PANCAKE: Distributed Automated Transport Vehicles

High-load capacity 3D printed autonomous vehicle swarm
Completed transport tasks using distributed control.
Reduced costs by 80% and increased efficiency by 130% at the same time.

Project Target

Disadvantages of Traditional AGV

- High one-time investment
- Limited scene
- Limited goods

Advantages of Distributed Automated Transport Vehicles

- Lower cost at deploy
- Wider scene
- Higher reliability

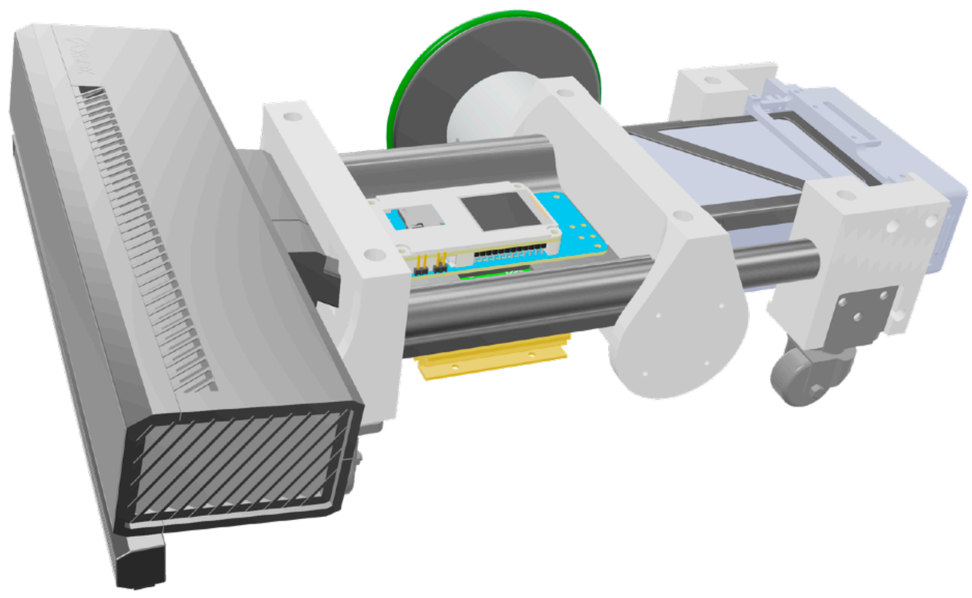
+

Keep Advantages of Traditional AGV

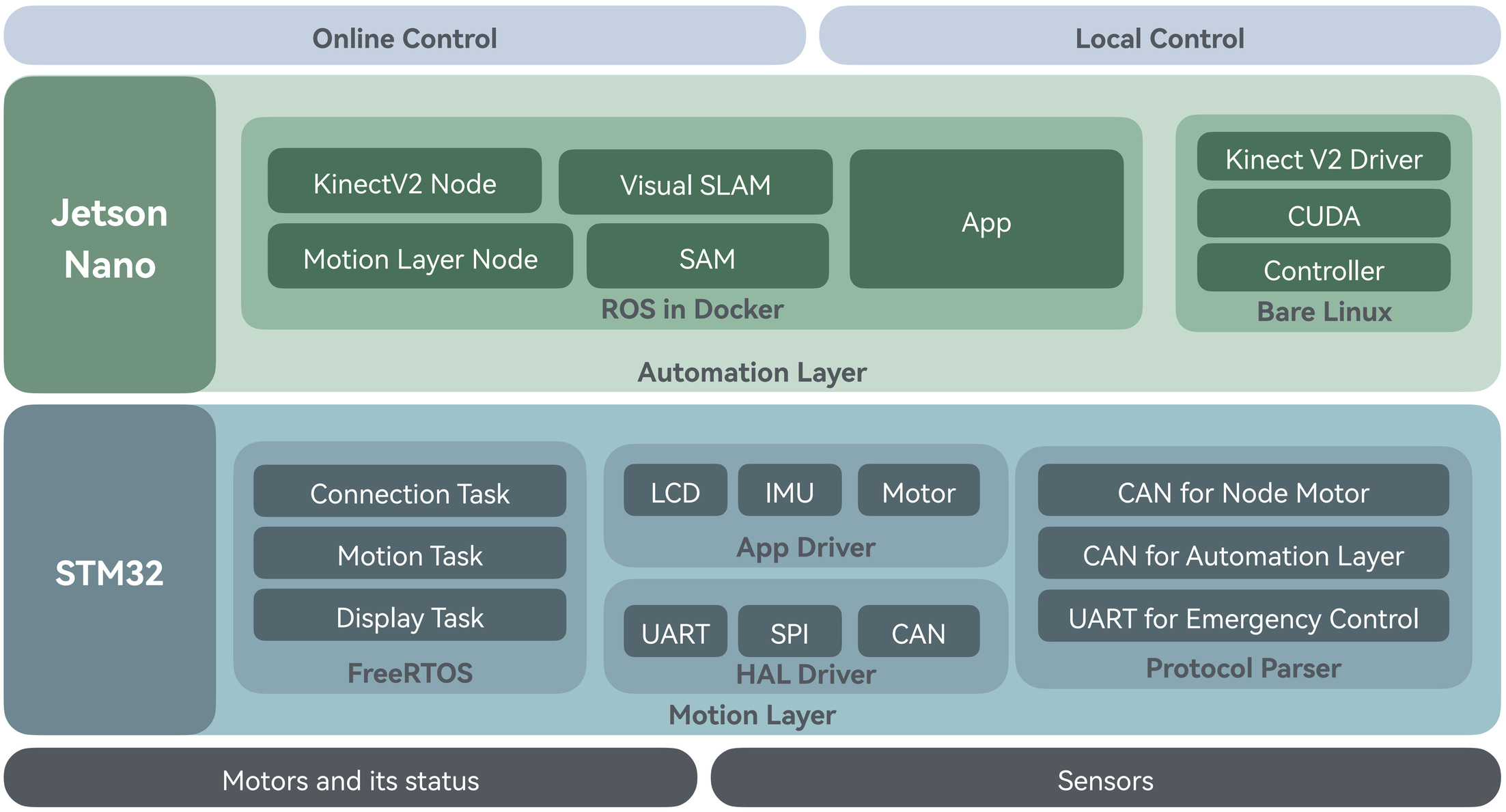
- Reduce costs for labor
- Smart management
- Hight-load capacity

Hardware Solution

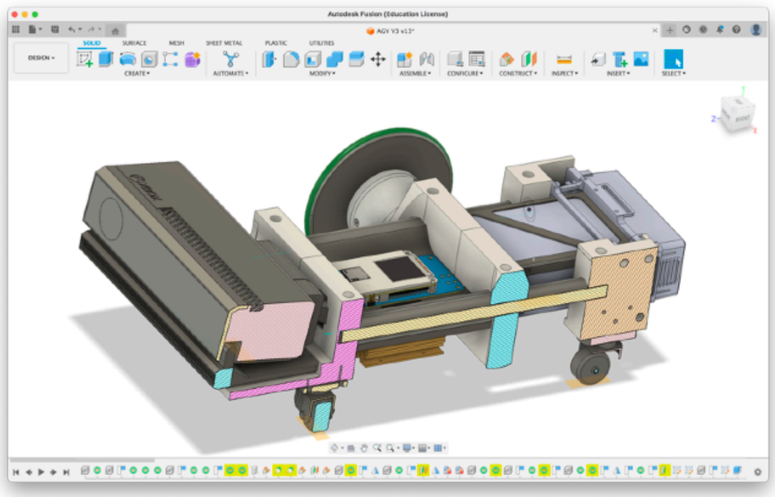
- Pioneer STM32 Dev-Board（more on next page）
- Jetson Nano 4G
- BLDC + Planetary reduction gear
- 100% 3D Printed structure parts（parts in white）
- 2x Carbon-fiber tube + Aluminum alloy panel

