The 2nd UNIST Workshop on Advanced Networking Technology (WANT)

WANT 워크숍은 첨단 네트워킹 기술을 주제로 최신의 우수 연구결과를 교류함으로써, 네트워킹 분야의 융합와 창조적인 혁신을 이루기 위한 교류의 장을 마련하고자 합니다. 두번째 워크숍은 KAIST 이융 교수의 발표를 시작으로, 한양대 이석복 교수, 중앙대 백정엽 교수, 한양대 최준원 교수, UNIST 김효일 교수가 최신 네트워킹 연구에 대한 깊이 있는 발표를 해 주실 예정입니다. 많은 참여와 관심을 부탁 드립니다.

일 자: 2016 년 2 월 8 일(수), 13:00~18:00
장 소: 울산과학기술원(UNIST) E207
등록비: 무료 (아래 문의처로 참석자들의 성함과 소속을 알려주시기 바랍니다.)
문 의: 주창희 교수 cjoo@unist.ac.kr

프로그램

12:00 ~ 13:00	등록
13:00 ~ 13:10	개회 / 이경한 (UNIST)
13:10 ~ 14:30	Stochastic Approximation: Application to Distributed Network Algorithms and and Deep Learning / **이융 (카이스트)**
14:30 ~ 15:10	Sharing Private In-Vehicle Dashcam Videos / **이석복 (한양대)**
15:10 ~ 15:40	휴 식 (break)
15:40 ~ 16:20	Cisco's Connected Grid Mesh Network (CG-Mesh) and Recent Research on Low-power Wireless Network for Internet of Things / **백정엽 (중앙대)**
16:20 ~ 17:00	무선센서네트워크를 위한 머신러닝 기술 / **최준원 (한양대)**
17:00 ~ 17:40	QoE-aware Computation Offloading in Mobile Clouds / **김효일 (UNIST)**

오시는 길

KTX	택시 이용시, 울산역(통도사)에서 약 5 분 / 버스 이용시, 울산역에서 337 버스를 탑승하여 UNIST 에서 하차하거나 327 번, 807 번 버스를 이용하여 유니스트 입구에서 하차
승용차	경부고속도로 -> 서울산 IC -> 울산방면 24 번 국도 -> UNIST (서울산 IC 에서 약 10 분)
항공편	울산공항에서 402,452 번 버스를 이용하여 태화루에서 하차하여 807 번 버스로 환승하여 유니스트 입구에서 하차. / 5003 번 KTX 리무진을 이용하실 경우 굴화 주공아파트 앞에서 337, 733 번 버스로 환승하여 유니스트에서 하차.

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초록 (Abstract) 및 발표자 약력

13:10 ~ 14:30	**Stochastic Approximation: Application to Distributed Network Algorithms and and Deep Learning**	**Yung Yi**

Stochastic approximation algorithms correspond to recursive update rules that are used to solve optimization problems or fixed point equations when the collected data is subject to random noise. We consider two class of important problems in networking and deep learning where stochastic approximation techniques are usefully utilized. First, in computer networking problems, we exploit stochastic approximations to develop distributed control mechanisms to drive the used parameters into an optimal solution. Second, in deep learning problems, we consider a graphical model with hidden nodes under the so-called exponential family, and apply stochastic approximation techniques to achieve provable, fast convergence to certain optimal parameters.

Yung Yi received his B.S. and the M.S. in the School of Computer Science and Engineering from Seoul National University, South Korea in 1997 and 1999, respectively, and his Ph.D. in the Department of Electrical and Computer Engineering at the University of Texas at Austin, USA in 2006. From 2006 to 2008, he was a post-doctoral research associate in the Department of Electrical Engineering at Princeton University. Now, he is an associate professor at the Department of Electrical Engineering at KAIST, South Korea. His current research interests include the design and analysis of computer networking and wireless communication systems, especially congestion control, scheduling, and interference management, with applications in wireless ad hoc networks, broadband access networks, economic aspects of communication networks (aka network economics), and green networking systems. He was the recipient of two best paper awards at IEEE SECON 2013 and ACM Mobihoc 2013. He is the winner of IEEE William Bennet Award. He is now an associate editor of IEEE/ACM Transactions on Networking.

14:30 ~ 15:10	**Sharing Private In-Vehicle Dashcam Videos**	**Suk-Bok Lee**

Today, search for dashcam video evidences is conducted manually and its procedure does not guarantee privacy. In this work, we motivate, design, and implement ViewMap, an automated public service system that enables sharing of private dashcam videos under anonymity. ViewMap takes a profile-based approach where each video is represented in a compact form called a view profile (VP), and the anonymized VPs are treated as entities for search and reward instead of their owners. ViewMap exploits line-of-sight (LOS) properties of dedicated short-range communications (DSRC) such that each vehicle makes VP links with nearby ones that share the same sight while driving. ViewMap uses such LOS-based VP links to build a map of visibility around a given incident, and identifies VPs whose original videos are worth reviewing. Users upload original videos only when their VPs are verified and anonymously solicited for further human checking. ViewMap offers untraceable virtual cash to reward users for provision of videos based on their contributions. We demonstrate the feasibility of ViewMap via field experiments on real roads using our DSRC testbeds as well as simulations using traffic traces.

