Talk 2 – 11:30 a.m. - Noon

“ECOPS: Energy-Efficient Collaborative Opportunistic Positioning for Heterogeneous Mobile Devices”
By Kaustubh Dhondge, PhD Student (Advisor: Prof. Baek-Young Choi)

Abstract
The fast growing popularity of smartphones and tablets enables us to use various intelligent mobile applications. As many of those applications require position information, smart mobile devices provide positioning methods such as Global Positioning System (GPS), WiFi-based positioning system (WPS), or Cell-ID-based positioning service. However, those positioning methods have different characteristics of energy-efficiency, accuracy, and service availability. In this work, we present an Energy-Efficient Collaborative and Opportunistic Positioning System (ECOPS) for heterogeneous mobile devices. An ECOPS facilitates a collaborative environment where many mobile devices can opportunistically receive position information over energy-efficient and prevalent WiFi, broadcasted from a few other devices in the communication range. The position-broadcasting devices in an ECOPS have sufficient battery power and up-to-date location information obtained from an accurate but energy-inefficient GPS. A position receiver in an ECOPS estimates its location using a combination of methods including received signal strength indicators and 2D trilateration. Our field experiments show that an ECOPS significantly reduces the total energy consumption of devices while achieving an acceptable level of location accuracy. An ECOPS can be especially useful for unique resource scarce, infrastructure-less, and mission critical scenarios such as battlefields, border patrol, mountaineering expeditions, and disaster area assistance.

Biography
Kaustubh Dhondge is an Interdisciplinary Ph.D. student in the CSEE department at UMKC working under the guidance of Dr. Baek-Young Choi. Prior to starting his work towards the Ph.D. with coordinating discipline as TCN, Kaustubh got his MS degree in Computer Science from UMKC with a thesis supervised by Dr. Choi that explored energy-efficient ways to track targets in sensor networks. His research interests and publications lie in the areas of localization for smart devices, security and authentication for smart devices, vehicular communications, and target tracking in sensor networks. He is currently serving as the editor for UMKC Journal of Interdisciplinary Research. He has been awarded the Outstanding Graduate Student Presentation awards at the Great Plains Network Conference in 2011, 2012, and 2013 for his work presented at the conference.