

Interests

• **Computer Vision, Human-Computer Interaction, Remote Sensing and Machine Learning:**

- Signal Processing, Object Detection, Object Tracking, Face Verification, Action Recognition, Motion Analysis
- Deep Learning, Transfer Learning, Model Conversion, Optimization
- Recommendation System, User Behavior Analysis

• **Blockchain Techniques:**

- Smart Contracts & Blockchain Development, Security Enhancement
- Decentralized Finance (Defi), Blockchain as a Service (BaaS)

Education

- **University of Alberta** Edmonton, AB
Ph.D. in Computing Science *Sept. 2017 - Present*
- **University of Alberta** Edmonton, AB
M.S. Computing Science, Specialization with Multimedia *Sept. 2015 - Apr. 2017*
- **University of Alberta** Edmonton, AB
B.Sc. Science, Specialization in Computing Science *Sept. 2010 - Dec. 2015*

Research and Work Experience

- **Multimedia Resaerch Centre, UofA** Edmonton, AB
Wide Area Monitoring Research Team, Tech Lead *Aug. 2020 - present*
Technical Lead of the InSAR project research team in Multimedia Research Center. The projects are collaborating with 3vGeomatics Vancouver Canada. The team is working on combining conventional Signal Processing and recent Artificial Intelligent algorithms to
 - Filter the noisy radar images
 - Estimate the quality of the signals
 - Decompose ground deformation signals and refine the earth’s digital elevation model (DEM)
 - Build an ultimate InSAR simulator for a standard benchmark evaluation on different algorithms
- **3vGeomatics Inc** Vancouver, BC
Mitacs Accelerate Research Intern *July. 2017 - Aug. 2020*
Funded by Consortium of Aerospace Research and Innovation in Canada (CARIC) & Natural Sciences and Engineering Research Council of Canada (NESRC)

- Large scale motion mapping of ground displacement estimation with InSAR images
- Applied Deep Learning technique to denoise InSAR noisy images and estimate coherence index
- Developed a evolution strategy based algorithm to estimate ground motion rate and DEM height error
- Works are released on the news: [TheStar](#), [Journal of Edmonton](#), [GatewayOnline](#), [University of Alberta website](#).

- **Bi.Link Inc & Bi9.cn Inc**

Shanghai, China

Co-founder

April. 2018 - May. 2019

- [Bi9.cn](#) helps customers to earn more than \$1.5 million profit in 2018
- Built a Digital asset management platform, and contributed to hedge fund strategies by analyzing trading behaviors and environments of multiple Digital Currency Marketplaces
- Built a decentralized digital asset lending platform and hosted on EOS and Ethereum public chains
- Digital Assets used as a collateral for loans are stored in a public Ethereum and EOS blockchain to obtain high network security with the use of a non-custodian depository smart contract.
- Take charge of developing 1) all business logic of EOS smart contracts 2) corresponding front-end APIs for web apps integration and interaction with smart contracts on EOS public chain.

- **Boardee Inc**

Edmonton, AB

Co-founder

May. 2016 - Sept. 2017

- One of three finalists in [TELUC ICT](#) streams in TEC of Edmonton competition 2017
- Developed and co-designed a front-end cross-platform mobile applications.
- Co-developed a back-end system for fetching location-awarded social media contents from the Internet.
- Explored content-based recommendation and user notification strategies based on user's preference via deep recurrent neural networks.

- **TCL Research America, Silicon Valley**

San Jose, CA

Research Engineer Intern

May. 2016 - Expected Jan. 2017

- Developed and led team for using the Drone as inter-mediator to enhance human to human communication.
- Implemented an Android app for tracking human face to control the Parrot Bebop Drone to follow the detected person.
- Developed a system for human body detection, tracking, and human face detection, verification via deep convolutional neural networks, and built an autopilot framework for UAV devices.
- First inventor of three patents and co-inventor of one patent on related works.

