Yan Zhang

Human oriented and people foremost.

Image Processing · Computer Vision · Pattern Recognition · Machine Learning · Partial Differential Equation · Mechatronics

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, Department 4, 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 – Now **Research assistant**, *Institute of neural information processing, Ulm University*, Ulm.

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
- **Adaptive resonance network on human tracking**: novel deep learning method · online learning · tensorflow

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. 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

张言

以人为本

德国
乌尔姆
yz-cnsdqz.github.io
yan.zhang@uni-ulm.de

图像处理 · 计算机视觉 · 机器学习 · 偏微分方程 · 机电一体化

学历

2005–2009 工程学士，机械工程学院, 西南交通大学, 中国成都.
- 分数：85/100
- 专业：机械设计制造及其自动化

2009–2010 科学硕士, 曼彻斯特大学, 英国曼彻斯特.
- 分数：distinction
- 专业：先进控制理论和工程

2011–2015 博士研究生, 萨尔大学, 德国萨尔布吕肯.
- 分数：1.6
- 专业：计算机科学，人工智能，图像处理和计算机视觉
- 课题：高阶耦合变分模型：连续函数理论，离散数值算法和图像分析上的应用

2015–现在 博士研究生, 乌尔姆大学, 德国乌尔姆.
- 专业：计算机科学，人工智能，图像处理和计算机视觉
- 课题：用于老年人监护的人体行为分析

工作经验

2011 年 11 月 – 2012 年 5 月 实习研究助理, 马克斯普朗克信息学研究所，人机交互实验室, 德国萨尔布吕肯.

2012 年 11 月 – 2015 年 2 月 研究助理, 数学图像分析组, 萨尔大学计算机学院, 德国萨尔布吕肯.

2015 年 3 月 – 2015 年 12 月 实习研究助理, 影像部计算机辅助医疗干预组, 德国癌症研究中心, 德国海德堡.

2015 年 12 月 – 现在 研究助理, 神经信息处理中心, 乌尔姆大学, 德国乌尔姆.

项目经历 (从 2011 年)

图像分析 .
- 采用各向异性扩散方程对三维 CT 图像去噪声: 非线性偏微分方程 · 工业 CT 图像 · C 语言
- 高阶耦合变分模型: Sobolev 空间连续性理论 · 新型有限差分模型和数值唯一解理论 · 图像分析上的应用
- 图像分割：一种基于 level-set 的新型边缘检测器: 耦合项 · Geodesic Active Contour · 优化 · C 语言

计算机视觉 .
- 基于最近点迭代算法和 RGBD 摄像机: iterative closest point 算法 · Kinect · Visual C++
- 基于核方法的路标牌探测和识别: Matlab · 支持向量机

人机交互 .
- 基于全局优化的方法提升平板电脑文字输入: Android 开发 · 模拟退火算法

生物医学工程
- 用于内窥镜图像理解的多频谱材质特征组织分类: local binary pattern · 多频谱成像 · 支持向量机 · Python

人体行为分析
- 认知损伤仿真和老年人运动机能仿真实验: 寻找实验 · 多模态数据库（视频，音频，动作捕捉等）
- 基于运动的方向感丧失识别: 多尺度分析 · 3D 人体追踪 · 行走路径和运动能量分析 · 基于 Fisher 向量的动作一致性表示 · 较目前最先进的方法（包括深度学习的方法）表现更好
- 连续活动分析和行为早期检测: 新型的动作-情景特征 · 积累型学习方法 · 早期检测
- 基于动态聚类的时序动作分割: 新型的在线聚类算法 · 快速，通用，非监督且不需要额外训练数据 · 较目前最先进的算法表现更好
- 基于层次动态聚类的人体动作解析: 继承了动态聚类的优点 · 晕倒/摔倒非监督检测 · 较目前最先进的算法表现更好
- 自适应震荡网络和在行人追踪上的应用: 新型深度学习模型 · 在线学习 · tensorflow

软件工程
- MITK 模块开发: git · C++ · QT
- SSI 开发, 设计和开发数据采集实验系统: git · C++ · OpenCV

发表文献和报告

- 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
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- Yan Zhang et al. "Tissue classification for laparoscopic image understanding based on multispectral texture analysis." Journal of Medical Imaging 4.1 (2017): 015001.
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- 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).

语言

中文	母语	
英文	熟练	听说读写，能与外国人流畅沟通
德文	基本	基本应用 *Telc B1*

专业能力

编程	C/C++, CUDA, OpenCV, Matlab, Python, Cython, Tensorflow, Caffe
系统	Unix/Linux, Android, IOS
软件	Latex, Git, Eclipse, Cmake, CAD, Pro/E
其他	Charted Financial Analyst Level-1