

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 of Courses: 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**, *Human-Computer Interaction Group, Department 4, Max-Planck Institute of Informatics*, Saarbrücken.
May. 2012
- Nov. 2012 – **Researcher**, *Mathematical Image Analysis Group, Computer Science School, Saarland University*, Saarbrücken.
Feb. 2015
- Mar. 2015 – **Research Assistant**, *Medical and Biological Informatics, German Cancer Research Center*, Heidelberg.
Dec. 2015
- Dec. 2015 – **Research Assistant**, *Institute of neural information processing, Ulm University*, Ulm.
Now

Projects (since 2011)

- **High Level Computer Vision**: (a) Traffic Sign Detection and Categorization using A Kernel-based Learning Algorithm (**Keywords**: Matlab · machine learning)
- **Human-Computer Interaction**: Developing a novel keyboard layout on an Android tablet using computational methods. (**Keywords**: Android)
- **3D Reconstruction**: Object Scanning and Surface Reconstruction using A RGB-D Camera. (**Keywords**: Iterative Closest Point Algorithm · Kinect · Visual C++)
- **Image Restoration**: Noise Removal in 3D CT Images using Anisotropic Diffusion. (**Keywords**: Nonlinear Partial Differential Equation · Industrial CT Image Stack · C)

- **A Higher-Order Variational Coupling Model:** A Higher-order Variational Coupling Model: continuous theories in the Sobolev space, novel finite difference scheme and convexity, applications on image analysis.
- **Image Segmentation:** A Level-Set Method based on a Novel Edge Detector. (**Keywords:** higher-order variational model · Geodesic Active Contour · Optimization · C)
- **Biomedical Engineering:** Tissue Classification for Laparoscopic Image Understanding based on Multispectral Texture Analysis (**Keywords:** local binary pattern · multispectral imagery · support vector machine · Python)
- **Human Behavior Analysis:** Simulation of disorientation and motor functionalities of elderly people in the lab. (**Keywords:** cognitive impairment reproduction · search experiments · multi-model dataset (video, audio, mocap, etc.) · empirical experiments)
- **Human Behavior Analysis:** Disorientation recognition based on video recordings (**Keywords:** 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))
- **Human Behavior Analysis:** Continuous activity understanding and early recognition (**Keywords:** pose-context pattern · accumulative learning scheme · early recognition without observing the entire video)
- **Human Behavior Analysis:** Temporal action segmentation via dynamic clustering (**Keywords:** unsupervised method · online learning · fast response · superior to state-of-the-art method)
- **Human Behavior Analysis:** Human motion parsing via hierarchical dynamic clustering (**Keywords:** unsupervised method · online learning · fast response · superior to state-of-the-art method · fainting/falling detection)
- **Human Behavior Analysis:** Adaptive resonance network on human tracking (**Keywords:** novel deep learning method · online learning · superior to state-of-the-art method)
- **Software Engineering:** Developing new features and debugging in the MITK software (**Keywords:** git · C++ · QT)
- **Software Engineering:** Development of Social Signal Interpretation (SSI), setup recording system in the lab (**Keywords:** 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 **Professional**

scientific writing

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 Chartered Financial Analyst Level-1

Interests

Music guitar, music composition

Sports table tennis, hiking

Relaxing meditation

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)

- 计算机视觉 基于核方法的路标牌探测和识别.
- 人机交互 基于优化的方法提升平板电脑文字输入.
- 三维建模 基于最近点迭代算法和 **RGBD** 摄像机.
- 图像还原 采用各向异性扩散方程对三维 **CT** 图像去噪声.
- 高阶耦合变分模型 .
- Sobolev 空间连续性理论
 - 集散模型数值分析：新型有限差分模型和唯一解理论
 - 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.

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.
人体行为分析	认知损伤仿真, 老年人运动机能仿真, 多模态数据库 (视频, 音频, 动作捕捉等).
人体行为分析	基于运动的方向感丧失识别. <ul style="list-style-type: none"> 三维人体追踪 运动轨迹和强度分析 情景特征提取和细粒度动作分析 动作一致性建模 较目前最先进的方法 (包括深度学习的方法) 表现更好
人体行为分析	连续活动分析和行为早期检测. <ul style="list-style-type: none"> 新型的动作-情景模式提取 新型的积累型训练方法 不需要处理整段视频即知即将发生的动作
人体行为分析	基于动态聚类的时序动作分割. <ul style="list-style-type: none"> 新型的聚类算法 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
人体行为分析	基于层次动态聚类的人体动作解析. <ul style="list-style-type: none"> 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
人体动作分析	自适应震荡网络和在行人追踪上的应用.
软件工程	MITK 模块开发 (git · C++ · QT) .
软件工程	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, 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
德文 基本

听说读写，能与外国人流畅沟通
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 Chartered Financial Analyst Level-1