REU Site: Enhancing Undergraduate Experience in Mobile Cloud Computing

Project Elements:
New or Renewal: Proposal for Renewal of REU Site CNS #1156574
Project title: REU Site: Enhancing Undergraduate Experience in Mobile Cloud Computing
Principal Investigators: Dr. Jie Wu (PI) and Dr. Avinash Srinivasan (Co-PI)
Submitting Organization: Temple University
REU Site Location: Temple University, Philadelphia, Pennsylvania
Fields: Computer science, mobile computing, wireless communication, cloud computing, and security
Number of undergraduate participants per year: 10
REU Site Period: Summer REU site
Duration: 8 weeks
International/Ethics/RET component: N/A
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Project summary: We propose to continue the Temple University REU Site and hereby request its renewal. If renewed, the Site will help us continue our efforts towards offering research opportunities to undergraduate students, specifically for women, and underrepresented and minority students, aspiring to gain knowledge in mobile cloud computing. Mobile cloud computing is an emerging research area that encompasses mobile computing, wireless networking, and cloud computing. Our primary target for participants focuses on underrepresented groups in STEM, as well as students from institutions with limited research infrastructure and opportunities. This new REU Site will be led by PI Jie Wu and Co-PI Avinash Srinivasan, and supported by a team of faculty mentors, Drs. Ola Ajaj, Bo Ji, Justin Y. Shi, and Chiu C. Tan. The proposing team has extensive experience working with undergraduate students. This new proposal also brings in three young blood to the program team – Co-PI Srinivasan, with extensive experience in undergraduates and non-traditional program/training development, and Drs. Ajaj and Ji as faculty mentors, both with strong industry experience. The proposed Site will be an 8-week summer program, bringing in 10 participants each year.

Intellectual merit: Mobile computing, having become manifested as the ubiquitous smartphone, has become an inseparably integral part of the common mans' life. However, the small form factor of the phone, coupled with the dearth of computational resources and energy, has challenged their ubiquity. Then came cloud computing, overflowing with resources, to the rescue of mobile computing, challenged with scanty resources. This marriage of domains provided the necessary empowered mobile computing to leverage a plethora of resources from the cloud, which ensued unparalleled advances in both these domains. Subsequently, the convergence gave birth to novel applications, such as *crowdsourcing* and *participatory sensing*, that hinge on the seamless integration of large-scale (cloud) and small-scale mobile computing resources. Unfortunately, these advances have also introduced newer and more sophisticated attack vectors making security and forensics analysis extremely challenging.Therefore, training students in this ever-evolving field is extremely important toward the development of a highly competent and skilled future workforce. A key challenge in mobile cloud computing is the need for expensive resources, which are hard to find at institutions with limited research infrastructure and opportunities. CIS at TU posses unique state-of-the-art resources to provide hands-on training to participants.

Broader impacts: Participants in the proposed Site will gain exposure to the latest developments in the areas of mobile, wireless, and cloud computing, and acquire valuable hands-on experience and training. This combination, from our previous experience, will help inspire undergraduates to continue to pursue higher education in both computer science and other broad STEM areas. The Philadelphia district happens to be the 2^{nd} hungriest in the nation, and therefore, the opportunities for aspiring students from the neighborhood colleges are limited, especially at community colleges. Consequently, with the potential for local students to participate, this Site will have a profound impact on the community. We were very successful in attracting minority students in the previous site and with the proposed site we will focus on recruiting 10-20% students from the poverty stricken local colleges, with special efforts towards community colleges.

Key Words: Computer science, mobile computing, wireless communication, cloud computing, and security.