



Newsletter No. 28
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Intel University Collaboration Symposium 2013

Foreword

This issue briefly reports on significant events in Intel University Collaboration Symposium 2013. As one of the collaboration member, Intel-NTU Connected Context Computing Center was invited to participated in the symposium. The workshop laid out the future challenges in internet of things (IoT) and provided solutions for the upcoming challenges. One remarkable announcement in Intel UCS 2013 is Intel's Early Career Faculty Honor Program. The only awardee from Taiwan, Michael Hsin-Mu Tsai, one of the PIs of Intel-NTU Center, is from National Taiwan University.

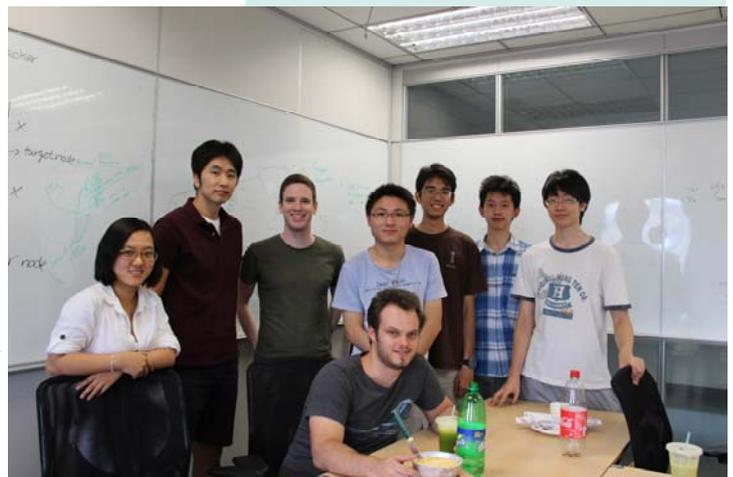
As one of the collaboration member, Intel-NTU Connected Context Computing Center (Intel-NTU Center) participated in Intel University Collaboration Symposium 2013 (Intel UCS 2013) on June 25-26, 2013. The symposium started with a presentation arguing the increased importance of collaboration between academic, industry, and government. In fact, this principle underpins the Intel-NTU Center which is one of Intel's twelve exploratory research communities around the world. The goal of these exploratory research communities is to accelerate university research in areas known to be strategic to Intel and infuse Intel with game-changing ideas, from invention to innovation.

Limor Fix, the director of Intel University Collaborative Research, pointed out the fact that (a) there will be big society challenges we are going to facing; (b) we need to solve these with core technologies in system level and policy level (Innovate and Invent); (c) new technology will also bring big changes; (d) academia and industry and government

Monthly Event

Summer Intern Program

- The summer intern program is coming to the second month towards the end. During the period, they share their findings weekly. There will be a two-day presentations on their achievements at the end of August.



have the power to facing these big changes and challenges. Potential threats and big challenges we are going to facing are water, food, habitat, health, education, energy, security, transportation, communication issues. To resolve these issues, we need “Innovate and Invent”, including core technologies and also system policies. The resources we have is computing society to solve these problems, like sensing → communicate → store → compute (manipulate). There are also new/emerging additional resources, including mobile computing, data centers, social network, crowd sourcing, big data, analytics, machine learning, internet/wireless, green technology from the technology perspectives. On the other hand, from the “SYSTEM” perspectives, the challenges we will face are to understand user needs, to build systems of systems, to collaborate across disciplines (university should lead the way), to establish policy and standards, and most importantly to develop new business model. Industry + University + Government fully integration is the key for 21st century challenges.



