Portfolio.

NAME： **Fenze Feng**

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About me

SKILLS

▶ Familiar with micro-nanofabrication process; experience in tape-out; solid semiconductor knowledge;
▶ Knowledge of multiple languages such as Python, Verilog, MATLAB, C, etc.;
▶ Mastery of various tools such as Linux, Latex, FPGA & Raspberry Pi development, etc.

PROJECTS

▶ The 19th National Intelligent Vehicle Competition for College Students National **Second Prize** (Team);
▶ U.S. Collegiate Mathematical Modeling Competition **Meritorious Award** (Team);
▶ **State-level** College Students' Innovative Entrepreneurial Training Plan Program, two **invention patents** in the investment.

PROFILE

▶ National Encouragement Scholarship, 5* Specialty Scholarship, Second Class Outstanding Student Award;
▶ Excellent Student Cadre, President of the student union, multiple social work honors;
▶ Obtained More than 20 sports honors, advanced individual in innovation and entrepreneurship of Shandong University .

SCHOOL	Shandong University	NAME	Fenze Feng
English	IELTS:6.0, CET4:478	GPA	90.17/100

| MAJOR	Micro-Nano Optoelectronics Science and Technology (Wang Shouwu Class)

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ABSTRACT

5G Remote Automatic Navigation Outdoor Race, which mainly involves automatic navigation to complete all the tasks on the way, including color recognition, PID control obstacle avoidance, and patrolling algorithms. The tasks were mainly focused on computer vision processing and PID control, which were applied to the knowledge of intranet penetration, Python/C++ programming, Linux system, etc. I was trained to a great extent from the hardware architecture of the vehicle body to software programming and communication control.
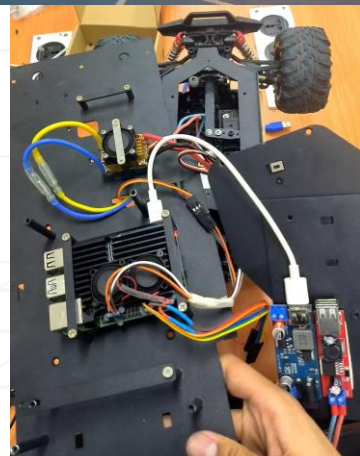
CHALLENGES

- Camera exposure problems caused by outdoor glare are solved by cleverly changing the camera's alignment.
- The complexity of the environment makes debugging very difficult. The best results are obtained through teamwork and continuous debugging.
- Multi-tasking articulation adds complexity. We make individual tasks concatenate by setting flag bits.
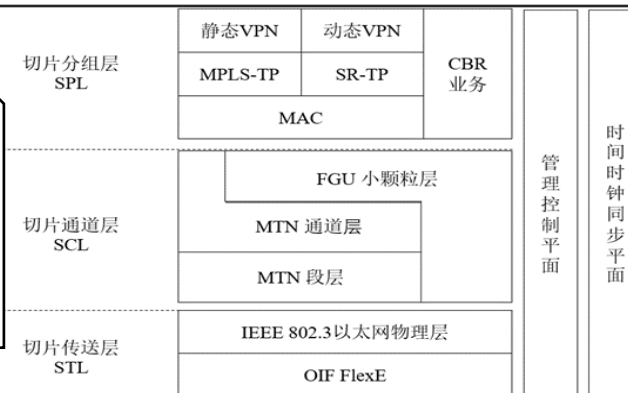
GAINS

- This competition has developed my teamwork skills, including positive communication and division of labor.
- Meanwhile, I also learned a lot of skills, including Python\C++ algorithmic programming and field debugging, Raspberry Pi/Linux system development, and problem solving skills

ABSTRACT

Resource allocation system model in 5G-based Slicing Package Network(SPN) in the context of smart grid, including slice resource allocation design, time slot resource dynamic allocation algorithm. Algorithms such as Greedy Algorithm(GA) and Ant Colony Optimization(ACO) are utilized to explore the optimal solution, while Long Short-Term Memory Network(LSTM) and their variants are used for traffic prediction. Good results are obtained in both slice resource allocation and time slot resource allocation, which have meaningful application prospects.

