

Byungchul Park

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Research Interests

Internet traffic measurement and analysis; Intelligent traffic classification; Content-centric networking

Education

Degree	Year	University	Field
Ph.D	2012	POSTECH, Pohang, Korea	Computer Science and Engineering
		<i>Thesis:</i> Fine-grained Traffic Classification based on Functional Separation	
		<i>Advisor:</i> Prof. James Won-Ki Hong	
B.S.	2006	POSTECH, Pohang, Korea	Computer Science and Engineering

Experience

Title	Organization	Year
Postdoctoral Researcher	INRIA, Sophia Antipolis, France	10/2012 – Present
Postdoctoral Reseacher	Division of ITCE, POSTECH, Korea	03/2012 – 09/2012
Research Internship	Microsoft Research Asia, Beijing, China	09/2008 – 03/2009
Research Internship	DP&NM Lab. POSTECH, Korea	12/2003 – 12/2005

Awards

Title	Organization	Year
Best Promotional Video Awards	IEEE/IFIP NOMS	2010
Student Travel Grants	IEEE/IFIP IM	2009
	IEEE/IFIP NOMS	2008
Best Paper Award	Korean Network Operations and Management Conference	2008
Academic Scholarship	POSTECH (given to the student with highest grade)	2003

Miscellaneous

Title	Organization	Year
TPC	Asia Pacific Network Operations and Management Symposium	2013
Invited Paper Reviewer	International Journal of Network Management, Wiley	03/2012 – Present
Teaching Assistant	POSTECH, Korea (Introduction to Computing)	03/2011 – 06/2011
	POSTECH, Korea (Introduction to Computing)	03/2010 – 06/2010
	POSTECH, Korea (Digital System Design)	05/2011 – 06/2011
Nationwide University Entrance Exam	Korea Institute for Curriculum and Evaluation Percentile Rank : 99.13	2001

Publications: Journal

1. Byungchul Park, Youngjoon Won, JaeYoon Chung, Myung-sup Kim, and James Won-Ki Hong, "Fine-grained Traffic Classification based on Functional Separation", International Journal of Network Management (IJNM). Accepted to appear **(SCIE)**
2. Young J. Won, Mi-Jung Choi, Byungchul Park, and James W. Hong, "An Approach for Failure Recognition in IP-Based Industrial Control Networks and Systems," International Journal of Network Management (IJNM) **(SCIE)**
3. Byungchul Park, Young J. Won, and Jame Won-Ki Hong, "Toward Fine-grained Traffic Classification," IEEE Communications Magazine, vol. 49, Issue 7, July, 2011. pp. 104--111. **(SCI)**

Publications: Conference

1. Yeongrak Choi, Jae Yoon Chung, Byungchul Park, and James Won-Ki Hong, "Automated Classifier Generation for Application Level Mobile Traffic Classification," 13th IEEE/IFIP Network Operations and Management Symposium (NOMS 2012), Hawaii, USA, April 16-20, 2012, pp. 1075--2081.
2. Jae Yoon Chung, Yeongrak Choi, Byungchul Park, and James Won-Ki Hong, "Measurement Analysis of Mobile Traffic in Enterprise Networks," 13th Asia-Pacific Network Operations and Management Symposium (APNOMS 2011), Taipei, Taiwan, Sep. 21-23, 2011, pp. 1--4.
3. Jae Yoon Chung, Byungchul Park, Young J. Won, John Strassner, and James W. Hong, "An Effective Similarity Metric for Application Traffic Classification," 12th IEEE/IFIP Network Operations and Management Symposium (NOMS 2010), Osaka, Japan, April 19-23, 2010, pp. 286--292.
4. Seong-Cheol Hong, Jin Kim, Byungchul Park, Young J. Won, and James W. Hong, "Traffic Growth Analysis over Three Years in Enterprise Networks," 15th Asia-Pacific Conference on Communications (APCC 2009), Shanghai, China, Oct. 2009, pp. 896--899.
5. Jae Yoon Chung, Byungchul Park, Young J. Won, John Strassner, and James W. Hong, "Traffic Classification Based on Flow Similarity," 9th IEEE International Workshop on IP Operations and Management (IPOM 2009), Venice, Italy, Oct. 2009, pp. 56--77.
6. Byungchul Park, Young J. Won, Hwanjo Yum and James Won-Ki Hong, "Fault Detection in IP-Based Process Control Networks using Data Mining Technique," 11th IFIP/IEEE International Symposium on Integrated Network Management (IM 2009), New York, USA, June 2009, pp. 211--217.
7. Byungchul Park, Young J. Won, Mi-jung Choi, Myung-Sup Kim, and James W. Hong, "Empirical Analysis of Application-level Traffic Classification using Supervised Machine Learning," 11th Asia-Pacific Network Operations and Management Symposium (APNOMS 2008), Beijing, China, Oct. 2008, pp. 474--477.
8. Byung-Chul Park, Young J. Won, Myung-Sup Kim, and James Won-Ki Hong, "Towards Automated Application Signature Generation for Traffic Identification," 11th IEEE/IFIP Network Operations and Management Symposium (NOMS 2008), Salvador, Brazil, April 2008, pp. 160--167.