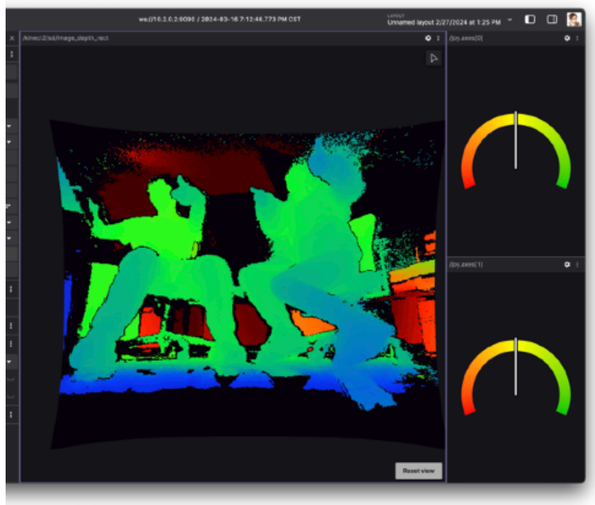


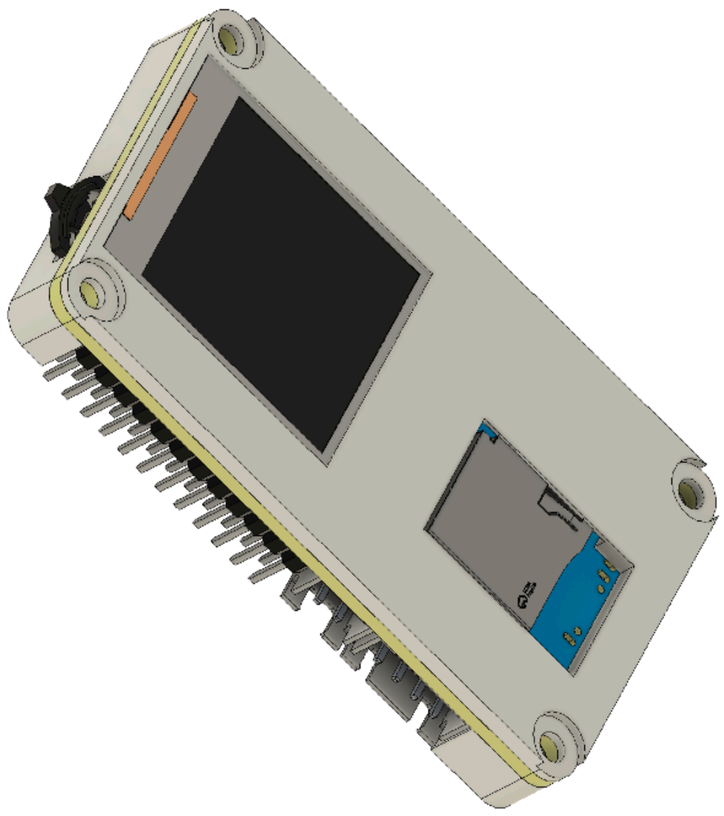
Software Solution



Demonstration







PIONEER: STM32 Smart Vehicle DevBoard

Optimized for four-wheel smart car applications
Accelerated and improved the tutorials in lab