切片分组层 SPL	静态VPN	动态VPN	CBR 业务
	MPLS-TP	SR-TP	
	MAC		

切片通道层 SCL	FGU 小颗粒层
	MTN 通道层
	MTN 段层

切片传送层 STL	IEEE 802.3以太网物理层
	OIF FlexE

管理控制平面

时间时钟同步平面

INTRODUCTION

The slice allocation task mainly builds a channel allocation model based on SINR and combines greedy and genetic algorithms for model solving.

The dynamic allocation of time slots task is focused on solving the optimal scheme by improving the mathematical model of ACO. And a bidirectional LSTM is used in combination for time slot traffic prediction to shorten the time required for the solution.

用户　传感器网络　预测模型

请求数据　数据采集　实时数据　数据预测

中心节点

云计算平台

分析结果

大数据分析
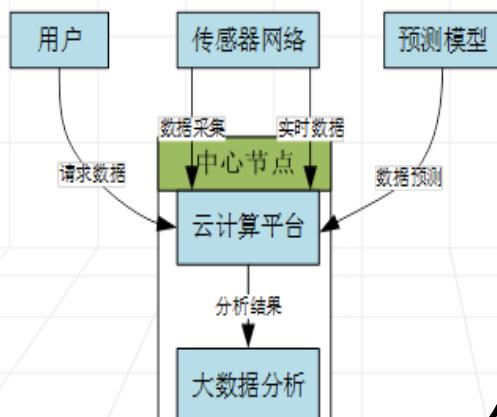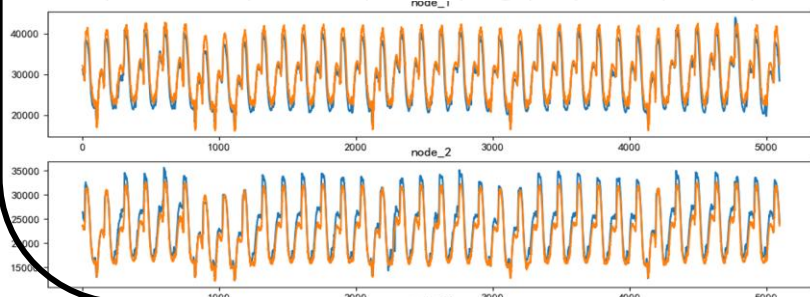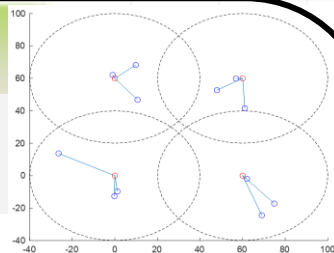
PRODUCTION

Two Invention Patents：
- A utility-maximizing resource allocation method for smart grid network slicing；
- Hybrid competitive dynamic time slot allocation method and system based on BiConv-LSTM combined with improved ant colony algorithm

State-level College Students' Innovative Entrepreneurial Training Plan Program. A 30,000-word project closure report was produced.

Learned a lot about 5G communication networks.
Delved into the principles and applications of relevant algorithms.
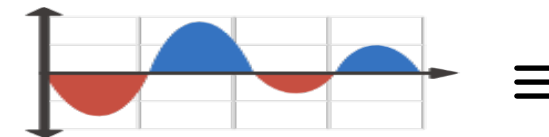
ABSTRACT