9. Young J. Won, Byung-Chul Park, Mi-jung Choi, James W. Hong, Hee-Won Lee, Chan-Kyu Hwang, Jae-Hyoung Yoo, "End-User IPTV Traffic Measurement of Residential Broadband Access Networks," 6th IEEE International Workshop on End-to-End Monitoring Techniques and Services (E2EMON 2008), Salvador, Brazil, April 2008, pp. 95--100.
10. Young J. Won, Byung-Chul Park, Mi-Jung Choi, and James Won-Ki Hong. "Service-based Charging Scheme for Mobile Data Networks," 1st KICS International Conference, Yanbian, China, Aug. 23--25, 2007.
11. Young J. Won, B.C. Park, S.C. Hong, K.B. Jung, H.T. Ju, James W. Hong, "Measurement Analysis of Mobile Data Networks," Passive and Active Measurement Conference (PAM 2007), Louvain-la-neuve, Belgium, April 5-6, 2007, pp. 223--227.
12. Young Joon Won, Byung-Chul Park, Myug Sup Kim, Hong-Tek Ju, and James Won-ki Hong, "A Hybrid Approach for Accurate Application Traffic Identification," IEEE/IFIP E2EMON, Vancouver, Canada, April 3, 2006, pp. 1--8.

Presentation/Talk

1. Byungchul Park, Damien Sauce, and Chadi Barakat, "Trace driven user demand modeling on CCN", CCNxCon2013 community meeting, Palo Alto, USA, September 4-5, 2013.

Domestic Journal/Conference Papers

2 journal & 10 conference papers (in Korean), available upon request

Research/Project Experience

Design and Implementation of Mobile Traffic Classification Methodology

Funded by Microsoft Research Asia (2011 – Present)

This research project aims at developing a novel application-level traffic classification methodology to monitor and analyze mobile traffic. The key challenges are the different traffic characteristics of mobile traffic compared to traditional Internet traffic and the limited computing resources of mobile devices. My role in this project includes, but is not limited to developing methodologies for discrimination of mobile traffic from the mixture of mobile and non-mobile traffic and a new application-level mobile traffic classification.

Highly Manageable Network and Service Architecture for Next Generation (HiMang)

Funded by Electronics and Telecommunications Research Institute (ETRI) (2010 – Present)

HiMang is a part of 3-year-long government funded project. This research project is to develop a novel autonomic and cognitive approach to providing a highly manageable network and service management architecture for current as well as future networks. It is based on using an innovative knowledge representation methodology that unifies disparate knowledge sources and greatly improves learning, decision-making, and reasoning in management systems. My work involves investigating traffic monitoring methodologies for HiMang architecture.

IT Convergence for Ubiquitous Autonomic Systems

Funded by Ministry of Education, Science, and Technology, Korea (2009 – Present)

This is part of the research work proposed under our World Class University grant from the Korean government. My work includes investigating how autonomic mechanisms can be applied to manage new ubiquitous computing systems that use bio-informatics, nano-technologies, and networking technologies for building ubiquitous computing applications (called ubiquitous health and ubiquitous environment applications in Korea).