- **City of Edmonton, IT Department**

Edmonton, AB

Course Project under Dr. Lihang Ying and Dr. Irene Cheng

Jan. 2016 - Apr. 2016

- Developed and led the team for feature matching based residential area recommendation system.
- Designed the three-layers system, developed mobile app and web app, co-developed the back-end business logic service.

- **Orbital Software Solutions Inc**

Edmonton, AB

Research Assistant under Dr. Irene Cheng
Funde by NSERC

Sept. 2015 - Mar. 2016

- Developed a sensor-based Cloud Computing Interface (CCI) - for motion analysis as a performance metric and education Tool.
- Developed a Multi-Leap Motion Sensor System via Linux Container (LXC) technique, and used machine learning algorithm for motion data fusion to overcome the single vision based sensor's occlusion issue.

- **Surgical Simulation Research Lab, University of Alberta** Edmonton, AB
Research Assistant under Dr. Bin Zheng and Dr. Anup Basu *Jan. 2015 - Apr. 2015*
 - Developed a Smart Sensor-based Motion Detection system for hand movement training in open surgery by using a statistical model.
- **Multimedia Reserach Center, University of Alberta** Edmonton, AB
Research Assistant under Dr. Irene Cheng and Dr. Anup Basu *Jan. 2015 - Apr. 2015*
 - Developed a Segmentation Quality Assessment mode for Ground Truth Delineation via medical Image Segmentation based on Local Consistency and Distribution Map Analysis.
- **ShunSoft Ltd** Shanghai, China
Freelancer, Outsource Developer *Sept. 2014 - Jun. 2015*
 - Developed the iOS version of ShunSoft's stock and futures trading app, which allows users to do transactions, and change the risk management settings of their accounts through iOS devices.
 - Designed and co-develop ShunSoft's back-end dashboard that allows multiple users to make detailed stock auto-transaction and risk management settings simultaneously, which focused on the requirements of security, availability and stability.
- **Game Cloud Ltd** Edmonton, AB
Co-founder *Jan. 2014 - Sept. 2014*
 - Co-founded a mobile game studio as one of core programmer for creating interesting casual and arcade mobile phone games and reached 500K downloads.

Publications

- **X. Sun**, A. Zimmer, N. Kottayil, S. Mukherjee, I. Cheng, "DeepInSAR: DeepInSARA Deep Learning Framework for SAR Interferometric Phase Restoration and Coherence Estimation", *Remote Sens.* 2020, 12, 2340
- S. Mukherjee, A. Zimmer, **X. Sun**, P Ghuman, I. Cheng, "An Unsupervised Generative Neural Approach for InSAR Phase Filtering and Coherence Estimation". *IEEE Geoscience and Remote Sensing Letters (GRSL)*, 2020, 7
- **X. Sun**, A. Zimmer, N. Kottayil, S. Mukherjee, I. Cheng, "A Benchmark InSAR Simulator for Phase Filtering and Coherence Estimation." *Conference of the Arabian Journal of Geosciences (CAJG)*
- S. Mukherjee, N. Kottayil, **X. Sun**, I. Cheng, "CNN-Based Real-Time Parameter Tuning for Optimizing Denoising Filter Performance", *International Conference on Image Analysis and Recognition (ICIAR)* 2019
- **X. Sun**, N. Kottayil, S. Mukherjee, I. Cheng, "Adversarial Training for Dual-stage Image Denoising Enhanced with Feature Matching", *International Conference on Smart Multimedia (ICSM)*. 2018
- S. Mukherjee, A. Zimmer, N. Kottayil, **X. Sun**, P Ghuman, I. Cheng, "CNN-Based InSAR Denoising and Coherence Metric" *IEEE SENSORS*. 2018

