGINEERINGAND ELECTRONICS FROM THE UNIVERSITY OF MANCHESTER (UK) IN 1984 AND 1987, RESPECTIVELY. HE CURRENTLY HOLDS THE EDITH J KINNEY GAYLORD PRESIDENTIAL PROFESSORSHIP IN THE SCHOOL OF COMPUTER SCIENCE AT THE UNIVERSITY OF OKLAHOMA.

DR. ATIQUZZAMAN RECEIVED IEEE COMMUNICATION SOCIETY'S FRED W. ELLERSICK PRIZE, IEEE DISTINGUISHED TECHNICAL ACHIEVEMENT AWARD, IEEE SATELLITE COMMUNICATIONS TECHNICAL CONTRIBUTION AWARD, AND NASA GROUP ACHIEVEMENT AWARD FOR "OUTSTANDING WORK TO FURTHER NASA GLENN RESEARCH CENTER'S EFFORT IN THE AREA OF ADVANCED COMMUNICATIONS/AIR TRAFFIC MANAGEMENT'S FIBER OPTIC SIGNAL DISTRIBUTION FOR AERONAUTICAL COMMUNICATIONS" PROJECT. HE IS THE CO-AUTHOR OF THE BOOK “PERFORMANCE OF TCP/IP OVER ATM NETWORKS” AND HAS OVER 350 REFEREED PUBLICATIONS.

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Abstract

WIRELESS SENSOR NETWORK (WSN) TECHNOLOGIES HAVE ENABLED UBIQUITOUS SENSING TO INTERSECT MANY AREAS OF MODERN DAY LIVING. THE CREATION OF THESE DEVICES OFFERS THE ABILITY TO GET, GATHER, EXCHANGE, AND CONSUME ENVIRONMENTAL MEASUREMENT FROM THE PHYSICAL WORLD IN A COMMUNICATING-ACTUATING NETWORK, CALLED THE INTERNET OF THINGS (IOT).
AS THE NUMBER OF PHYSICAL WORLD OBJECTS FROM HETEROGENEOUS NETWORK ENVIRONMENTS GROWS, THE DATA PRODUCED BY THESE OBJECTS RAISE UNCONTROLLABLY, BRINGING A SEVERAL SERIOUS CHALLENGES IN MANAGING IOT NETWORKS. INTERNET OF THINGS (IOT) FACES SEVERAL CHALLENGING ISSUES, ESPECIALLY RELATED TO SCALABILITY, QOS, HETEROGENEITY, INTEROPERABILITY, PRIVACY, SECURITY, AND RELIABILITY.
THE TALK WILL PROVIDE AN OVERVIEW OF INTERNET OF THINGS NETWORK AND WILL DISCUSS ITS ARCHITECTURAL DESIGN. THEN, THE TALK WILL FOCUS ON THE SCALABILITY ISSUES IN IOT. SCALABILITY IN THE IOT NETWORKS IS TO SATISFY A LARGE NUMBER OF REQUESTS FROM CONSUMERS —USERS, SERVICES, AND APPLICATIONS— IN A DENSE ENVIRONMENT, ALL BY MAINTAINING THE SYSTEM PRODUCTION AT ACCEPTABLE LEVEL OF QUALITY OF SERVICE (QOS).
IN THIS TALK, WE WILL EXPLAIN HOW TO PROMOTE THE SCALABILITY MANAGEMENT, USING HYBRID MECHANISM THAT WILL COMBINE TRAFFIC-ORIENTED MECHANISM AND RESOURCES-ORIENTED MECHANISM, WITH AUTOMATIC ADAPTION ACTIONS USING THE INTEGRATION OF CLOUDS WITH IOT.

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