

Advisor	Prof. Yoshihiro Kawahara	Location	Hongo	Area	Ubiquitous Computing
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Our research laboratory has contributed to designing a smart and attentive user environment (ubiquitous computing environment) in collaboration with Professor Asami's laboratory.

Realization of ubiquitous computing is attributed not only to new materials and miniaturization of electronics devices. It is also important to develop network technologies to coordinate heterogeneous devices, system and modeling technologies to deal with complex real world, and come up with new application services which has social significance.

Mission of our master course student is to find the essence behind daily inconvenience and model the problem to solve with the simplest solution. In addition to this mission, a doctor course student is expected to reach out to society about radical and revolutionary changes in human life.

Areas of interest include, but are not limited to followings.

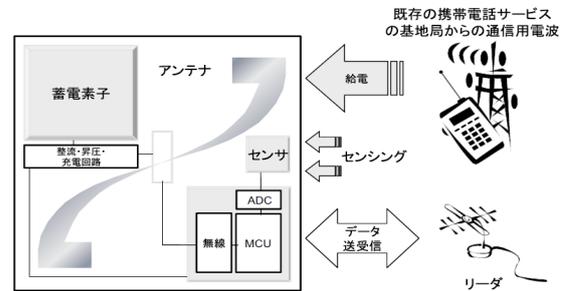
Smart Environment

A Lowcost sensing platform using ambient RF energy.

Energy supply is one of the main concerns for long-term operation of Wireless Sensor Networks deployed in a real environment. Quite a few research activities have been proposed in respect to energy saving technology of both hardware devices and software technologies including communication protocols. In our living environment, various electro magnetic waves including communication radio wave and noise from electronic devices exist. In this paper we propose to harvest electrical energy of hundreds uW from such energy sources to power sensor network nodes.

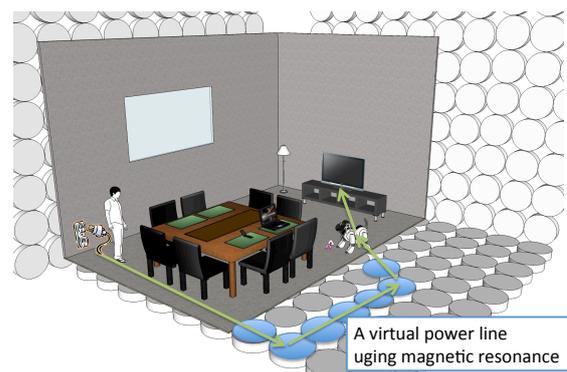
To assess the feasibility of this approach, we report measurement results of electrical field strength of several frequency bands under our daily living environment. Then we estimate the maximum amount of energy from these sources. Our prototype rectenna could generate sufficient energy for an electrical circuit from TV broadcasting signal.

This project is supported by NEDO and performed in collaboration with Professor Manos Tentzerises group at Geroriga Institute of technology.



Wireless Power Transfer

Communication has become wireless. However many technical challenges remain undone in wireless power transfer. In this research project, we are developing a wireless power transfer system which is low-cost, energy efficient and safe to human body. Different from existing wireless power transfer system such as magnetic induction and microwave power transfer, we choose magnetic resonance. Exploiting multiple antenna which are aligned next by next, our system can “route” electric power using magnetic resonance. This approach extends coverage area as well as improves energy efficiency.



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