- S. Mukherjee, A. Zimmer, N. Kottayil, **X. Sun**, P Ghuman, I. Cheng, "CNN-based InSAR Coherence Classification" IEEE SENSORS. 2018
- N. Kottayil, A. Zimmer, S. Mukherjee, **X. Sun**, P Ghuman, I. Cheng, "Accurate Pixel-Based Noise Estimation for InSAR Interferograms" IEEE SENSORS. 2018
- **X. Sun**, A. Basu, I. Cheng, "Multi-Sensor Motion Fusion Using Deep Neural Network Learning", International Journal of Multimedia Data Engineering and Management (IJMDEM). 2017
- **X. Sun**, S. Byrns, I. Cheng, B Zheng and A. Basu, "Smart Sensor-Based Motion Detection System for Objective Measurement of Hand Movements in Open Surgery", Journal of Medical System, 41.2 (2017): 24.
- **X. Sun**, I. Cheng, A. Basu, "Spatio-Temporal Optimized Multi-Sensor Motion Fusion", IEEE International Symposium on Multimedia (ISM), 2016.
- A.-C. Furtado, **X. Sun**, A. Basu and I. Cheng, "Optimized Per-Joint Compression of Hand Motion Data", IEEE System Man and Cybernetics (SMC), 2016.
- I. Cheng, **X. Sun**, N. Alsufyani, Z. Xiong, P. Major and A. Basu, "Ground Truth Delineation for Medical Image Segmentation based on "Local Consistency and Distribution Map Analysis," IEEE Engineering in Medicine and Biology Conference (EMBC), 2015.

Patents

- **X. Sun**, X.L. Liao, X. Ren and H. Wang. "System and method for vision-based flight self-stabilization by deep gated recurrent Q-networks". Grant 2019 US Patent No.10241520 B2
- X.L. Liao, **X. Sun**, X. Ren and H. Wang. "Method and device for Quasi-Gibbs structure sampling by deep permutation for person identity inference". Grant 2019 US Patent No.10339408 B2
- **X. Sun**, X.L. Liao, X. Ren and H. Wang. "System and method for enhancing target tracking via detector and tracker fusion for unmanned aerial vehicles". Grant 2018, US Patent No.10140719 B2
- **X. Sun**, X.L. Liao, X. Ren and H. Wang. "Face detection, identification, and tracking system for robotic devices". Grant 2018, US Patent No.10068135 B2

Awards

- Alberta Innovates Graduate Student Scholarship Data-Enabled Innovation (2020)
- Awarded Alberta Graduate Excellence Scholarship (2019)
- Awarded Computing Science Early Achievement PhD (Runner Up) (2019)
- Awarded a University of Alberta Doctoral Recruitment Scholarship (2017)
- Awarded a University of Alberta Academic Excellence Scholarship (2010)
- Awarded an International Student Scholarship (Bridging Program) (2010)

Academic Activities

- Invited Guest Lecture, "Blockchain Overview" University of Alberta, Multimedia Master Program
- Invited Guest Lecture, Introduction of Deep Learning and Remote Sensing Applications Institute of Disaster Prevention Science and Technology, China
- Expert Consultancy, "Using Deep Learning for Radar Signal Filtering and Recognition, Institute of Disaster Prevention Science and Technology, China
- Web Chair for International Conference on Smart Multimedia (ICSM) 2018, 2019
- Web Chair for IEEE International Conference ON Systems, Man, and Cybernetics (SMC) 2017
- Steering committee, webmaster for IEEE International Conference on Multimedia and Expo (ICME)

Computer Skills

- **Languages:** C, C++, Python, CUDA, Javascript, HTML, CSS, Obj, Obj-C, Matlab, Java, Fortran
- **Tools:** Linux Shell, GNU Make, Vim, Visual Studio, Eclipse, Xcode, Qt-Creator, Tensorflow, pyTorch, Caffe, OpenCV, dlib, Qt, Node.js, React, Ionic, EOS, Apache Cordova, Cocoa Touch, Docker, LXC.
- **OS:**Linux, Mac OS and Windows.