# PANCAKE: 分布式自动运输小车集群

降低80%的成本提升130%的效率 | 高承重能力的3D打印自动导航小车集群,分布式完成运输任务

## 项目目标

#### 传统运输车(AGV)的劣势

- 初期投资高
- 负载死板
- 场景有限

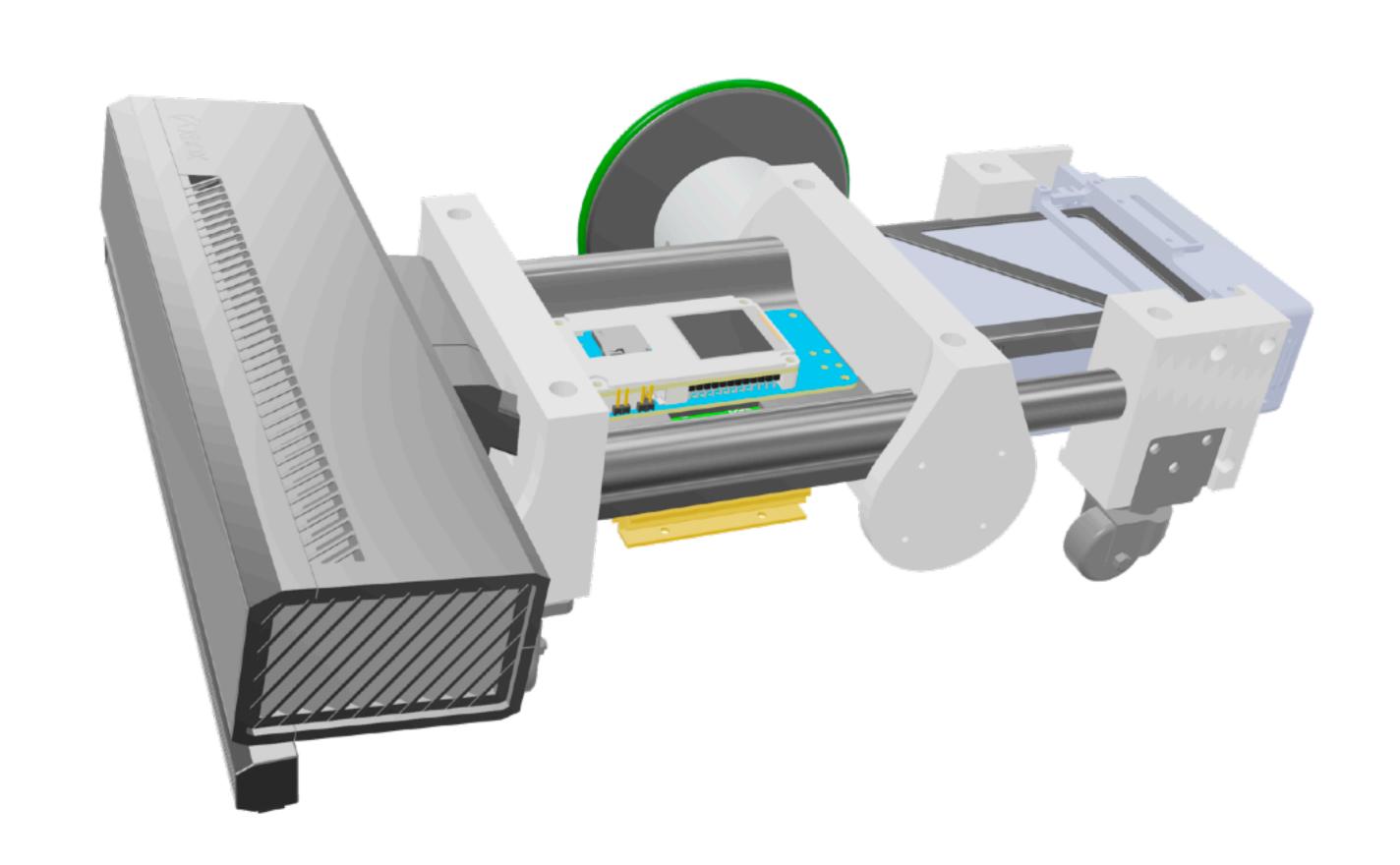
