Wonsang Song

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Education

Columbia University, Graduate School of Arts and Sciences, New York, NY
Ph.D., Computer Science   May 2014
- Thesis title: Next Generation Emergency Call System with Enhanced Indoor Positioning
- Advisor: Professor Henning Schulzrinne

Columbia University, School of Engineering and Applied Science, New York, NY
M.S., Computer Science   February 2006

Seoul National University, Seoul, Korea
B.S., Computer Engineering   February 1997

Research Interests

Indoor Location, Location-Based Services, Mobility Management, Mobile and Multimedia Networks

Experience

Twilio, Voice Connectivity, San Francisco, CA   2013–Present
Senior Software Engineer
- Designed and implemented SIP trunking infrastructure interconnecting IP PBX and telecommunications carriers using Java-based SIP Servlet technology and Opensips. Launched SIP Trunking product in March 2015.
- Developed web-based packet visualization tool which dynamically draws SIP call flows from captured network packets. Provided to customer support in 4Q 2013.

Columbia University, Internet Real-Time Lab, New York, NY   2005–2013
Graduate Research Assistant
- Conducted research on indoor localization using smartphone's inertial sensors to determine people's floor-level vertical location in buildings. Implemented a prototype on iOS and evaluated it on Columbia campus. Submitted results to UbiComp 2013.
- Invented new polygon simplification algorithm for location-based services to minimize size of service boundary data and evaluated it using real geographic boundaries. Published at IEEE ICC 2010.
- Led development of next generation emergency communication system based on VoIP technology, funded by US Department of Transportation. Published 3 conference papers, 1 Internet Draft, and 2 patent applications including SIGCOMM 2008 demo.

Bell Labs, End to End Wireless Networking Research, Murray Hill, NJ   Summer 2011
Summer Intern

- Prototyped mobility solution for HTTP content retrieval and evaluated it with real video streaming sites. Paper published in IEEE WiMob proceedings, October, 2012.

Neogenius Ltd., Seoul, Korea   2000–2004

Co-founder and Lead Developer
- Co-founded a start-up, which provided web-based B2B procurement solution.
- Managed development team, designed overall system architecture, and made key technical decisions.

PriseTech Co. Ltd., Seoul, Korea   1997–2000

Software and Systems Engineer
- Provided technical support to 3rd party developers on IBM enterprise solutions such as WebSphere, Transaction Server, and DB2.
- Upgraded Hanbit Bank's terminal-based legacy system into 3-tier web-based system using WebSphere.

Publications

Conference Papers

1. **Wonsang Song**, Jae Woo Lee, Byung Suk Lee, Henning Schulzrinne. "Finding 9-1-1 Callers in Tall Buildings". IEEE WoWMoM '14. Sydney, Australia, June 2014.

2. **Wonsang Song**, Georg Hampel, Anil Rana, Thierry Klein, Henning Schulzrinne. "MOSAIC: Stateless Mobility for HTTP-based Application". IEEE WiMob '12. Barcelona, Spain, October 2012.

3. Mauro Femminella, Roberto Francescangeli, Gianluca Reali, Jae Woo Lee, **Wonsang Song**, Henning Schulzrinne. "Future Internet Autonomic Management Using NetServ". IEEE LCN '11 (Demo Session). Bonn, Germany, October 2011.

4. **Wonsang Song**, Jae Woo Lee, Henning Schulzrinne. "Polygon Simplification for Location-Based Services Using Population Density". IEEE ICC '11. Kyoto, Japan, June 2011.

5. **Wonsang Song**, Jong Yul Kim, Henning Schulzrinne, Piotr Boni, Michael Armstrong. "Using IM and SMS for Emergency Text Communication". IPTComm '09. Atlanta, GA, July 2009.

6. Jong Yul Kim, **Wonsang Song**, Henning Schulzrinne, Anna Zacchi, Anupam Jain, Harshavardhan Chenji, Chris Magnussen, Chris Norton, Walt Magnussen, Ian Schworer, Ken Trinh. "The Next Generation 9-1-1 Proof-Of-Concept System". ACM SIGCOMM '08 (Demo Session). Seattle, WA, August 2008.

7. Jong Yul Kim, **Wonsang Song**, Henning Schulzrinne. "An Enhanced VoIP Emergency Services Prototype". ISCRM '06. Newark, NJ, May 2006.

Technical Reports

1. **Wonsang Song**, Jae Woo Lee, Byung Suk Lee, Henning Schulzrinne. "Improving Vertical Accuracy of Indoor Positioning for Emergency Communication". Technical Report, CUCS-016-12. October 2011.

2. Jae Woo Lee, Roberto Francescangeli, **Wonsang Song**, Emanuele Maccherani, Jan Janak, Suman Srinivasan, Michael Kester, Salman Baset, Henning Schulzrinne. "NetServ: Reviving Active Networks". Technical Report, CUCS-001-12. January 2012.

3. Jae Woo Lee, Roberto Francescangeli, **Wonsang Song**, Jan Janak, Suman Srinivasan, M. Kester, Salman Baset, Eric Liu, Henning Schulzrinne, Volker Hilt, Zoran Despotovic, Wolfgang Kellerer. "NetServ Framework Design and Implementation 1.0". Technical Report, CUCS-016-11. May 2011.

Patents

1. Henning Schulzrinne, **Wonsang Song**, Jong Yul Kim. "Systems, Methods, and Media for Connecting Emergency Communications". Granted US Patent 8,565,384. October 2012.

2. Piotr Boni, Michael Armstrong, Henning Schulzrinne, **Wonsang Song**, Jong Yul Kim. "Emergency Text Communication". Granted US Patent 8,401,154. March 2013.

Internet Draft

1. Jong Yul Kim, **Wonsang Song**, Henning Schulzrinne, Piotr Boni, Michael Armstrong. "Emergency Text Messaging using SIP MESSAGE". Internet-Draft, draft-kim-ecrit-text-00. November 2009.

Book Chapter

1. John Chiaramonte, Gordon Vanauken, **Wonsang Song**, Jong Yul Kim. "Research Projects and Pilots: US Department of Transportation's NG 9-1-1 Pilot Project". In Henning Schulzrinne, Hannes Tschofenig (Eds.), *Internet Protocol-based Emergency Services* (1st edition, pp. 298-317), Chicester, UK: John Wiley & Sons. 2013.

Skills

Languages: Java, C/C++, Objective-C, JavaScript, Perl, PHP, Tcl/Tk, SQL, HTML
Network protocols: TCP/IP, HTTP, WebDAV, SIP, LoST
Web development using AJAX, JSP, and Servlet
Systems and kernel programming on Unix/Linux
Network administration on Linux and Cisco IOS
Mobile application development for iOS and Android

Awards

CS Service Award 2007 and 2008

Given to PhD students in Computer Science agreed to be in the top 10% in service contributions. Awarded for recording distinguished lecture series and posting streaming videos on the department's website.

Leadership

President, Korean CS Students Association, Columbia University 2006–2008

President, Korean Engineering Students Association, Columbia University 2008–2010