MONICA (MENGQI) LI

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SUMMARY

- PhD student in Department of Computer engineering, Polytechnique Montréal. Focus on computer vision and robotics.
- Canada permanent resident, fluent English, basic French
- Led collaborative projects, resulting in seven peer-reviewed publications, including two first-authored publications
- Deep understanding of machine learning, genomic data analysis and visualization
- Passed CPA Exam and CFA Level 1

EDUCATION

Ph.D. in Computer Engineering — **Polytechnique Montréal**
MIST Lab Advisor: Prof. Giovanni Beltrame — *2023 - Current*
- Cooperative manufacturing assembly with mobile cobots
- Use representative learning to design specific control strategies for multiple robot arms, GPA: 4.0

M.Sc in Computer Science — **Bishop's University**
Advisor: Prof. Madjid Allili — *2020 - 2022*
- Research in human motion recognition and computer vision
- Thesis: Human action recognition with feature-embedding graph convolutional network.
- Extra credits in undergraduate computer science and mathematical courses, GPA: 93.6/100

M.A. in Comparative and Public History — **Chinese University of Hong Kong**
Advisor: Prof. Chiu Peng-sheng — *2014 - 2015*
- Established a dataset for *Ba County Archives* (General Research Fund #14402414)

B.B.A IN ACCOUNTANCY — **The Hong Kong Polytechnic University**
2009 - 2013
- Mass data collection from SEC database for Prof. Simon Fung Yu Kit's accounting research in labor union
- Exchange program to Anderson School of Management, University of New Mexico in 2011
- Exchange program to National Taiwan University in 2012
  Academic Advisor: Prof. Audrey Hsu

AWARDS AND PROFESSIONAL QUALIFICATIONS

- Vanier Canada Graduate Scholarships (Vanier CGS) - Natural Sciences and Engineering Research Council ($50,000 × 3 years)
- Bishop's University - Single Nomination for Arbour Foundation scholarship
- Bishop's University - International Student Entrance Grant ($600)
- Faculty Exchange Sponsorship 2011 and 2012

PUBLICATIONS

(Submitted to The International Conference on Robotics and Automation (ICRA) 2025) **Li, M. M.**, Lajoie, P.Y., Beltrame, G. *Frequency-based View Selection in Gaussian Splatting Reconstruction*. doi.org/10.48550/arXiv.2409.16470

Li, M. M., "Exploration of the Possibility for a Wider Range of the Discount Factor for Reinforcement Learning," 2024 6th International Conference on Communications, Information System and Computer Engineering (CISCE), Guangzhou, China, 2024, pp. 1536-1539. doi.org/10.1109/CISCE62493.2024.10653102

Li, M. M., Belzile, B., Imran, A., Birglen, L., Beltrame, G., St-Onge, D. . *From Assistive Devices to Manufacturing Cobot Swarms*, 32nd IEEE International Conference on Robot and Human Interactive Communication (RO-MAN) doi.org/10.1109/RO-MAN57019.2023.10309449

Li, M, Wang, P.,Hao, X., Tian, X., Zhang, F., Zhang, W., Xiong, Z.,Cui, Y., Yin, J.,Desmarais, M. , Li, T., "Multi-modal Multi-scale Deep Convolutional Neural Networks for Recognizing Acceleration and Deceleration Graphs in Intrapartum Fetal Continuous Cardiotocography", submitted to *IEEE Journal of Biomedical and Health Informatics (JBHI)*.

