HENGYUE (HENRY) LIU

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EDUCATION

University of California, Riverside — Expected Jun. 2023
Ph.D. in Electrical Engineering. — GPA: 3.85/4.0
Advisor: Prof. Bir Bhanu.

University of Southern California — Jan. 2015 - Dec. 2016
M.Sc. in Electrical Engineering (Multimedia and Creative Technologies). — GPA: 3.83/4.0

Beijing University of Posts and Telecommunications — Sep. 2010 - June. 2014
B.Sc. in Telecommunications Engineering with Management. — GPA: 85.6/100
Joint program with Queen Mary University of London.
Advisor: Yan Shi.

EXPERIENCE

Futurewei Technologies — Jun. 2020 - Nov. 2020
Research Intern — Santa Clara, CA

- Proposed a novel bottom-up fully convolutional scene graph generation method that can detect entities and relationships simultaneously with fast inference speed (fastest model achieves ~25FPS).

Latent AI — Jun. 2019 - Sep. 2019
Research Intern — Princeton, NJ

- Implemented throttleable neural networks (TNN) that can save energy based on run-time environment. The utilization of the whole network can be as low as 10% while maintaining high accuracy for many vision tasks.
- Designed and implemented image classification, object detection and gesture recognition TNN models with gateable 2D/3D convolutional and fully-connected layers.
- Implemented and experimented controller networks to adaptively control throttleable neural networks for best energy-accuracy trade-off using Deep contextual bandit network variant. For gesture recognition systems, the runtime power is much lower when there is no gesture and higher when scene changes on demand.

Frenzy Labs Inc — Feb. 2017 - Aug. 2017
Head of Computer Vision — Los Angeles, CA

- Managed a small team of 5 engineers for building exact garment visual search APIs and systems as a team leader and full-stack engineer, and helped the company secure seed funding.
- Designed and implemented deep learning architectures for fine-grained garment classification. A hierarchical model was developed consisting of a base architecture such as VGG-19 and Inception-v3 for coarse classification (shoes, tops, bottoms, etc.), and several sub-category classifiers (high heels, loafers, sneakers, etc.).
- Implemented RESTful APIs and back-end modules for keypoint detection and object recognition.
- Implemented a parallel query and process job client and server application for retrieving product images given certain cues (e.g. garment category, material, color, etc).
- Configured and deployed the landing page and web applications on AWS EC2 server.

CloudSight Inc — May. 2016 - Dec. 2016
Computer Vision Intern — Los Angeles, CA

- Implemented a dense circular object detection and counting algorithm, achieving 2.3 MAE on a dataset with ~20 objects on average.
- Implemented a sentiment classification model using Word2vec and CNNs, achieving 95.9% accuracy on 10k testing data (50k training).
- Implemented an image retrieval system with Bag of Visual Words matching and TF-IDF.

Tsinghua University Jul. 2013 - Sep. 2013
Software Engineer Intern Beijing, China

- Implemented an accurate disease prediction web services for a large project "Community Health Care Cloud Platforms" involving 32 members from different disciplines. The prediction is a mixture of data regression and medical formulas on over 20 different types of measurements of human body.
- Assisted in implementing and testing the online user management system over 80 hours.

PUBLICATIONS

[1] **H. Liu** and B. Bhanu, "RepSGG: Novel Representations of Entities and Relationships for Scene Graph Generation," *Preprint*, 2023, Submitted to TPAMI.
[2] **H. Liu**, S. Parajuli, J. Hostetler, S. Chai, and B. Bhanu, "Dynamically Throttleable Neural Networks," *Machine Vision and Applications*, 2022.
[3] **H. Liu** and B. Bhanu, "JEDE: Universal Jersey Number Detector for Sports," *IEEE TCSVT*, 2022.
[4] **H. Liu**, N. Yan, M. Mortazavi, and B. Bhanu, "Fully Convolutional Scene Graph Generation," *CVPR*, 2021, Oral.
[5] **H. Liu** and B. Bhanu, "Pose-Guided R-CNN for Jersey Number Recognition in Sports," *CVPRW*, 2019.
[6] T. Gupta, **H. Liu**, and B. Bhanu, "Early Wildfire Smoke Detection in Videos," *ICPR*, 2021.
[7] B. X. Guan, B. Bhanu, R. Theagarajan, **H. Liu**, P. Talbot, and N. Weng, "Human Embryonic Stem Cell Classification: Random Network with Autoencoded Feature Extractor," *Journal of Biomedical Optics*, 2021.

PATENTS

[1] B. Bhanu, **H. Liu**, and R. Li, *Athlete style recognition system and method*, US Patent 11,544,928, 2023.

ACADEMIC SERVICES

Reviewers
IEEE Transactions on Pattern Analysis and Machine Intelligence (TPAMI)
International Journal of Computer Vision (IJCV)
Machine Vision and Applications
Neural Computing and Applications

Research Assistant
UCR VISlab, advised by Bir Bhanu. F'18, S'19, F'19
BUPT State Key Lab of Switching and Networking, advised by Yan Shi. May 2013 - May 2014

Teaching Assistant
Computer Vision (UCR EE 146). W'20, W'21, W'22, W'23
Image Processing (UCR EE 152). S'22, S'23
Computational Learning (UCR EE 244). F'19, S'21, F'22
Logic Design (UCR EE 120A). W'21, F'21, F'22, S'23
Probability, Random Cariables, and Random Processes (UCR EE 114) S'21
Linear Methods For Engineering Analysis and Design Using MATLAB (UCR EE 20). S'20
Engineering Circuit Analysis I (UCR EE 01LA). W'19

History of Science and Technology (UCR ENGR/HIST 108). F'19, S'20

HONORS AND AWARDS

Dean's Distinguished Fellowship, UC Riverside. 2017

Mathematical Contest in Modeling Meritorious Winner (top 15% of 6000 teams worldwide). 2013

1^{st}-class college scholarship, BUPT (top 10%). 2011, 2012, 2013

China National Tri-Merit Student (top 1%). 2010

TECHNICAL SKILLS

Languages Python, Matlab, C/C++, Java, PHP, HTML, Javascript, Shell Script, SQL.

Frameworks PyTorch, Tensorflow, Keras, Caffe, Torch, MXNet, Scikit-learn, OpenCV.

Miscellaneous Git, Kubernetes, LaTeX, OpenMP, OpenGL, Docker, Amazon Web Services, Spark, Supervisor, Gearman, AngularJS.

Software Blender, Unity, Adobe Illustrator, Adobe Photoshop.

SELECTED COURSES

Machine Learning Machine Learning from Signals: Foundations and Methods, Computational Learning.

Computer Vision Pattern Recognition, Computer Vision, Advanced Computer Vision; Introduction to Digital Image Processing.

Algorithms Data Structure and Application (Undergrad), Scientific Computing, Design and Analysis of Algorithms, Foundations of Artificial Intelligence.

Signal Processing Signals and Systems Theory (Undergrad), Introduction to Signal Processing, Introduction to Digital Image Processing.

Multimedia Multimedia Systems (Undergrad), Advanced DSP Design Laboratory, Multimedia Systems Design, Speech Recognition and Processing for Multimedia.

Computer Graphics 3D Graphics Programming Tools (Undergrad), Computer Graphics.