Hongsheng Zhang

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EDUCATION BACKGROUND

School of Software Engineering, Northwestern Polytechnical University (NPU), China 09/2017 – 06/2021
B.E. in Software Engineering | GPA: **3.420**/4.0 | **84.68**/100
Main Courses:
C++ Programming, Data Structure, Computer Networks, Computer Operating System, Principles of Computer Organization, Signal and System, Compiler Construction Principles, Computer Coding and Password, Networks and Information Safety, Discrete Mathematics, Linear Algebra, Computational Methods, Probability Theory and Mathematical Statistics, Complex Function and Integral Transformation

STANDARDIZED TESTS

TOEFL:

SKILLS

Programming Languages: C/C++ | Python | PHP | JAVA | MATALB | HTML | JavaScript | C# | SQL
Software: Robot Operating System | Arduino | Qt
Hobbies: Tennis | Badminton | Volleyball

AWARDS AND HONORS

Outstanding Student Scholarship, Star of Innovation and Entrepreneurship (only 10 students per year) 2018 & 2019 & 2020
The 1st Prize | China National College Student "Innovation, Originality and Entrepreneurship" Challenge 08/2020
The 3rd Prize | National University Student Social Practice and Science Contest on Energy Saving & Emission Reduction 07/2020
The 1st Prize | Sanhang Cup Extracurricular Science and Technology Works Competition 04/2020
The 3rd Prize | iCAN International Innovation and Entrepreneurship Competition 12/2019
The 2nd Prize | China College Computer Competition 09/2019
The 3rd Prize | NPU Undergraduate Mathematical Contest in Modeling 06/2018

RESEARCH EXPERIENCES

Micro 5G Unmanned Aerial Vehicle (UAV) and its Cloud System 04/2019 – 04/2020
National Engineering Laboratory of Big Data Application Technology for Air, Space, Ground and Sea Integration, NPU

- Led a team of four to design, prototype and test an autonomous UAV system based on 5G communication for remote control; key components include:
- As one of the main contributors of the project, I help to successfully manufactured a small UAV which integrated the digital transmission, the graphic transmission and ultra-remote control based on 5G in December 2019. The main contribution include:
  - **Computer Vision:** Implemented a set of deep learning and classical computer vision algorithms in Python (PyTorch) and OpenCV for object detection, tracking and aiming.
  - **Communication:** Enabled 5G broadband cellular communication for operating range exceeding 1K+ miles; measured packet loss for various heights, locations, and signal strengthens for validating the system robustness.
  - **Control Platform:** Established a Cloud-based data storage and processing system for real-time flight monitoring and management.
  - **Navigation:** Implemented a Simultaneous Localization and Mapping (SLAM) algorithm in MATLAB for concurrent location tracking and map updating.
  - **Electronic Hardware:** Integrated an onboard microcontroller, a field camera, and a set of sensors and actuators to enable 6 degrees-of-freedom flight control; performed PCB design/testing using Altium Designer and Proteus.
  - **Software:** Built a control application in C# and Linux, allowing two-way real-time flight control and flight data visualization.
  - **Mechanical Hardware:** Conducted CAD design, material procurement, parts machining, and system assembly; performed computational fluid dynamics (CFD) simulation in ANSYS-Fluent to optimize the propeller geometry for noise reduction and efficiency enhancement.
- **A Chinese patent gained** (202020156197.9); **two software copyrights granted** (2020SR0135810) and (2020SR0838390)
- Technical merit and novelty recognized with **two national awards**, **three provincial awards**, and **eight university awards**.
- **Presented the work in the 2019 International Innovation and Entrepreneurship Exp (国际创新创业博览会)**; the work highlighted by multiple national newspapers and presented the work to chairman of China Youth Federation; **selected into the National College Students' Innovation and Entrepreneurship Annual Exchange Program**; participated in the **proposal of Key R&D Projects of Shaanxi Province in 2020 (陕西省重点研发项目计划“面上项目”)**
- Coordinated cross-departmental collaboration following divide-and-conquer strategy; organized numerous meetings to drive brainstorming, alignment and troubleshooting; spearheaded the liaison with external stakeholders and secured external financial support; significantly bolstered technical leadership and interpersonal skills.

High dynamic obstacle avoidance technology of 5G network-connected UAV **07/2020-08/2020**
(National Engineering Laboratory of Big Data Application Technology for Air, Space, Ground and Sea Integration, NPU)

- Studied the principle of event camera and learned Robot Operating System(ROS)

- A method of removing self movement from the stream of events proposed by Mitrokhin etc. was referenced. A density-based clustering algorithm and self-trained neural network were used to segment the target obstacles. Finally, the speed of the obstacle is calculated by the optical flow method, so that the UAV can avoid obstacles.
- Establish a rapid obstacle avoidance system of the UAV, use an event camera (an open simulation data set) to conduct the environment perception of the unmanned system, reduce the environment perception time of the unmanned system to level 10MS.

"iGuada" Campus Life WeChat Mini Program
China College Computer Competition 01/2019-08/2020

- Led a team of three effort to develop the WeChat mini program to help users to quickly check the class schedule, remind of courses, and share learning materials on campus
- "Seed Program for Innovation and Entrepreneurship" supported; the cumulative number of users reached 4.8 thousand.
- **Three software copyrights granted** (2020SR0993804) (2020SR0992659) and (2020SR0956715)

Intelligent Door Lock System Of A Vehicle Based On Artificial Intelligence, NPU 04/2018-04/2019

- Led a team of three to design and build a car door lock that could be unlocked by using face recognition without the key.
  - Design the mechanical structure of car door locks and make the prototype by 3D printing.
  - Integrate the bluetooth module, camera, Jetson nano and cloud system, enabling face recognition and remote unlock.
  - Create a convolutional neural network based on the SqueezeNet architecture.The facial RGB-D images are input into the network and outputs a distance between the two embeddings. The network is trained with a constrastive loss, that minimizes distances between pictures of the same person and maximizes the distance between pictures of different persons. After some training, face data could be mapped to a low dimensional potential space and be distinguished from each other.
- Supported by the National College Students' Innovation Training Program, awarded as "Excellent Final Project" (no more than 20% of all projects).

EXTRACURRICULAR EXPERIENCES

School Bus Service Team of Northwestern Polytechnical University 01/2019 – 01/2020

- Served as the first technical team member of the school team, I designed a WeChat Mini Program, which realized the functions of checking the school bus running schedule, real-time status, booking and queuing, etc. and was recognized by the competent department. It was promoted and used in the whole school and served every teachers and students.

Attendee | College Student Maker Day Xi'an Province, China 11/2019

- Be recommended and represented NPU to participate in College Student Maker Day with fellowship students from 20+ universities.

Team Leader | "Made in China 2025" looking from Zhejiang Province, China 08/2018

- Conducted field survey on the impact of "Made in China 2025" on enterprises; interviewed 30+ management personnel and government officials.
- Found out the shortcomings of Zhejiang Province's manufacturing industry; collected first-hand data regarding the history, operational models, development prospects, the methods adopted and achievements; generated recommendations for promoting health growth of them.

"Belt and Road Initiative" Research and Exchange Program, Vietnam 02/2018

- Go to the Hanoi National University, Confucius Institute at Hanoi University, Vietnam, the communist youth league central committee and craft village and other places, through interactive, field investigation, teaching form, fully enjoy Vietnam native culture and promote the economic and social development since the reform achievements.