

Message from the President

In April 2008, the University of Aizu was reorganized from two departments into three divisions, computer science, and computer engineering and information systems. Based on this reformed organization, our students attained numerous great achievements by winning the Nifty gold medal, prizes at international competitions, including winners Health 2.0 Developers World cup finals 2013. and excellent awards at international conferences.

I would like to introduce the activities and visions of three divisions, which succeeded to foster our students to high levels.

Computer Science Division The mission of computer science division is to foster not only system engineers who can design, integrate, and different computers, but also computer scientists who can understand and create advanced theories and algorithms for modeling and for solving various engineering and scientific problems. This division was established for the latter purpose. The common mission of the professors in this division is to educate persons who are talented enough to understand computer science related knowledge, and touch enough to solving practical problems.

This division consists of four clusters, mathematics and physics, mathematical modeling, computer foundation and intelligent systems.

The professors have studied and will continue to study the following topics: modeling of quantum computing and development of next generation computing elements; development of new technologies for cryptography and steganography; mathematical modeling of computers and development of new methodologies for solving large scale and complex problems(e.g. heart modeling, social modeling and air radiation modeling); modeling of perception, awareness, cognition and proposal of key technologies for intelligent computing, intelligent service and intelligent spaces.

Computer Engineering Division The members in the division are contributing to the strategic researches of the university. More specifically, they are researching and supervising students in the fields of the advanced networks and high performance computing. Besides, many members are working on hardware design and embedded systems as the fundamental basis of the above two strategic directions. The faculty members have very active in organizing workshops and conferences in Aizu, to create the opportunities for students, faculty and local engineers to exchange their ideas and research results with researchers and engineers coming from all over the world, such as IEEE 6th International Symposium on Embedded Multicore SoCs , Vietnam-Japan ICT Workshop and UMEDIA 13. Five members

received “Best paper awards” and four members received awards from Funai foundation and organizations of foreign countries. They are aiming toward high level computer engineering education, specially enhancing transfer of hands-on experience to students. They have been providing research-oriented education, which gives the opportunities for undergraduate students to touch high level research topics and obtain practical skills from junior year. They are also planning to improve the exercise classes with projectbased exercises evolving from introduction courses to advanced courses. Furthermore we are considering organizing flexible virtual R&E centers consisting of members of several laboratories, to further enhance the cooperation for the high level research and education.

Information Systems Division Laboratories in the division perform research and development on new approaches, methods, and software for the acquisition, processing, storage, and dissemination of visual, video, audio, textual, and numerical information, including graphics and computer interfaces, and industrial applications. Faculty publish around 40 journal papers and 80 conference papers per year. They regularly organize international scientific meetings and conferences. While research of each laboratory is worth describing, let us consider just a few examples of interesting scientific work. Considerable progress has been made by the team of researchers towards development of an application platform in a multipurpose distributed environment for various applications by combination of heterogeneous software and information components using new software methodology named Virtual Model View-Controller. Based on this approach, the High performance Service-Oriented Tsunami Modeling Environment, which will allow analyzing tsunami wave parameters and impact effects, is being developed. The research is also focused on local features of bathymetry and coastal areas of Fukushima prefecture. Special attention is paid to acceleration of computationally intensive parts of modeling process by embedding GPU processors and designing parallel algorithms.

The biomedical information technology laboratory performs research, enhancing social contributions through casting academic results into practice. Diversified modalities for seamless monitoring of physiological information is developed by making use of various physical and chemical principles, revealing statistical links between dynamic changes in health conditions and various factors in temporal and spatial domains by mathematical modeling and interpretation of multifarious vital parameters, fostering a new discipline, “Healthology”. Relational Database Query Language for Big Data analysis of Medical Information Repositories are under development in the Database System Lab. Existing keyword-based research engines such as Google fail to address the needs of health-care workers, who often

receive results which are irrelevant and not useful for their tasks. As a result, seeking medical information through queries is gaining importance in the medical domain. The Image Processing Lab works on development of image recognized methods and their applications, such as object recognition in images and videos, 3D reconstruction from multiple images and human identification from motions. Also, the laboratory designs autonomous weeding robots, which move around in actual rice fields for automated rice farming.

We would like to make the best use of our results for society and business/industry. My best and warmest regards to all of you.



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President