Zhang, W., Ao, Q., Guan, Y., Zhu, Z., Kuang, D., **Li, M.**, ... , Shen, K. (2021). *A Novel Diagnostic Approach For The Classification Of Small B-Cell Lymphoid Neoplasms Based On Nanostring Platform*, Modern Pathology - Nature https://www.nature.com/articles/s41379-021-00954-z

(Submitted to Pattern recoginition)Yang, D., **Li, M. M.**, Fu, H., Fan, J., & Leung, H. *Unifying Graph Embedding Features with Graph Convolutional Networks for Skeleton-based Action Recognition*. arXiv preprint arXiv: 2003.03007. (shared co-first authorship)

Li M, Leung H, Li TMH, Li-Tsang CWP *Measuring the tilt and slant of Chinese handwriting in primary school students: A computerized approach*, PLOS ONE 14(11): e0223485. https://doi.org/10.1371/journal.pone.0223485

Ma L and **Li M**, *A Quantitative Way to Utilise the Social Network in Social Status: A Study Using CBDB Song Dynasty Data*, presented at the DADH 2019: 10th International Conference of Digital Archives and Digital Humanities. https://dadh2019.conf.tw/site/page.aspx?pid=305&sid=1308&lang=en#paper7

TECHNICAL SKILLS

- **Model tuning:** Pytorch, Scikit-learn, Keras, Seaborn
- **Cloud computing:** Google Colab, AWS, Snowflake
- **Robotics and Simulation** ROS/ROS2 (Gazebo, MoveIt, RViz), Matlab
- **Computer vision and graphics:** OpenCV, Openpose, MMSkeleton/MMCV, iMotion
- **Programming languages:** Python, C#, SQL, Matlab, R, Netlogo and LaTeX
- **Agent-based modeling**: NetLogo

SOFTWARE, HARDWARE AND LANGUAGE SKILLS

Motion capture	Kinect SDK 1.0 and 2.0, Rokoko
Graphics tablet development	Pendo C# SDK
Statistics	IBM SPSS
3D Scanning	Structure Sensor, MSoft, 3DSizeMe, 1Measure, VXelements
3D Modeling	Materialise Mimic, Geomagic Design X, VXmodel
Finite Element Analysis	Abaqus Unified FEA
2D CAD	FreeCAD
Languages	English: Advanced (IELTS: 8.0) Cantonese: professional proficiency Mandarin: native French: conversational.

RESEARCH EXPERIENCE

Université de Sherbrooke
Supervisor: Dr.Daniel Chamberland-Tremblay
Research Intern *Oct 2022 to Dec 2022*

- Develop a SQL parser that provides detailed feedback (beyond the traditional syntax error) on the student work in an English/French readable form. The parser support grading and detailed feedback.
- Test the SQL parser with a standardised set of SQL queries.

Université de Montréal **Center for Advanced Research in Sleep Medicine (CARSM)**
Supervisor: Prof.Johannes Frasnelli
Research Intern *Nov 2020 to Jan 2021*

- Trying out convolution models like VoxCNN and ResNet for Rapid eye movement (REM) diagnosis.
- Developing a frequency domain algorithm to extract features in brain MRI images.

City University of Hong Kong **3D Motion Capture Laboratory**
Supervisor: Dr.Howard Leung
Research Assistant *May 2018 to Apr 2019, Aug 2020 to Sep 2020*

- Adopted graph centrality and motif to augment the original graph convolutional network (GCN) for motion classification tasks.
- Developed an algorithm to quantify features of online Chinese handwriting, including slant/tilt, horizontal/vertical alignment, deviation of size and pressure.
- Utilised SPSS for traditional statistics analysis.
- Recorded 20 subject EEG data for handwriting ability assessment and understanding.
- Ad-hoc consultancy for two individual undergraduate final year projects and three group final year projects.
- These projects led to the submission of 4 publications.

Chu Hai College of Higher Education **Sustainable Systems and Innovative Technologies Research Centre**
Supervisor: Dr. FU Hong
Research Assistant(part-time) *Jul 2019 to Jun 2020*

- Synchronized the data recorded from a Pendo graphic tablet(PH1410 Digit-Note) and an customized Pupil Labs eye tracker.
- Extracted data via Openpose for screening special education need students for certain tasks.
- Recruited primary school students and contact their parents for experiment arrangements.
- These projects led to the submission of 1 publications.