Figure 1: Limor Fix's keynote speech

Three workshops were arranged with the following theme, Data Society, Heterogeneous System, and Intelligent Everything. One of the related themes to our center is the workshop named “Intelligent Everything,” in which Vida Ilderem, Vice President of Intel Labs and Director of Integrated Platform Research, delivered a speech “How the internet of things will happened in the long term, not only from the technology side, but also social side?” She explained that the common elements in internet of things (IoT) are Intelligence (processing and control), Interconnect (communication), and Instrumentation (sensing). For the sensing system challenges and opportunities, we need a real-time processing system to move compute closer to data to have compute resources decline in cost, and increase power efficiency. We also need intrinsic correlations among multiple data streams to share network bandwidth with nodes may be connected over constrained networks. A greater need for security and manageability of sensor is necessary for all IoT systems. From the security perspective, we need distributed interactions between nodes, anomaly detection, diverse capabilities on sensors, gateways, servers, etc. We need to have different processing, storage, crypto, power, adapted to do encryption, self-fault detection and healing due to scale and real-time nature. From the manageability perspective, autonomous manageability to the lower common element, discovery, subscription/provision, policy-based access control, confidentiality, and integrity control are all essential to IoT systems. The challenges on the IoT nodes are to have perpetual wireless sensing capability, and users can set and forget. The node should have capabilities for low power sensing, pre-process to reduce communication energy, low power radio, and even zero-power processing with energy harvesting technologies.

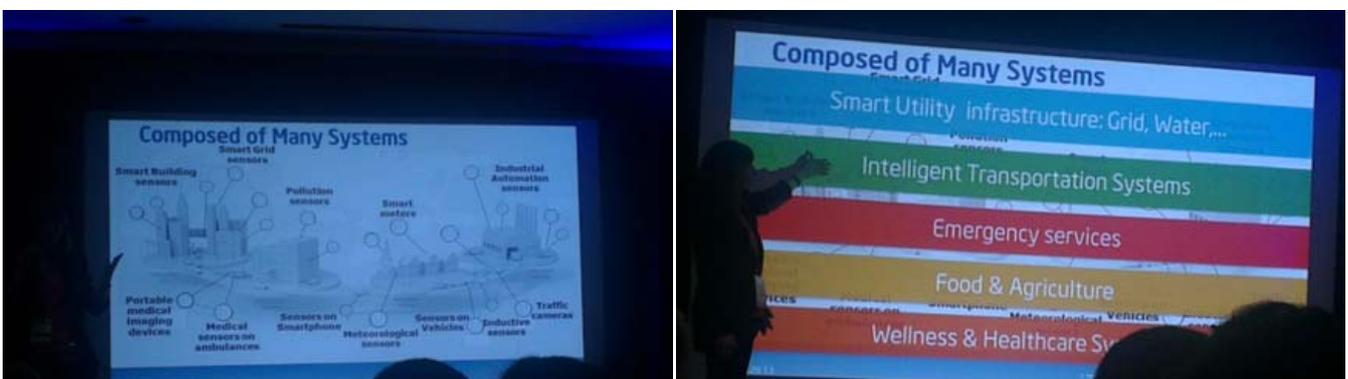


Figure 2: Vida Ilderem's keynote speech

For the following, another series talk, "IoT: Another Long Tail?" moderated by Mark Abel. Lightening talks from Intel researchers and professors from academia highlights the thoughts from the application and technology perspectives, covering automobiles, healthcare, retailing, agriculture, etc. After the lightening talks, there are many interesting discussions lead by the moderator and panelists (speakers of lightening talks) to debate there will be killer apps for IoT or IoT will be long tail. There is no solid conclusion in the end. Then another series talk, "Why isn't everything Intelligent yet?" moderated by Yen-Kuang Chen, Associate Director, Intel-NTU Connected Context Computing Center. After the lightening talks, all participants have to choose from four discussion groups, including energy harvesting, video sensor/natural language processing, anticipatory reasoning / modeling / prediction, and IoT framework / interoperability. The leader of each group presented a summary and highlight of each group. Generally speaking, the technology barriers may be there, but should not be the major barrier of IoT to be realized someday. As mentioned earlier by Vida in the earlier section, the major barrier should be about business model, how people can make money from this, and how the complex eco-system can be connected and realized.



Figure 3: Mark Abel's talk



Figure 4: Yen-Kuang Chen's talk

One remarkable announcement in Intel UCS 2013 is Intel's Early Career Faculty Honor Program which provides financial and networking support to those faculty members who are early in their careers and show great promise as future academic leaders in disruptive computing technologies. This year, 10 faculty members from US and Taiwan were chosen as awardees for being leaders in their respective fields of research. The only awardee from Taiwan, Michael Hsin-Mu Tsai, is from National Taiwan University and is also one of the PIs of Intel-NTU Center.



Figure 5: Michael Tsai given Intel's Early Career Faculty Honor Program award



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