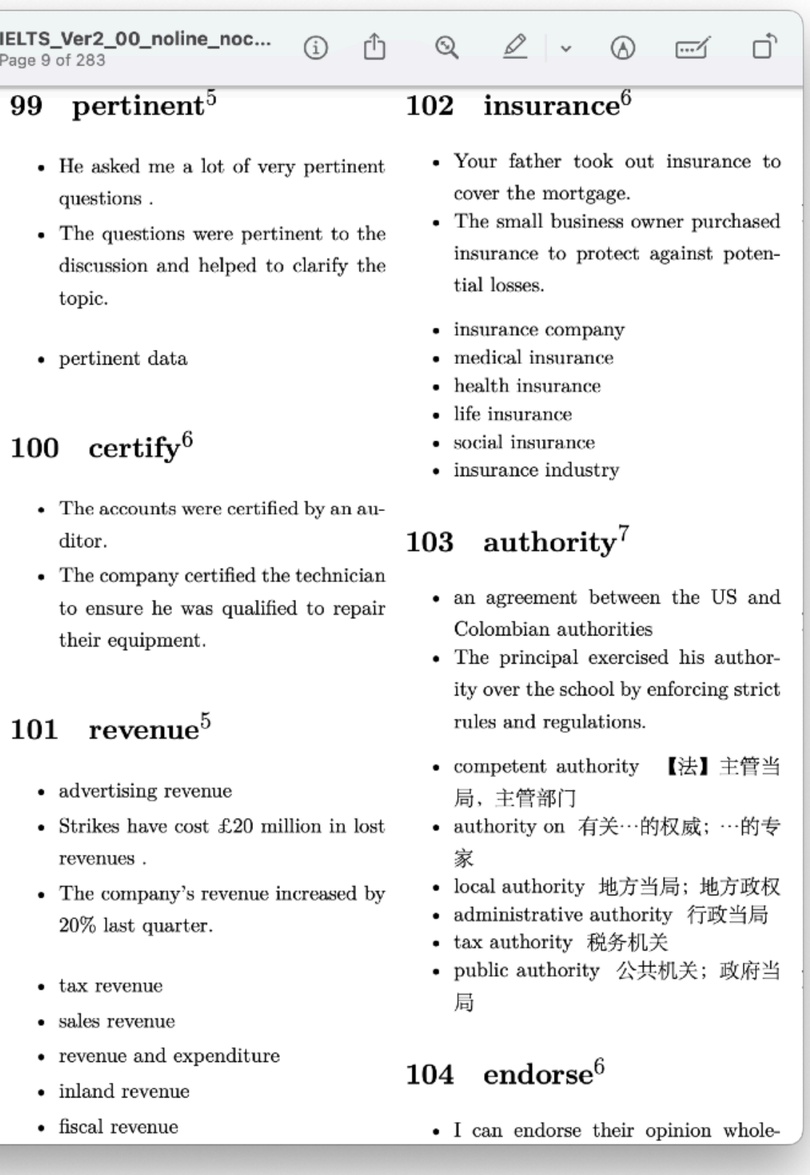
STM32F103RCT6 · 72MHz · 48K RAM · 256K ROM

CAN transceiver | SPI Flash | IMU (MPU6050) | USB | LCD(SPI)

Embedded Software Development :

- Basic Examples: CLK、Debug、IT
- Examples for all peripherals : GPIO、UART（DMA/IT）、SPI（DMA/IT）、IIC（DMA/IT）、CAN
- Examples for smart vehicle application: BLE controller（with ESP32）, Connect to control-board
- Bootloader based on USB-DFU: Download firmware directly rather than through UART nor ST-Link
- FreeRTOS integrated
- Port LVGL（a GUI framework）:
  - Optimization approaching performance limits (SPI through DMA, manual malloc buffer, double frame-buffer)
  - Achieve 30fps@240*240 resolution with acceptable RAM and ROM usage

```
Memory region         Used Size  Region Size  %age Used
           RAM:       40232 B        48 KB     81.85%
         FLASH:      184084 B       256 KB     70.22%
```



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99 pertinent[5]

- He asked me a lot of very pertinent questions .
- The questions were pertinent to the discussion and helped to clarify the topic.
- pertinent data

100 certify[6]

- The accounts were certified by an auditor.
- The company certified the technician to ensure he was qualified to repair their equipment.