Hercz Rehabilitation Technology
Supervisor: Prof. Cecilia Li
Technical Officer *Jul 2019 to Mar 2020*

- Drafted a proposal for an Innovation and Technology Fund Project (3D printing pressure facemasks for burnt patients).
- Reconstructed several human skull models for pressure distribution on facial surface wearing a facemask, based on CT data.
- Developed a pattern drawing program for female pressure garment using FreeCAD.
- Setup a standardized procedures for lab and factory production of a silicone sheeting for scar treatment.
- Collaborated with Techmed3D for human head and hand scanning project.
- Collaborated with Shenzhen TOZI Tech for body measurement project.
- Wrote a research newsletter for Stratasys regarding 3D printing in rehabilitation science
- Updated the website of supervisor via HTML and CSS codes.

Huazhong University of Science and Technology **Tongji Medical College**
Collaborator: Dr. ZHANG Wei
Ad-hoc
- Develop classification algorithms for lymphoid neoplasms screening on weak-labelling data.
- These projects led to the submission of 2 publications.

SUMMER SCHOOL AND DATA CAMP

Montreal Robotics Summer School **MILA - Quebec AI Institute**
June 2023
- Machine learning methods for training the next generation of learning robots
- Simultaneous localization & mapping (SLAM), path planning and trajectory optimization for robots

ESSA-Behave Summer School **Behave Lab**
Sep 2021
- Netlogo modeling for agent-based modeling (Schelling's Model, Axelrod's Model and Small-world Model)
- Agent-based modeling parameter calibration and validation, unit testing
- Analyzing model outputs with R and the tidyverse

Advanced Machine Learning Training Camp **Greedy Technology**
Feb 2020 - Sep 2020
- Basic convex optimization: KTT Condition, Primal-dual problem solving
- Classic Machine Learning: Logistic Regression, SVM(Kernel Tricks), Clustering
- Data preprocessing: Regularization, Batch Normalization, PCA &LDA(and Kernel)
- Ensembling methods: Bagging, Boosting, Stacking
- Sampling: EM, HMM
- Neural Network and Deep Learning
  CNN, GCN
  CRF, RNN, LSTM
  GAN, Conditional GAN, CycleGAN
- Reinforcement Learning: Q-Learing, Deep Q-Learning, Policy Gradient

INDUSTRIAL EXPERIENCE

Pratt and Whitney Canada - Technology Collaborative Office **Longueuil, QC, Canada**
Internship - Collaborative research projects coordination & technology management process improvement *May 2023 - Sep 2023*
- Design compliance and internal control procedures for intellectual property transfer.
- Contacted the balloters for the procedures.
- Deploy the control procedures to corporate WEBCON.

Aeroport AI **Montreal, QC, Canada**
Machine Learning Consultant *Jan 2023 - Apr 2023*
- Trained deep learning models to detect osteoarthritis in advance.
- Deployed the model onto AWS server.
- Developed the SDK and user interface for collaborators/physicians to use the model.

Bishop's University - Department of Computer Science **Sherbrooke, QC, Canada**
Teaching Assistant *Feb 2021 - Aug 2022*
- Mark students' assignments and tests for the course "Foundations Computer Science" and "Medical Image".
- Answer students' questions related to the lecture materials.

PricewaterhouseCoopers Hong Kong **Assurance - Financial Service, Hong Kong Office**
Associate Auditor *Sep 2015 - Jun 2017*
- Work on several annual auditing projects for banks, insurance companies and mutual funds.
- Conduct an IPO for a listed company.
- Perform compliance regulation checks for two investment banks.

Ernst & Young Hua Ming LLP Shanghai Branch **Shanghai, China**
Internship – Assurance *Aug 2014*
- Bank and financial lease confirmation work to ensure the client's debt status.
- Translate letters of representation from English into Chinese as the client required.
- Industrial research data collection.

Convoy Financial Group **Hong Kong**
Wealth Management Advisor *Aug 2013 - Aug 2014*
- Financial planning for clients to arrange their portfolio regarding insurance, stocks and mutual funds.