#### 分布式自动运输小车集群的优势 + 保留传统运输车 (AGV) 的优势

- 低成本部署
- 广泛的使用场景
- 更高的可靠性

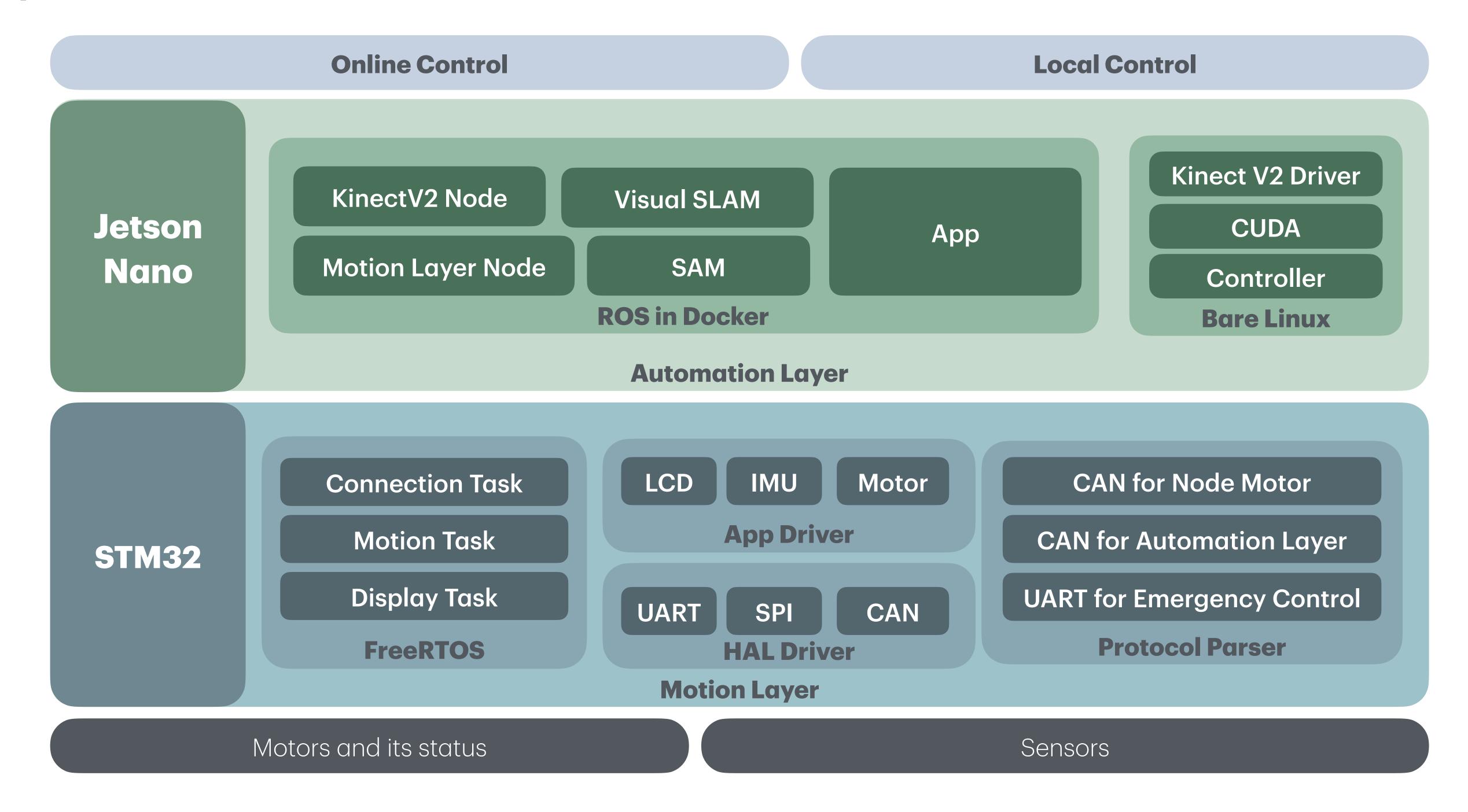
- 节省人力成本
- 智能化管理
- 高搬运负载能力

## 硬件方案

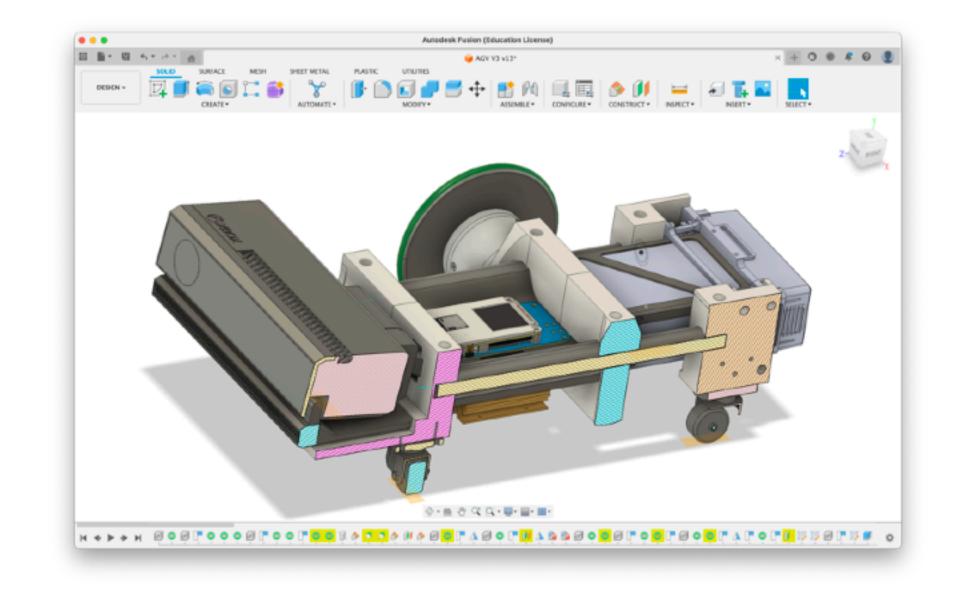