Collect, Analyze, and Share for Future Internet (CASFI) – Manageability of Future Internet

Funded by Ministry of Knowledge Economy, Korea (2008 – Present)

CASFI is a 5-year-long government funded project (managed by Prof. Sue Moon) that focuses on a high-precision network performance measurement and analysis. This project develops performance measurement and analysis mechanisms for the current Internet; these efforts are expected to provide insight into developing better manageability approaches for the Future Internet. I have focused on examining different manageability challenges for the Future Internet. For instance, I have developed an automated signature generation system and similarity-based traffic classification algorithms. I have also given a talk at the CAIDA-WIDE-CASFI annual joint workshop in 2010.

Data Center Networking

Internal project, Microsoft Research Asia (2008 – 2009)

In this project, we worked on several aspects of data center networking (DCN) including DCN architecture, DCN infrastructure consolidating, DCN measurement and management, DCN resource management and congestion control, traffic engineering and power control, and application and OS support in DCN. I was responsible for developing a method for measuring and monitoring data center internal traffic. I also managed detecting performance bottleneck of a data center.

Fault Detection & Prediction for Industrial Control Networks

Funded by POSCO (2008-2009)

This work was a follow-on project expanded upon the Fault Monitoring project of POSCO that is to be explained below. I successfully extended the capabilities of their existing fault diagnosis system so that it includes functions of fault prediction and adaptive decision based on machine learning.

Load testing for network-based home robots via simulation

Funded by Korea Telecom (2007 – 2008)

A network-based intelligent service robot, called a ubiquitous robotic companion (URC), has been introduced recently. URC robots access services, content, and application software via the Internet and provide users with intelligent services in diverse fields such as education, entertainment, health care, etc. The quality of the URC service depends on the performance of the URC robot server. Korea Telecom (KT) initiated a pilot project on URCs as a national project and started a URC robot service as a trial business in 2005. They are planning to deploy one million network-based robots to households. I was in charge of designing and implementing a network-based load testing simulation system that evaluates the URC robot management server performance

and analyzes the performance evaluation results prior to the deployment of the URC robots by testing the URC robot servers.

End-User IPTV traffic modeling and analysis

Internal Project, POSTECH (2008)

Offering IPTV to broadband access subscribers is not only a key challenge but also a prospective revenue source for ISPs. Despite of its growing importance, no comprehensive study has yet presented the traffic details of real world commercial IPTV services. We had measured commercial IPTV traffic via four different residential broadband access networks, namely xDSL, Cable, FTTB, and FTTH. Based on our observations on the IPTV traffic characteristics, we had formulated the representation for bandwidth demands in IPTV VoD services. Using this formula, we simulated the proposed model on the dedicated links where the IPTV server farm supports 200 active viewers.

Triple Play Services Traffic Impact Analysis on Broadband Access Networks

Funded by Korea Telecom (2007)

Korea Telecom provides full scale triple- and quadruple-play services over IP networks. This project focused on traffic impact analysis on broadband access networks (e.g., xDSL, FTTH) that used large-scale triple play services. It involved traffic measurement and analysis of each of the services provided, along with analyzing how the user utilized each service. I was responsible for providing analysis results and projection models for these services.

Remote Fault Monitoring System for Industrial Control Networks

Funded by POSCO (2006-2008)

This project was funded by POSCO, the second largest iron and steel manufacturer in the world. POSCO operates many different types of specialized IP networks for their manufacturing process and various business-specific uses. I participated in developing an advanced fault monitoring system for a set of their Industrial Control Networks (ICN); this system was modular and independent of any one specific ICN. I also contributed to the development of a set of related analysis techniques for handling different types of ICN-specific alarms and faults.

Traffic Analysis and Application-specific Billing Systems for Commercial Mobile Data Networks

Funded by nTelia (2006)

This was a confidential research project for a large Korean vendor. The project goal was to develop sophisticated billing schemes for Internet users over 2G and 2.5G cellular phone networks. It involved real-time packet inspection for improved classification and billing by using advanced traffic characteristic analysis in mobile data networks.

Reference

Available upon request