Xiongming Dai

Ph.D. Candidate

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# Research and Hobbies

I am a Ph.D. candidate at [Louisiana State University](https://www.lsu.edu/). Currently, I am working towards State Estimation for Sequential Data Analysis. I have been actively involved in various inter-disciplinary researches. My research interest includes Bayesian Learning, Monte Carlo Sampling, Tracking, Simultaneous Localization and Mapping (SLAM), Robotics, Anomaly Detection (Deep One-Class Learning), Optimal Control and Estimation, Evolutionary Algorithm, Graph Theory and Riesz Potentials. I am passionate about Mathematics, Cooking, Drawing and Playing Basketball & Badminton.   
I am looking for a full-time job related to Deep Reinforcement Learning, Machine Learning, Computer Vision, Robotics, Autonomous Driving (Visual SLAM) now!

**Experience**

Graduate Research & Teaching Assistant Louisiana State University May 2018 - Present

* Responsible for theoretical research of resampling for sequential Monte Carlo, and have proposed a repetitive ergodicity in deterministic domain with median, it is faster than the state of the art, which is verified by theoretical deduction and experiments of a hidden Markov model in both the linear and non-linear cases.
* Responsible for theoretical research of optimal camera configuration for large-scale motion capture systems, a NP hard problem, and have developed a 3D simulation framework, further introduce Riesz potentials to discretize rectifiable submanifolds of the maximum overlapping coverage, it proves that the proposal grows at most logarithmically, under mild assumptions.
* Responsible for theoretical research of Monte Carlo Sampling, and have proposed a weighted Riesz potentials interaction, where only few samplers required to achieve high performance for hidden Markov model.

Director Shenzhen Realis Multimedia Technology Co.,Ltd. Jul 2016 - Aug 2017

* Responsible for the location and tracking of infrared reflective markers corresponding to rigid bodies to realize multiplayer motion capture.
* Responsible for the optimization of optimal camera configuration solutions.
* Responsible for the optimization of the inverse kinematics and the integration of the system.

Project Leader Shenzhen Realis Multimedia Technology Co.,Ltd. Feb 2016 - Jun 2016

* Served as a leader for developing inverse kinematics software from scratch.
* Responsible for the configuration and optimization of the infrared reflective markers solution so that the corresponding rigid body is most easily captured by the camera system.
* Responsible for the interactive communication mechanism between cameras to ensure minimum latency of the camera system.

Senior Software Development Engineer Hunan VisualTouring Technology Co.,Ltd. Jun 2015 - Jan 2016

* Responsible for service robot multitasking development based on robotic systems ROS.
* Responsible for theoretical research of Visual SLAM and related software development.
* Responsible for 3D reconstruction of interior scenes.
* Responsible for 3D face recognition based on 3-dimensional projection volume invariance feature.

Graduate Research Assistant Huazhong University of Science & Technology Aug 2012 - May 2015

Software Development Engineer Huazhong Numerical Control Co.,Ltd. Aug 2012 - May 2015

* Responsible for calibration research and software development of industrial robot systems.
* Responsible for the algorithm research and software development of CNC toolpaths in order to obtain smooth machining results.

# Research Interests

• Visual Simultaneous Localization and Mapping (V-SLAM), 3D Reconstruction, Structure from Motion

• Anomaly Detection (Deep One-Class Learning), Tracking and Recognition

• State Estimation for Sequential Data Analysis, Bayesian Learning, Monte Carlo Sampling

• Robotics, Optimal Control and Estimation, Markov Decision Process, Deep Reinforcement Learning

# Publications

• **Xiongming Dai,** Gerald Baumgartner. **Weighted Riesz Particles.**Neural Information Processing Systems(NeurIPS), 2022 submitted

• **Xiongming Dai,** Gerald Baumgartner. **Optimal Camera Configuration for Large-Scale Motion Capture Systems.**Neural Information Processing Systems(NeurIPS), 2022 submitted

• **Xiongming Dai,** Gerald Baumgartner, **Variance Reduction of Resampling for Sequential Monte Carlo.**Association for the Advancement of Artificial Intelligence(AAAI), 2022 submitted

# Education

Louisiana State University Computer Science Ph.D., (Nov, 2022 (Expected))

Louisiana State University Computer Science M.Sc., 2022

Huazhong University of Science & Technology Mechatronical Engineering M.Eng., 2015

Changsha University of Science & Technology Mechanical Engineering B.Eng., 2012

# Awards

• Three software copyright

• 2nd place in the 3rd Changsha University of Technology Cooking Competition

• 2009-2010 School of Mechanical Engineering at Changsha University of Sci&Tech 1 on 1 Basketball competition champion, called “The King of 1 on 1”.

• The team got the 3rd place in the 15th HUST Graduate Cup Soccer League, Forward

• The team got the 2nd place in the 25th HUST Graduate Cup Basketball League, Small Forward

# Technical Strengths

* **Languages Proficient:** Python, R, Matlab, C/C++, Shell.
* **Robotic System:** ROS operating system

# • GPU Programming: NVIDIA CUDA

* **Computer Vision/Graphics:** OpenGL, OpenCV.
* **SDLC/Documentation:** LaTex, Overleaf
* **Platforms/ Frameworks:** Windows, UNIX/Linux •
* **Others:** Git
* **The Most Important:** non-stopable and perseverance in learning