Other projects mainly include mathematical modeling competitions, various FPGA-based projects, and AI-oriented research. In the field of mathematical modeling, I participated in ICM(U.S.) and CUMCM(China), and achieved good results in each of them. In the field of FPGA, my projects mainly came from my courses and preparations for the Electronic Design Contest, which involved RISCV CPU design, UART communication, clocks, etc. In the field of AI, I have done research in the field of gaze estimation, interpretability.
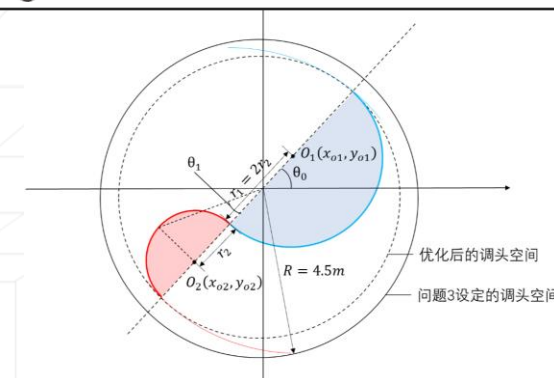
Mathematical Modeling Competitions

ICM(**Meritorious** Winner, TOP 7%)

- Theme : Wildlife Conservation
- Measure : Hierarchical Analysis of Hierarchy (AHP) and LSTM prediction. Data analysis based on SPSS.
- My work : Mathematical Modeling and Programming.
- Outcome: An English paper containing a complete program for wildlife conservation, both data and practical.

CUMCM(**2th Prize** of Shandong Competition Area)

- Theme : Isometric spirals based on bench dragons
- Measure : Modeling in Mathematics and Physics, simulating real physical models with Python.
- My work : Mathematical Modeling and Paper Writing.
- Outcome: A paper on complete modeling and problem solving from both mathematical & physical perspective.

FPGA Projects & AI Research

FPGA Projects

- RISCV CPU design : A three-stage pipelined CPU was designed using Vivado based on the officially provided instruction set and achieved better performance.
- Multiplier : Designed a 200MHz 32-bit multiplier using Booth-4 encoding + Wallace Tree with 3-stage pipelining.
- Others : UART serial communication, DDS, Vending machine, etc.
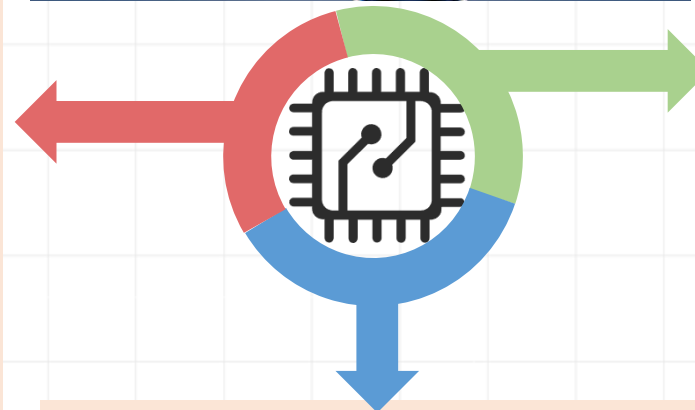
AI Research

- Gaze estimation : Studied the trade-off between computational resources and accuracy in gaze estimation, with plans to develop a real-time estimation app.
- Interpretability : Explored the application of Concept Bottleneck Models (CBMs) in the medical domain for interpretable classification of medical images.
- Other : Assisted in creating a benchmark dataset for knowledge conflicts in multimodal large models.

PERFECT

Core courses

- Digital/Analog Circuits
- Signals & Systems
- Solid-State Physics
- Semiconductor Physics
- Micro/Nano Fabrication
- High-Frequency Electronics
- Electromagnetic

Honors

- Outstanding Individual in Cultural & sports activities
- Outstanding Individual in Innovation & Entrepreneurship
- Outstanding Individual in Volunteer Service
- Excellent Student Cadre
- Excellent League Member
- 20+ Sports Awards
- 8 Scholarships

Research Interests

I have a strong interest in interdisciplinary studies, not only because I was exposed to diverse subjects during my undergraduate years, but also due to my deep enthusiasm for the field of electronics.

- Bio-Microelectronics
- AI and Robotics
- Integrated Circuit Design
- EDA and Embedded Systems

Personal Assessment

I am an optimistic and down-to-earth young individual with a positive mindset. I enjoy life and love learning, constantly enriching my experience and broadening my horizons while maintaining physical and mental well-being. I strive for academic excellence and continuously improve myself through social service and personal development.