CHEN JIN

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https://www.linkedin.com/in/chen-jin-33287593/ https://github.com/lxasqjc (confidential codes not available)

PERSONAL PROFILE

Jin has five years' **interdisciplinary** research experience in integrating **computer vision**, **machine/ deep learning** and **statistical modelling** techniques in both **medical-image** and **geo-image** sector, developed mainly in **Python and Matlab**. He has extensive practical experience and academic training in **multiscale mega-pixel image segmentation, classification, mapping, 3D image reconstruction**, **registration**, **visualisation** and **parallel simulation** on multi-modality 2/ 3D images. He has a passion for building AI-based medical imaging methods for greater social impact.

PROGRAMMING: **Python**, Matlab, C/C++, JavaScript, Numpy, Pandas, Batch.
TOOLS: Pytorch, Tensorflow, Keras, Jupyter, Linux, GPUs, Cloud/Cluster, ImageJ (FIJI), ParaView, Cinema4D.

RELATED RESEARCH PROJECTS

Histology-MRI mapping project for prostate cancer prediction (Python/ Pytorch/ Matlab)

- Develop novel deep learning method for mega-pixel histology image segmentation and classification.
- Innovated super-resolution based method to learn mapping between coarse MRI and fine histology image.

Multiscale image analysis and reconstruction workflow (Python/ C++) **PhD Thesis, 2017**

- Owned a novel multi-scale reconstruction workflow modelled full micrometer resolution image for a 6 cm^3 rock.
- Developed codes for rock image analysis and recognised pattern of landmark (thin layer) by machine learning.
- Calibrate low-quality CT and high-quality SEM images, and conduct image registration to integrate multiscale data.
- Segmented particles (6E+5 per image) and visualise cross-scale structure-correlated statistics by sliding window.
- 3D pore-grain image reconstruction conditional to neighbouring "patch" and correlative statistical characterisation.
- Automated the workflow in parallel HPC scripts delivered on broken record size of rock image (1.5E+12 voxels).

Weak supervised deep neural model for segmentation (Matlab)

- Innovated a weak supervised iterative convolutional net (embedded with filter banks, AdaBoost and auto-context) that auto-improves segmented connectivity of thin linear pattern with learning transferred from synthetic scratch.
- Researched the nature impact of the convolutional feature and training image on segmented connectivity from noisy images, measured qualitatively by activation map and quantitatively by confusion matrix over various filter banks.

Deep learning and machine learning for generic rock image analysis (Python/ Tensorflow/ GPUs/ imageJ)

- Supported visiting student on design experiments of rock image segmentation with KNN, K-mean, SVM and PCA.
- Evaluated modern deep learning (CNN, ResNet, RNN, R-CNN etc.) for semantic segmentation of rock image.

Uncertainty study of digital rock analysis in the parallel project (C++/ imageJ) **Presented at conference, 2017**

- Presented to industry the segmentation uncertainty improved by machine learning and visualise fluid simulation.
- Collaborated with visiting scholar on feature selection framework combine super-pixel and genetic algorithm.

Automated machine-learning for rock phase classification (JavaScript) **Published at conference, 2014**

- Implement an auto-sampling and labeling script in ImageJ by local mean and SD, window size refined by CoV.
- Developed an automated rock pattern classification procedure based on random forest and tested on real rock image.

EXPERIENCES

Research Associate, University College London, London, UK **Mar.2019 –Present**

- Develop deep learning model for Histology-MRI mapping project for prostate cancer detection though image segmentation, classification and multiple scale-modality image mapping.

Research Associate, Heriot-Watt University, Edinburgh, UK **Nov.2017 –Nov.2018**

- Built 3D images modelling protocol for the key mineral at nano-scale, combined polygon modeling and pattern statistics, deployed in Python, Matlab, and Tcl, documentation, wrote manual, manuscripts and research proposals.

