

# NA ZHANG

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## TECHNICAL SKILLS

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<b>Machine Learning</b>	Classification, Regression, Clustering, Unsupervised Learning
<b>Computer Vision</b>	Face Morphing/De-Morphing, Morphing Detection, Face Expression Analysis Face Recognition/Detection, Autism Diagnosis, Facial Traits Rating Prediction
<b>Data Process</b>	Data Gathering/Cleaning, Data Analysis/Wrangling/Mining/Visualization
<b>Deep Learning</b>	CNN, Generative AI (GANs), AutoEncoder(AE), Transformer
<b>Frameworks/Tools</b>	PyTorch, TensorFlow; Jupyter Lab, Jupyter Notebooks
<b>Languages</b>	Python, Java, Matlab, C#, C++, C
<b>Python Packages</b>	OpenCV/NumPy/Scikit-Learn/Scikit-Image/Pandas/Matplotlib/SciPy/DLIB
<b>Database</b>	SQL; Oracle DB, MySQL, PostgreSQL

## EDUCATION

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<b>West Virginia University, WV, US</b>	08/2016 - 05/2023
Ph.D. in Computer Science: Computer Vision, Deep Learning	
<b>Beihang University, Beijing, China</b>	09/2009 - 01/2012
Master's Degree in Computer Science: Software Development Process	
<b>Beijing Information Science and Technology University, Beijing, China</b>	09/2005 - 07/2009
Bachelor's Degree in Computer Science, GPA: 3.8	

## RESEARCH PROJECTS

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<b>Transformer-based Face Morphing and De-Morphing</b>	12/2021 - 09/2022
<i>Research Assistant</i>	<i>West Virginia University</i>

- Developed a transformer-based GAN scheme for face morphing generation and de-morphing.
- Constructed special losses (face-related/image-related) to learn an optimized latent code of a given face.
- Demonstrated its superiority to CNN-based morphing methods.

<b>Fusion-based Few-Shot Face Morphing Attack Fingerprinting</b>	09/2020 - 11/2021
<i>Research Assistant</i>	<i>West Virginia University</i>

- Extended morphing attack detection from binary to multiclass morphing attack fingerprinting.
- Proposed a few-shot learning framework (CNN+AE) to learn fusion features of 2 sensor pattern noises.
- Collected a high-resolution Doppelgänger dataset (look-alike face pairs without biological connections).
- Extensive experiments showed the outstanding performance.

<b>Video-based Facial Micro-Expression Analysis for Autism Diagnosis</b>	10/2022 - 04/2023
<i>Research Assistant</i>	<i>West Virginia University</i>

- Focused on hour-long interview video analysis by capturing facial micro-expression in unsupervised way.
- Designed a pipeline to classify autism/control groups by spotting/extracting feature of subtle facial movement via optical flow/attention mechanism/local patch of interest.
- Obtained 97.32% accuracy showing the efficiency of acquiring micro-expression for autism diagnosis.

<b>Face Dynamics Analysis for Autism Diagnosis on Interview Videos</b>	07/2019 - 08/2020
<i>Research Assistant</i>	<i>West Virginia University</i>

- Constructed a classification system to diagnose autism with different severity levels in hour-long videos.
- Designed a pipeline to leverage various strategies of 3D spatio-temporal face feature extraction, sparse coding, marginal fisher analysis, few-shot learning and scene-level fusion.

- Achieved 91.72% accuracy that is comparable to the standardized diagnostic scales.

**Facial Traits Rating Prediction and Analysis on Autism Participants** 12/2020 - 06/2021  
*Research Assistant* West Virginia University

- Designed a deep regression model for facial traits rating prediction by transfer learning.
- Investigated the difference between autism and normal groups on making facial trait judgment.
- Demonstrated different facial areas are involved for traits judgment between autism and normal.

**Face Recognition (FR) and Face Quality Analysis** 08/2016 - 06/2019  
*Research Assistant* West Virginia University

- Explored the impact of different face qualities on FR performance by investigating their relationship.
- Gathered a dataset with 356.4K face images of Asian celebrities crawled online after cleaning.

## WORK EXPERIENCE

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**Research & Development Engineer** 08/2012 - 01/2015  
**Beijing China-Power Information Technology Co., LTD, Beijing, China**

- Involved in implementing two large-scale systems (State Grid Infrastructure Control System, State Grid Information Resources System) based on Business Process Management (BPM) Platform using Java, JSP, Oracle and TortoiseSVN, which are successfully deployed and used by State Grid Corporation of China.

**Software Engineer Intern** 03/2010 - 09/2010  
**Software Engineering Institute, Beihang University, Beijing, China**

- Implemented Wireless Network Management System to monitor wireless access points and controllers of Beijing subway transportation wireless network using C# on .Net framework with MySQL.

## AWARDS

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**Second Class Scholarship**, Beihang University 2010  
**National Aspiration Scholarship**, Beijing, China 2007  
**Excellent Student Award; First Class Scholarship, 5 times**, BISTU 2005-2009  
**Third Class Award of National Physics Contest for College Student**, Beijing, China 2007

## PUBLICATIONS

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1. Discriminative few shot learning of facial dynamics in interview videos for autism trait classification. **Na Zhang**, Mindi Ruan, Shuo Wang, Lynn Paul, and Xin Li. IEEE Transactions on Affective Computing (2022).
2. Comprehensive social trait judgments from faces in autism spectrum disorder. Runnan Cao, **Na Zhang**, Hongbo Yu, Paula J. Webster, Lynn K. Paul, Xin Li, Chujun Lin, and Shuo Wang. Psychological Science (2023).
3. Fusion-based Few-Shot Morphing Attack Detection and Fingerprinting. **Na Zhang**, Shan Jia, Siwei Lyu, and Xin Li. IEEE Transactions on Biometrics, Behavior, and Identity Science.(Revision)
4. MorphGANFormer: Transformer-based Face Morphing and De-Morphing. **Zhang, Na**, Xudong Liu, Xin Li, and Guo-Jun Qi. arXiv preprint arXiv:2302.09404 (2023).
5. What is the challenge for deep learning in unconstrained face recognition?. Guodong Guo, **Na Zhang**. 13th IEEE International Conference on Automatic Face and Gesture Recognition (2018).
6. A survey on deep learning based face recognition. Guodong Guo and **Na Zhang**. Computer Vision and Image Understanding (2019).