101 revenue[5]

- advertising revenue
- Strikes have cost £20 million in lost revenues .
- The company's revenue increased by 20% last quarter.
- tax revenue
- sales revenue
- revenue and expenditure
- inland revenue
- fiscal revenue

102 insurance[6]

- Your father took out insurance to cover the mortgage.
- The small business owner purchased insurance to protect against potential losses.
- insurance company
- medical insurance
- health insurance
- life insurance
- social insurance
- insurance industry

103 authority[7]

- an agreement between the US and Colombian authorities
- The principal exercised his authority over the school by enforcing strict rules and regulations.
- competent authority 【法】主管当局，主管部门
- authority on 有关…的权威；…的专家
- local authority 地方当局；地方政权
- administrative authority 行政当局
- tax authority 税务机关
- public authority 公共机关；政府当局

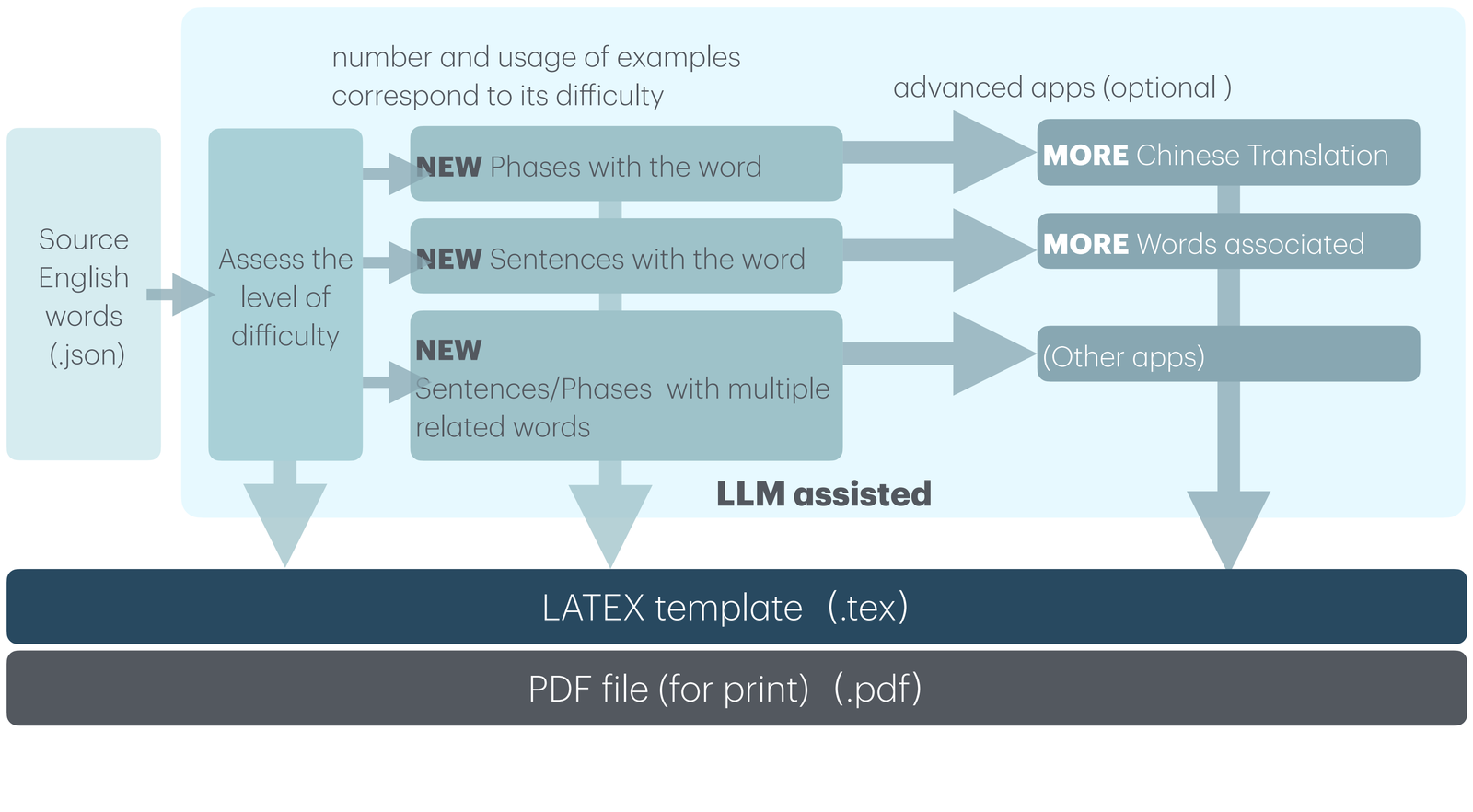
104 endorse[6]

