

The 2nd Hosei University IIST International Colloquium

Introduction of the Research Projects on Integrated Science and Technology at Hosei University

第2回法政大学 IIST 国際コロキウム

法政大学 IIST における総合理工学研究プロジェクト紹介

This colloquium is to introduce current research projects on integrated science and engineering at IIST, Hosei University. Part 1 of the colloquium will introduce selected projects of IIST doctoral and master's students. The researches of two IIST faculties will be presented in the Part 2 of the colloquium. Professor Capi will be introducing his research on assistive robotics and Professor Zhou will present her research on multimedia coding theory and practice.

本コロキウムは法政大学 IIST における研究プロジェクトの紹介を目的としている。第一部では IIST 在籍の博士、修士課程の学生により植物医科学をテーマとした研究プロジェクトが紹介される。第二部では教員の研究紹介を行う。チャピ教授の支援ロボットに関する研究紹介、及び周准教授によるマルチメディアコーディングの理論と実査について発表がある。

Date and Time: 9:30-11:30 a.m. Mar. 1st, 2017

日時: 2017年3月1日 午前9:30-11:30

Venue: Multimedia Hall, B1F Building West, Hosei University Koganei Campus

3-7-2 Kajino cho, Koganei City, Tokyo 184-8584 JAPAN

会場: 法政大学, 小金井キャンパス, 西館地下 1F マルチメディアホール

〒184-8584 東京都小金井市梶野町 3-7-2

JR 東小金井駅より徒歩 10 分 <http://www.hosei.ac.jp/access/koganei.html>

Host: Hosei University IIST: Institute of Integrated Science and Technology

主催: 法政大学・ IIST (総合理工学インスティテュート)



PROGRAM (プログラム)

09:30-09:35 OPENING MESSAGE (開会の辞)
Prof. Kazuo Yana, Vice President, Hosei University

SESSION 1 (第一部)

09:35-09:55 Cap Huu Quan and Eriha Fujita (1st Year Master Students, IIST, Hosei Univ.)
Leaf image classification by the deep learning technology for the plant clinical diagnoses
【ディープラーニング技術を用いた葉の画像診断による植物病診断】

09:55-10:15 Truong Hong Hanh (2nd Year Doctoral Student, IIST, Hosei Univ.),
Title TBD
【演題未定】

10:15-10:30 INTERMISSION (休憩)

SESSION 2 (第二部)

10:30-10:55 Prof. Jinjia Zhou,(IIST, Hosei University)
A 4Gpixel/s 8/10b H.265/HEVC Video Decoder Chip for 8K Ultra HD Applications
【8K 超高解像度 H265/HEVC ビデオデコーディングチップ】

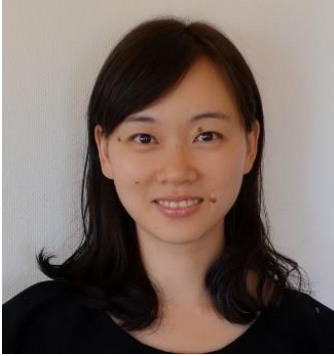
10:55-11:20 Prof. Genci Capi, (Robotics Eng., Hosei Univ.)
Intelligent Assistive Robots Operating in Real Environments (Video Presentation)
【知的福祉ロボットの実用化例】

11:20-11:30 CONCLUDING REMARKS (閉会の辞)
Prof. Nguyen Ngoc Binh, VNU Univ. of Engineering and Technology (VNU-UET).

Assoc. Prof. Jinjia Zhou, (IIST, Hosei University)

