Zewei Ding

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Personal Profile

I am a highly motivated, organized and self-driven computer science and engineering professional. My doctoral training has honed my resilience, perseverance and ability to see projects through to a successful completion. I have demonstrated ability to work collaboratively and constructively in a team and am also able to work productively individually. I have worked successfully in teams comprising peers, supervisors and external stakeholders. I have full work rights in Australia.

Professional Skills

- Throughout my doctoral training I have gained and demonstrated skills in self-directed learning, problem definition and solving.
- Data collection was a key part of my doctoral work. I successfully designed experiments to collect and curate dataset with 30,000 samples. I also adapted extant datasets to build and evaluate machine learning models.
- Experimental design to answer questions generated during problem definition is one of the transferable skills I have gained and demonstrated.
- Computer programming skills have been developed at a very high level in languages including Python, C++, Matlab, and R. I am also proficient in the three most popular deep learning frameworks – PyTorch, TensorFlow & Keras, Caffe, and common scientific python libraries including NumPy, scikit-learn, and matplotlib. Rich experience and advanced skills in Excel, Word, Visio, Latex, SQL, and Linux. Basic familiarity with JavaScript/HTML, C#, and Git.
- High degree of proficiency in applied linear algebra, optimization, probability & statistics, machine learning and computer vision.

Education Information

- Feb 2015 - Present **Ph.D Candidate, Computer Science**
  School of Computing and Information Technology, University of Wollongong (UOW)
- Sep 2011 - Mar 2014 **M.S., Microelectronics and Solid State Electronics**
  Dept. of Information Science & Electronic Engineering, Zhejiang University (ZJU) GPA: 3.6/4
- Sep 2007 - Jun 2011 **B.S., Electronic Science and Technology**
  Dept. of Information Science & Electronic Engineering, Zhejiang University (ZJU) GPA: 3.3/4

Research Experiences

- Nov 2020 – Precent **Development of Postural Analysis Software**
  - Programming language: C#
  - Development of a software that integrates skeleton data from different sources that come in diverse formats and standards.
- Mar 2019 – Oct 2020 **Research on skeleton-based whole-body postural assessment**
  - Extended the graph convolutional network (GCN) to extract spatio-temporal information from short skeleton sequences by using attention mechanism.

- Performance: mean absolute error (MAE)/Kappa reach 0.145/0.764. As a comparison, multi-layer perceptron (MLP) achieves 0.177/0.712, and two-stream GCN achieves 0.156/0.749

- Mar 2018 - Mar 2019 **Research on designing better convolutional neural network (CNN) architectures**
  - Designed a new architecture using network architecture search (NAS), obtaining better performance with less parameters than conventional CNNs
- Jun 2018 - Sep 2018 **RIP current Detection from high-resolution images**
  - Adapted Mask-RCNN, YOLOV3+, and DeepLabV3+ for detection of RIPs in 1080p colour images, in both object-level and pixel-level.
  - Developed an algorithm that allows training of networks on original-resolution images using small-memory GPUs.
  - mAP 85.2, AP@.50 91.9, AP@.75 91.5
- Mar 2017 – Mar 2018 **Research on deep learning-based whole-body postural assessment**
  - Proposed an attention-based CNN that achieves MAE/Kappa of 0.158/0.742. As a comparison, ResNet50 achieves 0.170/0.723.
  - Created a new dataset by reannotating existing pose estimation dataset
  - Developed a GUI-based tool for automatic annotation based on Matlab
- Apr 2016 - Mar 2017 **Research on deep learning-based upper-body postural assessment**
  - Proposed an end-to-end trainable CNN that achieves state-of-the-arts (accuracy 91.5%).
  - Triplet rank loss, Adaboost.M2
- Feb 2015 - Feb 2016 **Research on image-based upper-body postural assessment**
  - Weighted Histogram of Oriented Gradient (WHOG), Support Vector Machine (SVM)
  - Created a new dataset of 30 upper-body poses with around 30,000 colour images.
  - Performance: overall accuracy 81.5%, speed ~20 FPS. As a comparison, Alexnet achieves 79.9% and ~10 FPS, DenseNet121 achieves 86.3% and ~5 FPS.
  - Developed a real-time software based on Qt5 framework and OpenCV
- Jul 2013 - Mar 2014 **Research on combination of Earth Sensor (Light and Infrared) and Sun Sensor**
  - Designed a new structure of circuits.
  - Developed the algorithms for all sensors.
  - Designed new DSP and FPGA software to deal with sensors' data.
- Apr 2013 - Jul 2013 **Design of new Sensor for Micro-Satellites**
  - Combined the Magnetometer and Super-View Digital Sun Sensor
  - Communication protocol: Pelican
- Mar 2013 - Apr 2013 **Research on algorithm for fisheye lens calibration**
  - Proposed a new algorithm dedicated to fisheye lens in sensors, accuracy 0.05°
- Sep 2012 - Mar 2013 **Design of the Analog Sun-sensor for Micro-Satellites (Participant)**
  - View: 90°×360°, Power: <30mW, Accuracy: 3 σ <0.1°
- Oct 2012 - Mar 2013 **Design of Super-View Digital Sun Sensor for Micro-Satellites**
  - Proposed a new structure design of digital Sun Sensor with fisheye lens, followed by a special coms chip, with Field Programmable Gate Array (FPGA) and Micro Control Unit (MCU) as CPUs
  - View:180°×360°, Power: <300 mW, Error: <0.05°@any point
- Oct 2012 - Mar 2013 **Design of Super-View Visible Light Earth Sensor for Micro-Satellites**
  - Proposed a new structure design of Earth Sensor with fisheye lens, followed by a special coms chip, with FPGA as image data processor and DSP as CPU
  - Hough transform, affine transform and edge detection as algorithms
  - View:180°×360°, Power: <700 mW, Error: <0.03°@any point

