# Yan Zhang

### Human oriented and people foremost.

employing artificial intelligence and computer vision technologies to provide solutions for biomedical engineering and healthcare

#### 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 Research assistant intern, Human-computer interaction group, Department 4, Max-May. 2012 planck institute of informatics, Saarbrücken.
- Nov, 2012 Research assistant, Mathematical image analysis group, computer science school, Saar-Feb. 2015 land university, Saarbrücken.
- Mar. 2015 Research assistant intern, computer-assisted medical intervention group, German Can-Dec. 2015 cer Research Center, Heidelberg.
- Dec. 2015 Research assistant, Institute of neural information processing, Ulm University, Ulm. Now

#### Projects (since 2011)

#### Image .

- Analysis O Noise removal in 3D CT images using anisotropic diffusion: nonlinear partial differential equation  $\cdot$  industrial CT image stack  $\cdot$  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  $\cdot$  geodesic active contour  $\cdot$  optimization  $\cdot$  C

#### Computer .

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

Human- .

Interaction

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

Biomedical

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

Human

## **Analysis**

- Behavior o 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  $\cdot$  walking path and motion energy analysis  $\cdot$  action consistency represented by Fisher vectors  $\cdot$ 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
  - Adaptive resonance network on human tracking: novel deep learning method · online learning · tensorflow

Software

- **Engineering** MITK development:  $git \cdot C++ \cdot QT$ 
  - 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.
- o 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.
- o 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. Springer, Cham, 2016.
- Yan Zhang, et al. "Visual Confusion Recognition in Movement Patterns from Walking Path and Motion Energy." International Conference on Smart Homes and Health Telematics. Springer, Cham, 2017.
- Yan Zhang, Georg Layher, and Heiko Neumann. "Continuous activity understanding based on accumulative pose-context visual patterns." 2017 Seventh International Conference on Image Processing Theory, Tools and Applications (IPTA). IEEE, 2017.
- Yan Zhang, He Sun, Siyu Tang, Heiko Neumann. "Temporal Human Action Segmentation via Dynamic Clustering." arXiv preprint arXiv:1803.05790 (2018).

### Languages

Chinese Native simplified Chinese

English Fluent widely used, fluent communication

German Basic Telc B1

#### Additional Skills

Programming C/C++, CUDA, OpenCV, Matlab,

Python, Cython, tensorflow, caffe

System Unix/Linux, Android, IOS

Software Latex, Git, Eclipse, Cmake, CAD, Pro/E

Others Charted Financial Analyst Level-1

#### Interests

Music guitar, music composition

Sports table tennis, hiking

Relaxing meditation

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