A 4Gpixel/s 8/10b H.265/HEVC Video Decoder Chip for 8K Ultra HD Applications

【8K 超高解像度 H265/HEVC ビデオデコードチップ】



ABSTRACT: 8K Ultra HD is being promoted as the next-generation digital video format. From a communication channel perspective, the latest high-efficiency video coding standard (H.265/HEVC) greatly enhances the feasibility of 8K by doubling the compression ratio. Implementation of such codecs is a challenge, owing to ultrahigh throughput requirements and increased complexity per pixel. The former corresponds to up to 10b/pixel, 7680×4320pixels/frame and 120fps – 80× larger than 1080p HD. The latter comes from the new features of HEVC relative to its predecessor H.264/AVC. The most challenging of them is the enlarged and highly variable-size coding/prediction/transform units (CU/PU/TU), which significantly increase: 1) the requirement for on-chip memory as pipeline buffers, 2) the difficulty in maintaining pipeline utilization, and 3) the complexity of inverse transforms (IT). This talk presents an HEVC decoder chip supporting 8K Ultra HD, featuring a 16pixel/cycle true-variable-block-size system pipeline. The pipeline: 1) saves on-chip memory with a novel block-in-block-out (BIBO) queue system and a parameter delivery network, and 2) allows high design efficiency and utilization of processing components through local synchronization. Key optimizations at the component level are also presented.

BIOSKETCH: Jinjia Zhou received B.E. degree from Shanghai Jiao Tong University, China, in 2007. She received M.E. and Ph.D. degrees from Waseda University, Japan, in 2010 and 2013, respectively. From 2013 to 2016, she was a junior researcher with Waseda University, Fukuoka, Japan. Currently she is an Associate Professor with Hosei University, Tokyo, Japan. Her interests are in algorithms and VLSI architectures for multimedia signal processing, especially in low-power high-performance VLSI design for video codecs including H.265/HEVC (High Efficiency Video Coding) and H.264/AVC. Dr. Zhou received the research fellowship of the Japan Society for the Promotion of Science during 2010-2013. She is a recipient of the Chinese Government Award for Outstanding Students Abroad of 2012. Dr. Zhou received the Hibikino Best Thesis Award in 2011. She was a co-recipient of the best student paper award of VLSI Circuits Symposium 2010 and the design contest award of ACM ISLPED 2010. She participated the design of the world first 8K UHD TV video decoder chip, which was granted the 2012 Semiconductor of the Year Award of Japan. She works as a reviewer for journals including IEEE Trans. Circuits Syst. Video Tech., IEEE Trans. Circuits Syst. I, IEEE Trans. VLSI Syst., and IEEE Trans. Multimedia. This talk was given at IEEE International Solid-State Circuits Conference (ISSCC 2016). The paper related to this talk received the ISSCC 2016 Takuo Sugano Award for Outstanding Far-East Paper.

Prof. Genci Capi, (Robotics Eng., Hosei Univ.)

Intelligent Assistive Robots Operating in Real Environments (Video Presentation)

ABSTRACT: Soon robots are expected to operate in our homes, hospitals and offices. Therefore, they have to process multiple sensors data and adapt the policy as the environment changes. In this talk, I will overview the existing efforts including our attempts at creating intelligent robots operating in everyday life environments. In particular, I will focus on remotely operating surveillance robot, robot navigation in urban environments, and assistive humanoid robot. I will show experimental results that demonstrate the effectiveness of proposed algorithms.



BIOSKETCH: Genci Capi received the Ph.D. degree from Yamagata University, in 2002. He was a Researcher at the Department of Computational Neurobiology, ATR Institute from 2002 to 2004. In 2004, he joined the Department of System Management, Fukuoka Institute of Technology, as an Assistant Professor, and in 2006, he was promoted to Associate Professor. He was a Professor in the Department of Electrical and Electronic Systems Engineering, University of Toyama up to March 2016. Now he is a Professor in the Department of Mechanical Engineering, Hosei University. His research interests include intelligent robots, BMI, multi robot systems, humanoid robots, learning and evolution. Dr. Capi is a recipient of the Excellent Paper Award of 7-th International Conference on Production Engineering, Design and Control, Alexandria, 2001; Highly Commended Award for "Real Time Generation of Humanoid Robot Optimal Gait for Going Upstars Using Intelligent Algorithms" *Industrial Robot - An International Journal* Vol. 28, No. 6, 2001; Best Paper Award of International Conference on Artificial Life and Robotics, 2007; Best Innovation Award of ICAME2010, 2010; Excellence in Research Journal Award of *Journal of Information Technology Research*, 2011. He is a leading organizer of the annual IEEE International Symposium on Robotics and Intelligent Sensors and IEEE the IEEE International Robot PRIDE Competition.