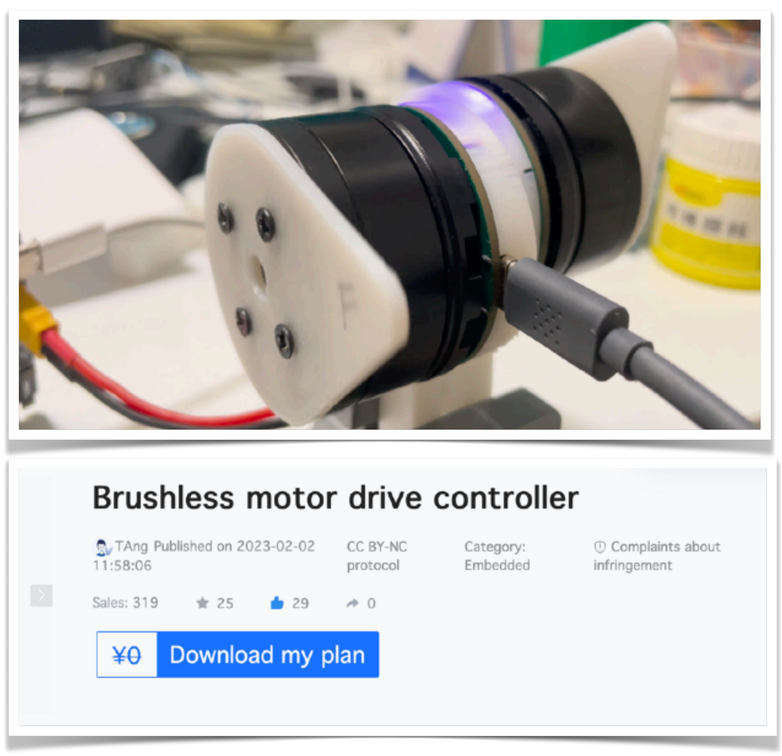
- I can endorse their opinion whole-

MEMORIZE: LLM Assisted Word Memorization

Generate example sentences of varying difficulty for words
Create Latex-formatted documents.

- Local large language model
- Assess the difficulty of words in real contexts (rather than based on word length), with the difficulty level indicated by the number in the top right corner.





Brushless motor drive controller

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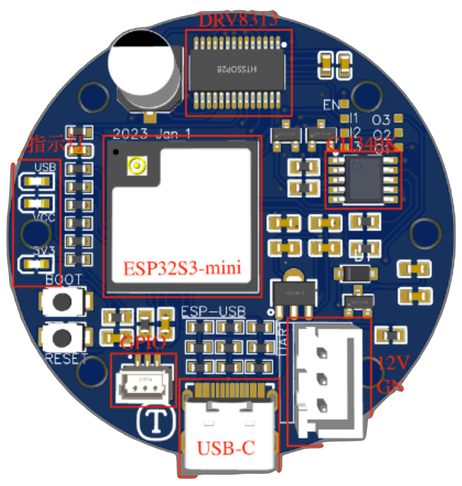
Sales: 319 ★ 25 👍 29 ↗ 0

¥0 Download my plan

Brushless Motor Drive Control Board

High performance BLDC driver with FOC algorithm

- Achieve 318 sales, ranking in the top 5% of the JLC · Hardware Community.



- ESP32-S3 SOC
- DRV8313 driver（MOS integrated）
- AS5600 magnetic encoder
- Program with C/C++
- Port FOC algorithm (with open-source SimpleFOC)
- Wi-Fi/BLE for command and debug