Suk-Bok Lee is an assistant professor in the Department of Computer Science and Engineering at Hanyang University, Korea. He received the PhD degree in computer science from the University of California, Los Angeles in 2011. His research interests include computer networks, mobile systems, and wireless networking.

15:40 ~ 16:20	Cisco's Connected Grid Mesh Network (CG-Mesh) and Recent Research on Low-power Wireless Network for Internet of Things	Jeongyeup Paek

Cisco's Connected Grid Mesh Network (CG-Mesh) is an embedded mesh network designed for smartgrid end-points within a field area network to support services such as Advanced Metering Infrastructure (AMI). CG-Mesh provides end-to-end two-way IPv6 communication network using multi-hop wireless mesh networking technology, and it can be used not only for smartgrid end points, but also potentially for many other future devices in the Internet of Things (IoT). In this talk, I'll describe the architecture, design, and protocols used within the CG-Mesh, and what are the research challenges that still remain. In addition, I will discuss recent research topics on Low-power and Lossy wireless Networks (LLN) with a focus on RPL routing protocol for LLN in IoT.

Jeongyeup Paek is currently an assistant professor at Chung-Ang University, School of Computer Science and Engineering, Seoul, Republic of Korea. He received his B.S. degree from Seoul National University in 2003 and his M.S. degree from University of Southern California in 2005, both in Electrical Engineering. He then received his Ph.D. degree in Computer Science from the University of Southern California (USC) in 2010 where he was a member of the Networked Systems Laboratory (NSL) led by Dr. Ramesh Govindan. He worked at Deutsche Telekom Inc. R&D Labs USA as a research intern in 2010, and then joined Cisco Systems Inc. in 2011 where he was a Technical Leader in the Internet of Things Group, Connected Energy Networks Business Unit (formerly the Smart Grid Business Unit). In 2014, he was with the Hongik University, Department of Computer Information Communication as an assistant professor.

16:20 ~ 17:00	무선센서네트워크를 위한 머신러닝 기술	Jun Won Choi

본 세미나에서는 최근 많은 관심을 받고 있는 머신러닝 기술을 이용한 무선센서네트워크 기술에 대해서 살펴본다. 다이내믹하고 복잡한 환경에서 센서 네트워크의 지연시간, 전송량, 데이터 분석성능을 향상하기 위해서는 빅데이터를 이용하는 머신러닝 방법이 효과적일 수 있다. 본 세미나에서는 다양한 머신러닝 기법 중에 특히 딥강화학습의 원리에 대해서 간단히 설명하고 이를 이용한 센서네트워크 운영 및 최적화 적용사례에 대해 분석해 본다. 또한 무선 센서네트워크에서의 라우팅, 위치측위 및 추적, 분산데이터처리, 특정이벤트검출등의 문제들에 대한 머신러닝 응용 방법에 대해서도 소개한다.

한양대학교 **최준원** 교수는 서울대학교 전기공학부 학사 석사를 마치고 어바나 샴페인 일리노이 주립대에서 박사학위를 취득하였다. 이후 미국 샌디에고 퀄컴 연구소에서

근무하였고 2013년부터 현재까지 한양대학교 전기생체공학부 조교수로 재직하고 있다. 최준원 교수의 연구분야는 신호처리와 머신러닝으로 현재 배열안테나/압축센싱을 이용한 밀리미터파통신 및 레이더 기술, 압축센싱이론, 머신러닝을 이용한 자율주행기술에 대해 활발히 연구하고 있다.

17:00 - 17:40	**QoE-aware Computation Offloading in Mobile Clouds**	**Hyoil Kim**

Computation offloading is a promising application of mobile clouds that can save energy of mobile devices via optimal transmission scheduling of mobile-to-cloud task offloading. Existing approaches to computation offloading have addressed various aspects of the tradeoff between energy consumption and application latency, but none of them explicitly considered the dependency in optimization on the mobile user's context, e.g., user tendency, the remaining battery level. This talk introduces our work that captures such a user-centric perspective in the energy-latency tradeoff via a quality-of-experience (QoE) based cost function, and formulates the problem of data offloading scheduling as dynamic programming (DP). To derive the optimal schedule, we first introduce a database-assisted optimal DP algorithm and then propose a suboptimal but computationally efficient approximate DP (ADP) algorithm based on the limited lookahead technique. Extensive numerical evaluation revealed that the ADP algorithm achieves near-optimal performance and much enhances QoE compared to the energy-only scheduling.

Hyoil Kim is an associate professor at the School of ECE, UNIST, Korea, and worked as a postdoctoral researcher at the IBM T.J.Watson Research Center, USA in 2010–2011. He received his B.S. degree in EE from Seoul National University, Korea in 1999, and M.S. and Ph.D. degrees in Electrical Engineering: Systems from the University of Michigan in 2005 and 2010. His research interests lie in wireless networking with an emphasis on cognitive radios (CR), mobile cloud, WLAN and LTE, and 5G communications. He is a senior member of the IEEE, and an editor of Journal of Communications and Networks (JCN).