Yan Zhang

Do AI For People

Education

2005–2009 **Bachelor of mechanical engineering and automation**, *Southwest Jiaotong University*, Chengdu, China, *Grade: 85/100.*
Mechatronics

2009–2010 **M.Sc in advanced control and system engineering**, *School of electrical and electronic engineering, University of Manchester*, UK, *Grade: distinction (first-class).*
dynamic system · feed-back control

2011–2015 **Graduate school of computer science**, *Saarland University*, Germany, *Grade: 1.6, PhD candidate.*
Image processing and computer vision · variational method · machine learning · optimization

2015–now **Institute of neural information processing**, *Ulm University*, Germany, PhD candidate.
Human behaviour analysis for elder healthcare

Working Experience

Nov. 2011 – May. 2012 **Research assistant intern**, *Human-computer interaction group, Graphics department, Max-planck institute of informatics*, Saarbrücken.

Nov, 2012 – Feb. 2015 **Research assistant**, *Mathematical image analysis group, computer science school, Saarland university*, Saarbrücken.

Mar. 2015 – Dec. 2015 **Research assistant intern**, *computer-assisted medical intervention group, German Cancer Research Center*, Heidelberg.

Dec. 2015 – Sep. 2018 **Research assistant**, *Institute of neural information processing, Ulm University*, Ulm.

Oct. 2018 – now **Research assistant**, *Max-Planck institute for intelligent systems, Perceiving system department*, Tübingen.

Projects (since 2011)

Image Analysis .

- **Noise removal in 3D CT images using anisotropic diffusion**: nonlinear partial differential equation · industrial CT image stack · C
- **A higher-order variational coupling model**: continuous theories in the Sobolev space · novel finite difference scheme and convexity · applications on image analysis
- **A level-set image segmentation method based on a novel edge detector**: higher-order variational model · geodesic active contour · optimization · C

Computer Vision .

- **Object scanning and surface reconstruction using a RGB-D camera**: iterative closest point algorithm · Kinect · Visual C++
- **Traffic sign detection and categorization using a kernel-based learning algorithm**: Matlab · machine learning

Human-Computer Interaction

- **Developing a novel keyboard layout on an Android tablet using global optimization methods**: Android · simulated annealing

Biomedical Engineering

- **Tissue classification for laparoscopic image understanding based on multispectral texture analysis**: local binary pattern · multispectral imagery · support vector machine · Python

Human Behavior Analysis

- **Simulation of disorientation and motor functionalities of elderly people in the lab**: cognitive impairment reproduction · search experiments · multi-model dataset (video, audio, mocap, etc.) · empirical experiments
- **Disorientation recognition based on action analysis**: multi-scale analysis · person 3D tracking · walking path and motion energy analysis · action consistency represented by Fisher vectors · state-of-the-art performance (better than deep learning)
- **Continuous activity understanding and early recognition**: pose-context pattern · accumulative learning scheme · early recognition without observing the entire video
- **Temporal action segmentation via dynamic clustering**: unsupervised method · online learning · fast response · superior to state-of-the-art method
- **Human motion parsing via hierarchical dynamic clustering**: unsupervised method · online learning · fast response · superior to state-of-the-art method · fainting/falling detection
- **Local temporal bilinear pooling for fine-grained action parsing**: statistics-based method, lossless dimension reduction, multilinear algebra-based method, high-order information approximation, state-of-the-art performance on various datasets

Human Body Graphics

- **Generative model for human-environment interaction**
- **Human mesh recovery**: SMPL model, AlphaPose, OpenPose, virtual camera
- **Human-centric graphics**: mesh inter-penetration loss

Software Engineering

- **MITK development**: git · C++ · QT
- **Social Signal Interpretation (SSI) development**: git · C++ · OpenCV

Publications and Reports

- A. Oulasvirta, A. Reichel, W. Li, Y. Zhang, M. Bachynskyi et al. Two-thumb text entry on touchscreen devices. CHI'13, April 2013.
- M. Bildhauer, M. Fuchs, J. Weickert, Y. Zhang. An Alternative Approach Towards The Higher-Order Denoising of Images. (manuscript of 60 pages for a mathematical journal), 2013-2014
- Yan Zhang, et al. "Tissue classification for laparoscopic image understanding based on multispectral texture analysis." Medical Imaging 2016: Image-Guided Procedures, Robotic Interventions, and Modeling. Vol. 9786. International Society for Optics and Photonics, 2016.
- Yan Zhang et al. "Tissue classification for laparoscopic image understanding based on multispectral texture analysis." Journal of Medical Imaging 4.1 (2017): 015001.
- Velana, Maria, et al. "The SenseEmotion Database: A Multimodal Database for the Development and Systematic Validation of an Automatic Pain-and Emotion-Recognition System." IAPR Workshop on Multimodal Pattern Recognition of Social Signals in Human-Computer Interaction (2016).
- Yan Zhang, et al. "Visual Confusion Recognition in Movement Patterns from Walking Path and Motion Energy." ICOST (2017).

- Yan Zhang, Georg Layher, and Heiko Neumann. "Continuous activity understanding based on accumulative pose-context visual patterns." IPTA (2017).
- Yan Zhang, He Sun, Siyu Tang, Heiko Neumann. "Temporal Human Action Segmentation via Dynamic Clustering." arXiv preprint arXiv:1803.05790 (2018).
- Yan Zhang, Siyu Tang, He Sun, Heiko Neumann. "Human Motion Parsing by Hierarchical Dynamic Clustering." BMVC (2018).
- Yan Zhang, Heiko Neumann. "An empirical study towards understanding how deep convolutional nets recognize falls." In: Leal-Taixé L., Roth S. (eds) Computer Vision – ECCV 2018 Workshops. ECCV 2018.
- Yan Zhang, Siyu Tang, Krikamol Muandet, Christian Jarvers, Heiko Neumann. "Local Temporal Bilinear Pooling for Fine-grained Action Parsing." CVPR (2019).
- Patrick Thiam et al. "Multi-modal Pain Intensity Recognition based on the SenseEmotion Database", IEEE Transactions on Affective Computing (2019)
- Yan Zhang, Krikamol Muandet, Qianli Ma, Heiko Neumann, Siyu Tang. "Low-rank Random Tensor for Bilinear Pooling". arXiv (2019).
- Yan Zhang, Mohamed Hassan, Heiko Neumann, Michael J Black, Siyu Tang. "Generating 3D People in Scenes without People". arXiv (2019).

Languages

Chinese	Native	*simplified Chinese*
English	Professional	*working language*
German	Basic	*Telc B1 certificate*

Additional Skills

Programming	C/C++, CUDA, OpenCV, Matlab, Python, Cython, tensorflow, pytorch, caffe
System	Unix/Linux, Android, IOS
Software	Latex, Git, Eclipse, Cmake, Blender
Others	Charted Financial Analyst Level-1

Social Activities

- 2013 Year. Vice chairman, Chinese Student Association of Saarland University