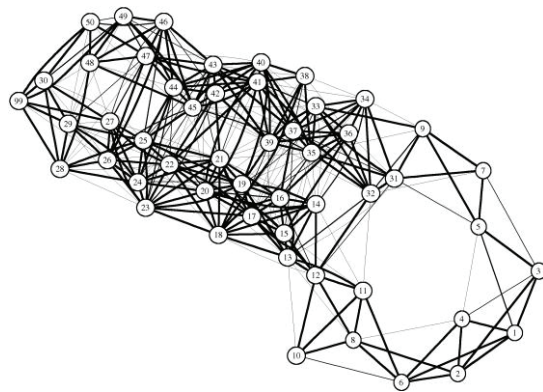


Hideya Ochiai, Associate Professor	Hongo Campus Eng. Bldg. #2	Sensor Network Engineering
---------------------------------------	-------------------------------	-------------------------------

Ochiai laboratory studies the integration of sensors and communications -- in short, we study the Internet of Things (IoT) related technologies and applications. In 2010s, communication devices became more and more sophisticated, and any kinds of machines, things, and facilities can be easily connected to the Internet. Federation with various information sources on the Internet is also making these machines, things, and facilities work as new functions of our society. The problem is that these technologies require sophisticated integration skills for actual deployment, and that only a few engineers can implement it. It is necessary to clear such implementation barriers to widely deploy into the society.

1. Delay/Disruption Tolerant Network

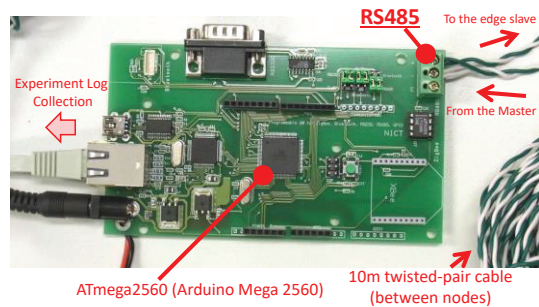
Wireless, multi-hop communication networks are basically unreliable regarding to data loss, and scalability. We apply delay / disruption tolerant networking architecture for this kind of network to enable 100% delivery -- reliable network system.



2. All-IP Sensor Network

All the sensors in the world are directly getting connected to the Internet. This trend suites to the Internet Architecture - making it independent from lower-layer concrete communication media. There are actually many challenges in this field, e.g., because we are applying IP to low power, narrow-band, and lossy media.

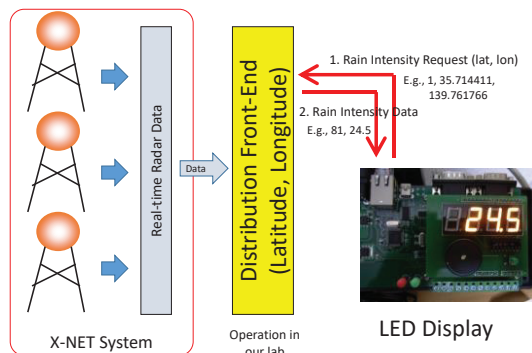
A Disruption Tolerant Network deployed in a Building of UoT



3. Federation with Application Data

Weather radar can detect very-local heavy rain with 100mx100m geographical mesh in real-time. Federation with this kind of information source will allow smart-warning, to activate water stop plates for avoiding water invasion into underground floors, to control skylight windows for agricultural green houses, to control HVAC system for managing electric powers in Smart Grid.

All-IP Sensor Network Testbed



Application of Weather Radar Data to Control Systems