Zhongming Huang

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Address: No.399 Binshui West Road, Tiangong University, Tianjin, China

Education

School of Electronics and Information Engineering, Tiangong University **Tianjin, China**

Undergraduate of Telecommunication Engineering, Class of 2023 Sep, 2019—Present

- GPA:3.79/4.0 | Rank: Top 1.6% in major
- Specialized Courses: Machine Learning and Bigdata Processing / Digital Signal Processing / Computer Networks / Signals and Systems / Microcontroller / EDA Theory & VHDL Programming / Communication Theory / High-Frequency Electronics / Electromagnetics / A&D Electronics / Linear Algebra / Modern Switching Technology, etc.

Publications and Patents

- **Zhongming Huang[1],** Yuxiang Wang[1], High Precision Small Hepatocellular Carcinoma Detection Using Improved EfficientNet with Self-Attention, *22nd IEEE/ACIS International Conference on Computer and Information Science (ICIS 2022)*
- **Zhongming Huang[1]**, Yuxiang Wang[1], Haolan Hu, Xun Liu, Tongzhen Liu and Zhanxu Zhang, Dynamic Feature Extraction Using I-Vector for Video Fire Detection, *ACIS 2nd International Conference on Artificial Intelligence (IAI 2022)* (Under Review)
- Yukuan Sun，**Zhongming Huang**，Yuxiang Wang，Xun Liu，Zhanxu Zhang，Tongzhen Liu，Haolan Hu，A Multi-dimensional Sensing Quadrotor UAV Fire Inspection System (Patent, Application Number: 202221074321.2)
- **Zhongming Huang**, Yuxiang Wang, Xun Liu, Zhanxu Zhang, Tongzhen Liu, Haolan Hu, Fire Detection System Based on Deep Learning Quadrotor UAV (Software Copyright, Submitting)

Intern Experience

School of Intelligent Science, National University of Defense Technology **Changsha, China**

Title : Optimal Robot Grasping Decision based on Computer Vision

Research Intern | Advisor: Prof. Xin Xu, Dr. Yifei Shi, *National University of Defense Technology* Feb. 2022—Mar. 2022

- Aimed to design an algorithm to pick a partially covered object in a cluttered scene, where the algorithm should calculate the best-next-grasp
- Reproduced papers about robot grasp planning during offline research and studied different strategies of 2-DoF or 6-DoF robot grasping and learned field related cutting-edge methods varying within 2D object labeling, 3D instance modeling, supervised or unsupervised grasp training and grasp pose estimation
- Designed a set of scoring algorithms for optimal grasping for a partially covered object using a single fixed camera based on the layout of scene, this scoring algorithm weights parameters including occlusion area and grasp confidence in a non-linear approach and decides the best object to grasp next

Research and Competition Experiences

Automatic CT Detection of Small Liver Cancer Based on Self-attention CNN **Tianjin, China**

Co-researcher | Collaborator: Yuxiang Wang, *Tiangong University* Mar. 2022—Present

- Developed a model that can better autonomically detect subtle small liver cancer (*small hepatocellular carcinoma*) characteristics in CT scans and has the reliable accuracy for diagnosis, which applied to the detection of early liver cancer that is difficult to be distinguished by naked eyes
- Combined the self-attention mechanism, often used in the field of natural language processing, with the convolutional neural network Efficient-net to improve the self-learning ability of the model, endowing the front end of the whole detection algorithm with an extraordinary ability to compare features between healthy livers and those with small liver cancer in CT scan images
- Achieved a primary detection accuracy of 97% after training on the LiTS dataset; contributed as the co-first author to a paper titled High Precision Small Hepatocellular Carcinoma Detection Using Improved EfficientNet with Self-Attention which has been accepted by the *22nd IEEE/ACIS International Conference on Computer and Information Science (ICIS 2022)*

Tianjin Provincial Project of The College Student Innovation and Entrepreneurship Plan **Tianjin, China**

Title: Fire Detection System Based on Deep Learning Quadrotor UAV

Team Leader | Advisor Faculty: Yukuan Sun, *Tiangong University* Mar. 2021—Present

- Targeted at researching novel visual detection algorithms and relative deployment on mobile processing platforms
- Trained and tested different traditional fire-detection CNN models and deployed them on a Jetson Nano Developer Kit, constructed an experimental quadrotor UAV prototype. Since traditional CNN detection models require massive dataset and huge computational capacity, a novel and efficient algorithm based on adapted I-Vector was proposed, which focuses on dynamic features of fire combustion instead of any static shape of fire
- Achieved 91% detection accuracy after training on a dataset of only 1296 sequences (< 9 MB), contributed to a paper titled “Dynamic Feature Extraction Using I-Vector for Video Fire Detection” which was submitted to the *ACIS 2nd International Conference on Artificial Intelligence (IAI-2022)*; submitted a patent titled “A Multi-dimensional Sensing Quadrotor UAV Fire Inspection System”

The 16th "Challenge Cup" Competition **Tianjin, China**

Title: Automatic Inspection Robot for Underwater Pipelines

Team Leader | Advisor Faculty: Di Zhao, *Robot Lab of Tiangong University* Mar. 2021—May 2021

- Committed to realizing the unmanned detection and maintenance the surface of underwater sewage or optical communication pipelines
- Designed an underwater robot that can automatically follow the pipelines and gives feedback when the machine vision module (OpenMV) detects defects
- Won the provincial second prize of the 16th "Challenge Cup" Competition as a work of "Underwater Robot" problem

The 7th National College Students' Engineering Training Comprehensive Ability Competition **Tianjin, China**

Title: Smart Logistic Quadrotor UAV

Team Member | Advisor Faculty: Di Zhao, *Robot Lab of Tiangong University* Dec. 2020—Apr. 2021

- Aimed to program a quadrotor UAV to fly indoors and automatically move a geometrically shaped object from one point to another based on ground marks
- The whole work involves automatic flight control, path planning, grasp control and automatic obstacle avoidance, the UAV was able to achieve full procedure after one-click take-off
- Won the provincial second prize of the 7th National College Students' Engineering Training Comprehensive Ability Competition, as the work of "Smart Logistic UAV" problem

Technical Skills

- **Language：** TOEFL 102/120
- **Programming：** Skilled in programming using C, Python, VHDL and Markdown; excelled in solving problems utilizing MATLAB, PyCharm, Jupyter Notebook, Visual Studio, Anaconda, Quartus, Keil; familiarized with Linux developing environment
- **Other Computer Skills：** Skilled in using MATLAB to calculate or draw diagrams, using Markdown to edit documents or generate diagrams, drawing illustrations using Visio, and editing TEX scripts using Overleaf

Honors and Prizes

- **Provincial Second Prize** June 2021
  The 16th "Challenge Cup" College Students Extracurricular Academic Science and Technology Works Competition, Tianjin Area
  Team Leader

- **Provincial Second Prize** May 2021
  The 7th National College Students Engineering Training Comprehensive Ability Competition, Tianjin Area Competition
  Team Member

- **Honorable Mention** Mar. 2021
  2021 Interdisciplinary Contest in Modeling (ICM)
  Team Leader

- **National Grand Prize** Dec. 2020
  National English Competition for College Students (NECCS)
  Individual Test Taker

- **National Third Prize** Dec. 2020
  12nd National Mathematics Competition for College Students
  Individual Test Taker

- **President First-class Scholarship** Sep. 2020 & Sep. 2021
  First-class Scholarship of Tiangong University for students ranked top 3%