Jiayun Li

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Google Scholar: https://scholar.google.com/citations?user=lM0y9NUAAAAJ&hl=en

EDUCATION

University of California, Los Angeles (UCLA) Mar. 2021

Ph.D, Bioengineering, GPA 4.00/4.00

Research Topics: Computer vision; Machine learning algorithms; Statistics, Informatics

Dissertation: Large-scale Whole Slide Image Analysis with Deep Learning Methods to Improve Prostate Cancer Diagnosis

Fudan University Jul. 2015

B.S., Electronic and Information Science and Technology, GPA 3.59/4.00

EXPERIENCE

Computational Diagnostics Group, UCLA Mar. 2016 – Mar. 2021

Graduate Student Researcher

- Built software to de-identify, normalize, and analyze Gigabyte image dataset
- Managed both computation and storage servers for the whole research group
- Developed multi-scale U-Net and EM-based models for supervised and semi-supervised image segmentation
- Developed attention-based MIL models for image classification and weakly-supervised object detection
- Developed a hierarchical graph pathomic network with self-supervised learning features to improve progression prediction
- 9 publications, 1 best student paper finalist, filed 2 patents
- Helped teach and prepare projects for the programming lab course (graduate level)

Geo UGC Infra Team, Google Jun. 2020 – Sep. 2020

Software Engineer Intern

- Developed a data pipeline to extract signals (e.g., model predicted labels and knowledge graph hierarchy) produced by the Google machine intelligence for over billion Geo-tagged photos
- Investigated and applied different unsupervised machine learning models (e.g., Word2Vec embedding models and graph Latent Dirichlet Allocation models) to identify representative photo topics for different places, which will be used across multiple clients (e.g., hotels and restaurants)
- Performed user experiments for models, and achieved around 7% performance improvement over the baseline model

Hotels Content Team, Google Jun. 2019 – Sep. 2019

Software Engineer Intern

- Designed an unsupervised model to match hotel photos to hotel aspects with different Word2vec embedding models
- Developed a data pipeline to extract embeddings and apply the model with the distributed computing framework (Flume C++) for over 300,000,000 hotels photos

- Built 3 different demos and set up user experiment for a new photo filter chip design using Google's Web development framework to improve user interaction with hotel photos

Computer Vision Team, Ancestry.com Jun. 2018 – Sep. 2018

Data Scientist Intern

- Developed CNN-LSTM based image captioning models to generate stories (scene descriptions) and visualize relevant regions for user-uploaded photos using PyTorch and Tensorflow
- Proposed a novel weakly-supervised image captioning model that leveraged the visual perception through the Gradient-weighted Class Activation Mapping to provide explicit attention correction without using any bounding box annotations
- Presented the work in the CVPR 2019 Language and Vision workshop
- Published 2 papers and filed 2 patents for the object detection model and the proposed image captioning model

PUBLICATIONS

- **Li, J.**, Sarma, K.V., Ho, K.C., Gertych, A., Knudsen, B.S. and Arnold, C.W., 2017. A multi-scale U-Net for semantic segmentation of histological images from radical prostatectomies. In AMIA Annual Symposium Proceedings (Vol. 2017, p. 1140**) [Cited by 51]**
- **Li, J.,** Speier, W., Ho, K.C., Sarma, K.V., Gertych, A., Knudsen, B.S. and Arnold, C.W., 2018. An EM-based semi-supervised deep learning approach for semantic segmentation of histopathological images from radical prostatectomies. Computerized Medical Imaging and Graphics, 69, pp.125-133 **[Cited by 31]**
- **Li J.,** Li W., Sisk A., Ye H., Wallace W.D., Speier W. and Arnold, C.W., A multi-resolution model for histopathology image classification and localization with multiple instance learning. Computers in Biology and Medicine. 2021 Apr 1;131:104253 **[Cited by 5]**
- **Li, J.,** Li, W., Gertych, A., Knudsen, B.S., Speier, W. and Arnold, C.W., 2019. An attention-based multi-resolution model for prostate whole slide image classification and localization. CVPR 2019 Towards Causal, Explainable and Universal Medical Visual Diagnosis (MVD) Workshop **[Cited by 22]**
- Wang Z*, **Li J***, Pan Z, Li W, Sisk A, Ye H, Speier W, Arnold CW. Hierarchical Graph Pathomic Network for Progression Free Survival Prediction. In International Conference on Medical Image Computing and Computer-Assisted Intervention 2021 Sep 27 (pp. 227-237). Springer, Cham.
- Li, W., Wang, Z., **Li, J.,** Polson, J., Speier, W. and Arnold, C.W., 2019, May. Semi-supervised learning based on generative adversarial network: a comparison between good GAN and bad GAN approach. In CVPR Workshops **[Cited by 13]**
- Ebrahimpour, M.K., **Li, J.,** Yu, Y.Y., Reesee, J., Moghtaderi, A., Yang, M.H. and Noelle, D.C., 2019, January. Ventral-dorsal neural networks: object detection via selective attention. In 2019 IEEE Winter Conference on Applications of Computer Vision (WACV) (pp. 986-994). IEEE **[Cited by 10]**
- Li, W., **Li, J.,** Sarma, K.V., Ho, K.C., Shen, S., Knudsen, B.S., Gertych, A. and Arnold, C.W., 2018. Path R-CNN for prostate cancer diagnosis and gleason grading of histological images. IEEE transactions on medical imaging, 38(4), pp.945-954 **[Cited by 44]**
- Ing, N., Ma, Z., **Li, J**,. Salemi, H., Arnold, C.W., Knudsen B.S. and Gertych A. Semantic segmentation for prostate cancer grading by convolutional neural networks. In Medical Imaging