- Apr 2012 - Oct 2012 **Design and test of Low Power Magnetometer for Micro-Satellites (Participant)**
  - 3 dimensions, Sensitivity: ~10nT , Power: <200mW

Selected Publications

- **Patent:** Wang, Hao and **Zewei Ding**, "Sun Sensor With Large Field of View Based On Fisheyes", 2012
- **Ding, Zewei**, Pichao Wang, Philip Ogunbona, and Wanqing Li. "Investigation of different skeleton features for CNN-based 3D action recognition." In *2017 IEEE International Conference on Multimedia & Expo Workshops (ICMEW)*, pp. 617-622. 2017.
- **Ding, Zewei**, Wanqing Li, Pichao Wang, Philip Ogunbona, and Ling Qin. "Weakly structured information aggregation for upper-body posture assessment using ConvNets." In *2017 IEEE International Conference on Multimedia and Expo (ICME),* pp. 1512-1517. 2017.
- **Ding, Zewei**, Wanqing Li, Philip Ogunbona, and Ling Qin. "A real-time webcam-based method for assessing upper-body postures." *Machine Vision and Applications*, no. 5 (2019): 833-850.
- Zhang, Jing, **Zewei Ding**, Wanqing Li, and Philip Ogunbona, "Importance weighted adversarial nets for partial domain adaptation." In Proceedings of the *IEEE Conference on Computer Vision and Pattern Recognition (CVPR)*, pp. 8156-8164. 2018.
- Ding, Zewei, Wanqing Li, and Philip Ogunbona. "Multi-attention ConvNets for whole-body postural assessment." TBME, under review.
- Ding, Zewei, Wanqing Li, and Philip Ogunbona, "Cross-stream feature shared graphical neural networks for whole-body postural assessment." ICME 2021, Under review.

Community Activities

- Mar 2020 - May 2020 Tutor of Data Mining and Knowledge Discovery (R programming) in UOW
- Mar 2018 - Mar 2019 Committee member of UOW badminton club
- Sep 2012 - May 2013 Tutor for Student Research Training Program (SRTP) in ZJU
- Sep 2007 - Sep 2007 Committee member of Comprehensive Quality Management Office in ZJU
- Sep 2007 - Jun 2009 Served as an assistant in school office in ZJU

Honors & Scholarships

- Oct 2017 The 12th place of IEEEXtreme Coding Competition in Australia
- Sep 2008 - Jun 2009 The 3rd Prize of Student Research Training Program (SRTP) in ZJU
- Sep 2007 - Jun 2008 Merit Student and the 3rd class scholarship in ZJU

Hobbies & Self-Evaluation

- Playing basketball, badminton, table tennis, computer games, and marathon.
- IELTS: Listening 7.0, Reading 7.0, Writing 6.5, Speaking 7.0
- Self-evaluation
  - Good communication skills
  - Hardworking and have a strong sense of responsibility
  - Strong thirst for knowledge and the ability to learn
  - Creative and willing to try novel things
  - Warm-hearted and sociable
  - Critical thinking

Referees

- Referees can be provided upon request