LIANGCHUN XU

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EDUCATION

Tufts University, Medford, MA, US
Ph.D., Mechanical Engineering — May 2020
GPA: 3.66/4.0
Advisor: Jason Rife
Concentration: Guidance, Navigation, Control, Robotics, Automated Systems
Awards & Honors: Student Paper Award from the Institute of Navigation (Sep 2017), Best Session Paper Award from the Institute of Navigation (Sep 2015)

Wuhan University, Wuhan, China
M.Eng., Geomatics Engineering — Jun 2014
Awards & Honors: Exceptional Graduate of the Department of Geodesy and Geomatics Engineering (Jun 2014), Yongling Chen Fellowship (Sep 2013)

B.Eng., Geodesy and Geomatics Engineering — Jun 2012
Awards & Honors: Exceptional Undergraduate of Wuhan University (Jun 2012), National Endeavor Fellowship (Sep 2010), Excellent Students' Scholarship (three times, Sep 2009 - Sep 2011)

Huazhong University of Science and Technology, Wuhan, China
B.Eng., Computer Science — Jun 2012
- Completed a joint CS degree program with 12 core courses and a thesis

RESEARCH EXPERIENCE

Tufts University, Medford, MA, US
Research Assistant and Lead Investigator — Sep 2015 - Present
- Developed novel line-of-sight signal identification scheme for positioning in 5G networks
- Designed antenna array to measure angle of arrival (AoA) for networked robots
- Researched and implemented different numerical integration algorithms for inertial navigation system (INS). Proved the equality of two dynamic equations for attitude update in INS mathematically
- Employed direct collocation method to design a collision avoidance system for automatic parallel parking
- Simulated automatic lane keeping system for vehicles on highway which integrates an extended Kalman filter (EKF) to estimate vehicle dynamics and a LQR controller to keep the vehicle in lane
- Published peer-reviewed papers and presented at the ION GNSS+ conferences
- Studied machine learning algorithms in class, such as decision trees, SVM, reinforcement learning etc. Implemented naive Bayes classifier, k-means algorithm, neural networks in Python

GNSS Research Center of Wuhan University, Wuhan, China
Project Leader in Software Development — Jul 2013 - Aug 2015
- Constructed a GPU based real-time GNSS software receiver with graphical user interface (GUI) in C, CUDA and Qt, which later became the testbed of the neighboring BeiDou System (BDS) RF frontend group, and a habitat for new GNSS-related algorithms developed by graduate students
- Implemented position, velocity, time (PVT) software for GPS/BDS dual-frequency (L1/L2) receivers, including both least square and Kalman filter estimations
- Created a version of the aforementioned PVT solver to post-process GPS measurements in RINEX files

Team Programmer — Nov 2011 - Jun 2013
- Built a real-time GPS software receiver with SIMD instructions and multi-threaded programming on CPU
- Collaborated with a multidisciplinary team of electrical engineers, and software engineers in the development of FFT and filter algorithms to acquire and track GPS signal

SKILLS & CERTIFICATIONS

Programming: C, C++, Matlab, Mathematica, Python, Qt, C#, CUDA, Intel AVX, XAML, R
Environment: Linux, JetBrains CLion, PyCharm, Visual Studio, Qt Creator, Xcode, Simulink, Arduino, Raspberry Pi
Software: GNU TeXmacs, LaTeX, Sublime Text, Git, PowerPoint, Excel, MotionGenesis, Weka
Certification: National Computer Science Test Certification (Band 4) — Apr 2011

PUBLICATIONS

Xu, Liangchun, Rife, Jason. “Doppler-aided Line-of-sight Identification and Localization in Future Cellular Networks." *ION GNSS+ 2018, Miami, Florida, September 2018.* Sep 2018

Xu, Liangchun. “A Compact, Lightweight Sensor to Measure Bearing Angle to a Radio Transmitter." *ION GNSS+ 2017, Portland, Oregon, September 2017.*

- Awarded “**Student Paper Award**" Sep 2017

Xu, Liangchun, Ziedan, Nesreen I., Niu, Xiaoji, Guo, Wenfei. “Correlation acceleration in GNSS software receivers using a CUDA-enabled GPU." *GPS Solutions*. Springer Berlin Heidelberg, 2016. Feb 2016

Xu, Liangchun, Ziedan, Nesreen I., Guo, Wenfei, Niu, Xiaoji. “NAVSDR: A GPU-based Modular GPS Software Receiver." *ION GNSS+ 2015, Tampa, Florida, September 2015.*

- Awarded “**Best Session Paper**" Sep 2015

Xu, Liangchun, et al. “A New SIMD Correlator Algorithm for GNSS Software Receivers to Process Complex IF Data." *China Satellite Navigation Conference (CSNC) 2013 Proceedings*. Springer Berlin Heidelberg, 2013.

- Awarded “Outstanding Youth Paper" May 2013

Yan, Kunlun, Zhang, Hongping, Zhang, Tisheng, **Xu, Liangchun**, Niu, Xiaoji. “Analysis and verification to the effects of NH code for beidou signal acquisition and tracking." *ION GNSS+ 2013, Nashville, Tennessee, September 2013.* Sep 2013

PROFESSIONAL SERVICES

NAVIGATION: Journal of the Institute of Navigation Reviewer Jul 2018

- Reviewed an article about the application of machine learning in indoor positioning

SELECTED COURSES

Mechanical Engineering: GPS and Satellite Navigation, Digital Control of Dynamic Systems, Advanced Dynamics, State Estimation and Optimal Control, Nonlinear System Dynamics, Optimal Control for Robotics
Geomatics Engineering: Principle of Inertial Navigation and GNSS/INS Integrated Navigation
Mathematics: Differential Geometry
Electrical Engineering: Advanced Electromagnetics, Communication Systems, Convex Optimization
Computer Science: Introduction to Machine Learning and Data Mining, Data Structures, Discrete Mathematics, Assembly Language Programming, Computer Architecture, Operating Systems, Compilers, Computer Organization, Software Engineering, Database Systems, Networks & Protocols