2018: Digital Pathology 2018 Mar 6 (Vol. 10581, p. 105811B). International Society for Optics and Photonics. **[Cited By 42]**

- Li, W., Wang, Z., Yue, Y., **Li, J.,** Speier, W., Zhou, M. and Arnold, C.W., 2020. Semi-supervised learning using adversarial training with good and bad samples. Machine Vision and Applications, 31(6), pp.1-11 **[Cited by 7]**
- Wang, M., **Li, J.,** Chen, L., Huang, Y., Zhou, Q., Che, L. and Shang, H., 2015. The study of the compatibility rules of traditional Chinese medicine based on apriori and HMETIS hypergraph partitioning algorithm. In Biomedical Data Management and Graph Online Querying (pp. 16-31). Springer, Cham **[Cited by 4]**
- Speier W., **Li J.**, Li W., Sarma K. and Arnold C., 2020 Image-based patch selection for deep learning to improve automated Gleason grading in histopathological slides. bioRxiv

REVIEW EXPERIENCE

- Reviewed 1 paper for the Frontier in Oncology Journal
- Reviewed 1 paper for the Artificial Intelligence In Medicine Journal
- Reviewed 1 paper for the Intelligence-Based Medicine Journal
- Reviewed 1 paper for the Computers in Biology and Medicine Journal
- Reviewed 4 papers for MICCAI 2020
- Reviewed 8 papers for MICCAI 2021
- Reviewed 2 papers for AMIA 2020
- Reviewed 1 paper for AMIA 2021
- Reviewed 1 paper for the Computational and structural biotechnology Journal
- Reviewed 1 paper for the Cancer Medicine Journal

PATENTS

- **Li, J.**, Ebrahimpour, M.K., Moghtaderi, A. and Yu, Y.Y., Ancestry Com Operations Inc 019404 019404, 2020. Image captioning with weakly-supervised attention penalty. U.S. Patent Application 16/596,063
- Ebrahimpour, M.K., Yu, Y.Y., **Li, J.,** Reese, J. and Moghtaderi, A., Ancestry com Inc, 2020. Ventral-dorsal neural networks: object detection via selective attention. U.S. Patent 10,796,152 (granted)
- Arnold, C.W., **Li, J.**, Speier, W., Li, W., Systems and methods for automated image analysis. Pending application No. 62/852,625
- Li, W., **Li, J.**, Arnold, C.W., Speier, W., Path R-CNN for prostate cancer diagnosis and Gleason grading of histological images. Pending application No. 62/913,256

SELECTED TALKS & POSTERS

- Oral and poster presentation. “Image captioning with weakly-supervised attention penalty”. Computer vision and pattern recognition (CVPR) 2019 language and vision workshop
- Oral presentation. “A multi-scale U-Net for semantic segmentation of histological images from radical prostatectomies”. American Medical Informatics Association (AMIA) 2017
- Poster presentation. “Classifying Prostate Cancer from Multiparametric Magnetic Resonance Imaging and Whole Slide Histology Imaging using Machine Learning”. Informatic Technology for Cancer Research (ITCR) 2019

- Poster presentation. “An EM-based semi-supervised deep learning approach for semantic segmentation of histopathological images from radical prostatectomies”. Gordon Research Conference on Advanced Health Informatics 2018

HONORS & AWARDS

- Finalist in AMIA 2017 Student Paper Competition
- UCLA Graduate Division University Fellowship
- Fudan University Outstanding Student Awards