Intern Student, Canadian Natural Resources International (UK) Limited **Aug.2013 –Dec.2014**

- Performed and presented numerical simulation analysis to development team helped on decisions worth millions.

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EDUCATION

Ph.D. Computational Geoscience, Heriot-Watt University, Edinburgh, UK March. 2013 – Nov. 2017
MSc Petroleum Engineering, Heriot-Watt University, Edinburgh, UK Aug. 2011 –Aug. 2012
B.E. Oil and Gas Engineering, China University of Petroleum September. 2007 –July. 2011

RELEVANT COURSES

- CS231n: Convolutional Neural Networks for Visual Recognition (Stanford University)
- Machine Learning (Coursera)

PUBLICATIONS

1. Jin, C., Tanno, R., Xu, M., Mertzanidou, T. and Alexander, D.C., 2020. Foveation for Segmentation of Ultra-High Resolution Images. arXiv preprint arXiv:2007.15124.
2. Zhang, L., Tanno, R., Xu, M., Jin, C., Jacob, J., Cicarrelli, O., Barkhof, F. and Alexander, D., 2020. Disentangling Human Error from Ground Truth in Segmentation of Medical Images. Advances in Neural Information Processing Systems, 33.
3. Jin, C., Tanno, R., Xu, M., Mertzanidou, T. and Alexander, D.C., 2020, October. Foveation for Segmentation of Mega-Pixel Histology Images. In International Conference on Medical Image Computing and Computer-Assisted Intervention (pp. 561-571). Springer, Cham.
4. Zhang, L., Tanno, R., Bronik, K., Jin, C., Nachev, P., Barkhof, F., Ciccarelli, O. and Alexander, D.C., 2020, October. Learning to Segment When Experts Disagree. In International Conference on Medical Image Computing and Computer-Assisted Intervention (pp. 179-190). Springer, Cham.
5. H. Kayhanian, W. Waddingham, P. Barmpoutis, C. Jin and M. Jansen, (2019) "Studying tumours & their precursors in 3D using computational image reconstruction", CI and CRUK-UCL Conference 2019.
6. C. Jin, (2017) "Developing a hierarchical digital core analysis workflow for petro-physical characterisation of cross-laminated reservoir rocks at pore scales", Ph.D. thesis, Heriot-Watt University, Edinburgh, United Kingdom, November 2017.
7. C. Jin, C. Lv, R. Wang, A. Zhu and J. Ma, (2017) "Challenges in Ultra-tight Rock Characterisation for Fluid Flow Modelling in Digital Core Analysis", 9th International Conference on Porous Media, May 2017.
8. C. Jin, J. Ma, J. Buckman, P. Zhang, and G. Couples, (2017) "Registering Scanning Electron Microscopy (SEM) and X-Ray Tomography (XRT) images for pore-grain characterisation of cross-laminated siliciclastic rock samples", The Geological Society Symposium, February 2017.
9. C. Jin and J. Ma, (2016) "Advanced fracture segmentation from X-ray tomography (XRT) images of reservoir core samples by machine learning-based centerline extraction", EAGE-SCA International Symposium, 2016.
10. C. Jin and J. Ma, (2014) "An automated machine-learning procedure for robust classification of SEM images of cross-laminated sandstones for digital rock analysis", Society of Core Analysis Symposium, 2014.

SCHOLARSHIP AND AWARDS

☆ Scholarship for Outstanding Xinjiang Students Studying Abroad in 2016
☆ James-watt scholarship of Heriot-Watt University in 2014 and 2015
☆ SINOPEC funding to study the uncertainty of DCA from 2014 to 2016
☆ "A College Activist in Science & Technology Innovation" of China University of Petroleum (East of China) in 2008 and 2009
☆ Scholarship for the scientific and technological innovation in 2008 and 2009
☆ The third prize the 3rd "Challenging Cup" Business Plan Competition of China University of Petroleum (East of China) in 2008