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# ZUWEI GUO

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[LinkedIn](#)

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## Software Engineer – Machine Learning

### *Data Science – Problem Solving – Medical Imaging*

Passionate, self-motivated and versatile Software Engineer with extensive experience in medical imaging, image action recognition, and objection detection. Demonstrated deep neural networks experience, including CNN, RNN, RCNN, GAN, and LSTM. Possesses inherent ability and technical understanding in multiple technologies to provide new insights and procedures. Forward thinking with focus on new and leading-edge technologies, collaborating across multiple teams and organizations, providing superior service efficiency while maintaining business goals.

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## KEY COMPETENCIES & SKILLS

ROBOTICS • MACHINE LEARNING • SOFTWARE ENGINEERING • OBJECT-ORIENTED PROGRAMMING • DEVELOPING • TESTING • DEBUGGING  
• COMPUTATIONAL NEUROSCIENCE • DECISION MAKING • COLLABORATION • COMPETITION • NEGOTIATION • SIGNAL PROCESSING •  
EXCELLENT COMMUNICATION • PROBLEM SOLVING • DOCUMENTATION • INVESTIGATION • INSPECTION • DIGITAL TRANSFORMATION •  
COLLABORATION • PRIORITIZATION • HARDWORKING • STRATEGIC THINKING • STRATEGIC DIRECTION • COORDINATION • MEDICAL IMAGING  
• IMAGE ACTION RECOGNITION • OBJECTION DETECTION • PYTHON • R • JAVA • CNN • RNN • RCNN • GAN • LSTM

LANGUAGES: C, C++, C#, PYTHON, SQL, MATLAB

SOFTWARE: VISUAL STUDIO, ANACONDA, ECLIPSE, RSTUDIO, GITHUB, JUPITER, SPYDER

TECHNOLOGIES: REST, SOAP, TENSORFLOW, KERAS, PYTORCH, CAFFE

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## PROFESSIONAL EXPERIENCE

### ARIZONA STATE UNIVERSITY, TEMPE, AZ

**LUNG DISEASE CLASSIFICATION WITH DISTANCE LEARNING (03/2019 – 07/2019):** Controlled and guaranteed adherence to quality control standards in machine learning for medical imaging processes and operations. Provided strategic advice and project services while leading implementations of novel self-supervised technique.

**KEY COMPETENCIES:** PROBLEM SOLVING, TRAINING, PROCESS IMPROVEMENTS

#### ***Developed new algorithm with method that doesn't require label in training data***

- Achieved average AUC of 81% on classification through new networks
- Administered clear direction to solve challenging problems
- Improved discriminator part of GAN for pathology classification task
- Coordinated team to align to organization goals and pre-determined objectives

**KEY COMPETENCIES:** ANALYTICS, STRATEGIC PLANNING, COMMUNICATION, CREATIVE THINKING

#### ***Proposed novel self-supervised technique to train generative adversarial network (GAN) to perform pathology classification on Chest x-rays***

- Designed method to define pretext task as patch classification and reconstruction
- Trained network to classify distance between two patches extracted from same x-ray image
- Mentored model for image-to-image translation

**BRAIN LESION DETECTION USING GAN (11/2017 – 03/2018):** Developed signal processing and machine learning algorithms for computer vision. Formulated and implemented benchmarks that measure functional behavior and performance. Amplified traditional machine learning algorithms that do not generalize well on MRI images.

**KEY COMPETENCIES:** STRATEGIC PLANNING, MACHINE LEARNING, LOGICAL TROUBLESHOOTING, CRITICAL DECISION-MAKING ABILITY

***Attained whole tumor dice score of 0.69 (compared to previous score of 0.647)***

- Identified opportunities to leverage technology to improve diagnostics
- Instructed DCGAN for patch-based detection and localization of brain lesions
- Coordinated processes and laid groundwork for deal to address probable concerns

**SOFTWARE ENGINEER (10/2016 – 02/2017):** Introduced learning-based method which combines various appearance and motion cues to predict motion boundaries, which are stable for foreground object detection in complex scenes. Foregrounded weights computed according to identified object signatures, meant to estimate saliency maps.

**KEY COMPETENCIES:** TEAMWORK, CREATIVE THINKING, PROBLEM SOLVING, PROCESS IMPROVEMENT

***Suggested robust method for salient object detection in videos***

- Integrated saliency maps from different channels to form higher-quality spatiotemporal saliency maps
- Explored object signatures from complementary channels to help each other in improving salient object detection in respective channels in video
- Demonstrated quantitative and qualitative experiments on several challenging video with methods to outperforms existing state-of-the-art approaches

**POLYP DETECTION FOR COLONOSCOPY (03/2016 – 05/2016):** Utilized daisy algorithm to extract features, clustered and categorized features using K-means clustering and Bag of Visual Words. Designed and developed Matlab GUI application to integrate models, presented results with data visualization.

**KEY COMPETENCIES:** PROBLEM SOLVING, STRATEGIC THINKING, COMMUNICATION, COLLABORATION

***Surpassed original state-of-the-art performance of 88.61% AUC and 86.54% accuracy through new model with AUC of 95.72% and 93.87% accuracy***

- Designed CNN architecture to beat previous state-of-the-art method at Polyp Detection for Colonoscopy
- Formulated new shallow neural network to work on relatively small dataset (around 400 images)
- Trained 3-layer CNN model for polyp detection
- Collaborated with teammates to develop automatic polyp detection in colonoscopy images

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## EDUCATION & CERTIFICATIONS

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ARIZONA STATE UNIVERSITY, TEMPE, AZ  
**DOCTOR OF PHILOSOPHY – COMPUTER ENGINEERING**  
 ARIZONA STATE UNIVERSITY, TEMPE, AZ  
**MASTER OF SCIENCE – COMPUTER ENGINEERING**

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## PUBLICATIONS

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**Fusing disparate object signatures for salient object detection in video**

Published in *Pattern Recognition* 72

Tu, Zhigang et al (2017)

PP. 285-299. ISSN: 0031-3203