DUC BUI

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My research lies at the intersection of **natural language processing/machine learning** and usable **security/privacy**. I am building an **automated analysis system** with a **conversational user interface** to answer **privacy policy questions** to increase user understanding of these policy documents. I previously worked on **mobile systems and networks** for **5 years**. I developed **novel quality-of-service-guaranteed energy-efficient technologies** for the **Chrome web browser** and **real-time streaming**.

EDUCATION

University of Michigan, Ann Arbor, MI **2017 – present**
- PhD candidate in Computer Science · Advisor: Professor Kang Shin

Korea Advanced Institute of Science and Technology (KAIST), South Korea **2011 – 2013**
- MSc in Computer Science · GPA 4.0/4.3 (96.7/100) · Outstanding Master's Thesis Award

Hanoi University of Science and Technology, Vietnam **2005 – 2010**
- BSc in Computer Science · GPA 8.5/10 (top 1% of CS Department)

INDUSTRIAL EXPERIENCE

Google, Mountain View, CA **Software Engineering Intern** **May – Aug 2017**
- *Performance metrics for the Chrome web browser*: Added congestion tracking metrics to Chrome which quantify page load times and the responsiveness of foreground tabs when the browser loads multiple tabs simultaneously. The metrics are deployed in production to direct optimization efforts to improve the user experience when loading many tabs. I made 16 changes (added 3000+ and deleted 500+ lines of code) to the Chrome codebase. [C++]
- *Power consumption estimation from CPU usage*: Investigated the correlation between Chrome's CPU usage and power consumption to estimate the power profiles of devices in the wild. [Python, Javascript]

Samsung Electronics, Suwon, South Korea **Research Intern** **May – Sep 2015**
- *Transparent cross-device resource sharing*: Improved camera preview frame rate by 6X and reduced photo capture time across two smartphones by 4X, compared to the state of the art (Rio, MobiSys 2014), by using more efficient real-time streaming protocols; developed Unified Resource Management Framework with 11,000+ lines of C/C++ code that manages resources (camera, sensors, and apps) across multiple heterogeneous-platform mobile devices. [C, C++, CMake, Tizen OS]

Microsoft Research, Beijing, China **Research Intern** **Jan – Jun 2014**
- *Energy-efficient mobile web browsing*: Analyzed inefficiencies, developed energy-saving techniques, and implemented profiling tools for the Chrome and Firefox web browsers on Android. The techniques were published in a top-tier conference (MobiCom) in the mobile systems field. [C++, Python, Bash, C# .NET]

MAIN RESEARCH PROJECTS AND PUBLICATIONS

1. **Assisting Automated Comprehension of Privacy Policies**
   - ***Duc Bui*** and Kang Shin *PhD Preliminary Exam project*, **Sep 2018**
   - The first ML-based fully automated extraction of personal information types from privacy policy documents, using ELMo-BiLSTM sentence classification and BiLSTM-CRF entity recognition. [AllenNLP, PyTorch, TensorFlow, Python]
   - Derived new word-level datasets from an existing paragraph-level privacy policy corpus.
   - Extracted fine-grained word-level information automatically with high accuracy in previously unseen documents using deep learning (better than state-of-the-art solutions which extract coarser-grained paragraphs, need manual refinement, or use rule-based methods)
2. **Rethinking Energy-Performance Trade-Off in Mobile Web Page Loading**
   - ***Duc Bui***, Yunxin Liu, Hyosu Kim, Insik Shin, and Feng Zhao cps.kaist.ac.kr/eBrowser
   - *ACM Int. Conf. on Mobile Computing and Networking* (**MobiCom**) 2015 **18%** acceptance rate
     - The first full paper from a university in South Korea accepted to the conference series
     - Published in *SIGMOBILE GetMobile magazine* (**research highlights**) April 2016
   - *GitHub open source*: energy_efficient_web_page_loading and browser_profiler
   - *Energy-efficient mobile web browsing*: Reduced the whole-system energy consumption of the Google Chrome mobile web browser by 24.4% with no perceivable impact on page load times. [C++]
3. **GreenBag: Energy-efficient Bandwidth Aggregation for Real-time Streaming in Heterogeneous Mobile Wireless Networks**
   - ***Duc Bui***, Kilho Lee, Sangeun Oh, Insik Shin, Hyojeong Shin, Honguk Woo, and Daehyun Ban cps.kaist.ac.kr/greenbag
   - *IEEE Real-Time Systems Symposium* (**RTSS**) 2013 **22%** acceptance rate
   - *GitHub open source*: greenbag project
   - *Energy-efficient multi-link real-time streaming*: Provided quality-of-service (QoS) for high-bitrate video streaming by simultaneously using multiple wireless network interfaces (WiFi & LTE) on smartphones. [C, Java]

OTHER PUBLICATIONS

1. **Cross-Platform Support for Rapid Development of Mobile Acoustic Sensing Applications**
   - *Yu-Chih Tung, **Duc Bui** and Kang Shin*
   - *ACM Int. Conf. on Mobile Systems, Applications and Services* (**MobiSys**) 2018
2. **Mobile Plus: Mobile platform for Transparent Sharing of Functionalities Across Devices**
   - Sangeun Oh, Hyuck Yoo, Daelyong Jeong, Sooyoung Park, ***Duc Bui***, Sungsoo Moon, and Insik Shin
   - *ACM Int. Conf. on Mobile Systems, Applications and Services* (**MobiSys**) 2017 **18%** acceptance rate
   - Demo paper *in ACM Int. Conf. on Mobile Systems, Applications and Services* (**MobiSys**) 2016
4. **A Case Study of the Application of Dynamic Symbolic Execution to Real-World Binary Programs**
   - ***Duc Bui***, Yunho Kim, and Moonzoo Kim
   - *Korea Conference on Software Engineering* (KCSE) 2012
5. **A method of verifying web service composition**
   - Thang Quyet Huynh, Quynh Thi Pham, and ***Duc Bui***
   - *ACM International Symposium on Information and Communication Technology* (SoICT) 2010

HONORS AND AWARDS

2016 **Naver Ph.D. Fellowship** by Naver Corp. (the largest search engine in Korea) for excellent Ph.D. students
2015 **Qualcomm Innovation Award** finalist, ranked in top ten out of 37 final-round projects
2015 **Microsoft Research Asia Fellowship Nomination Award**, ranked 14/90 students in top Asia universities
2014 **Microsoft Research Asia Excellent Award** in the Stars of Tomorrow Internship Program
2014 **Outstanding Master's Thesis Award** by Computer Science Department, KAIST