- Pioneer STM32 开发板(见下一页)
- Jetson Nano 开发板
- 无刷直流电机 + 行星减速器
- 100% 3D 打印连接件(白色部分)
- 2x 碳纤维管 + 铝合金面板支撑

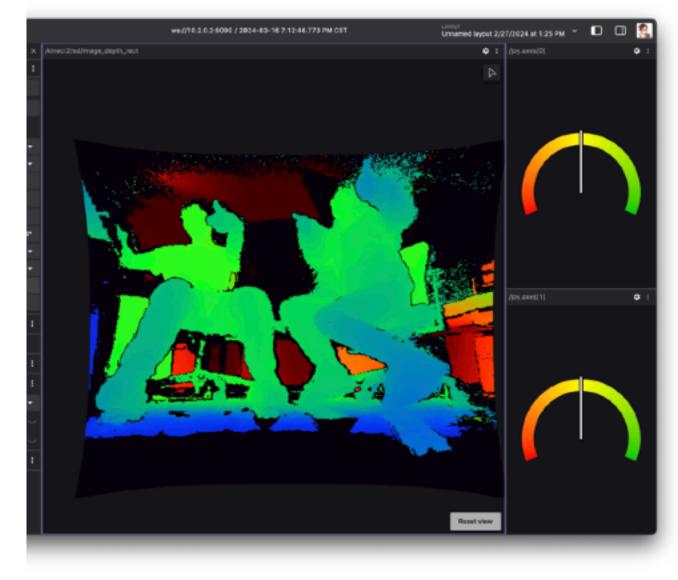


### 软件方案

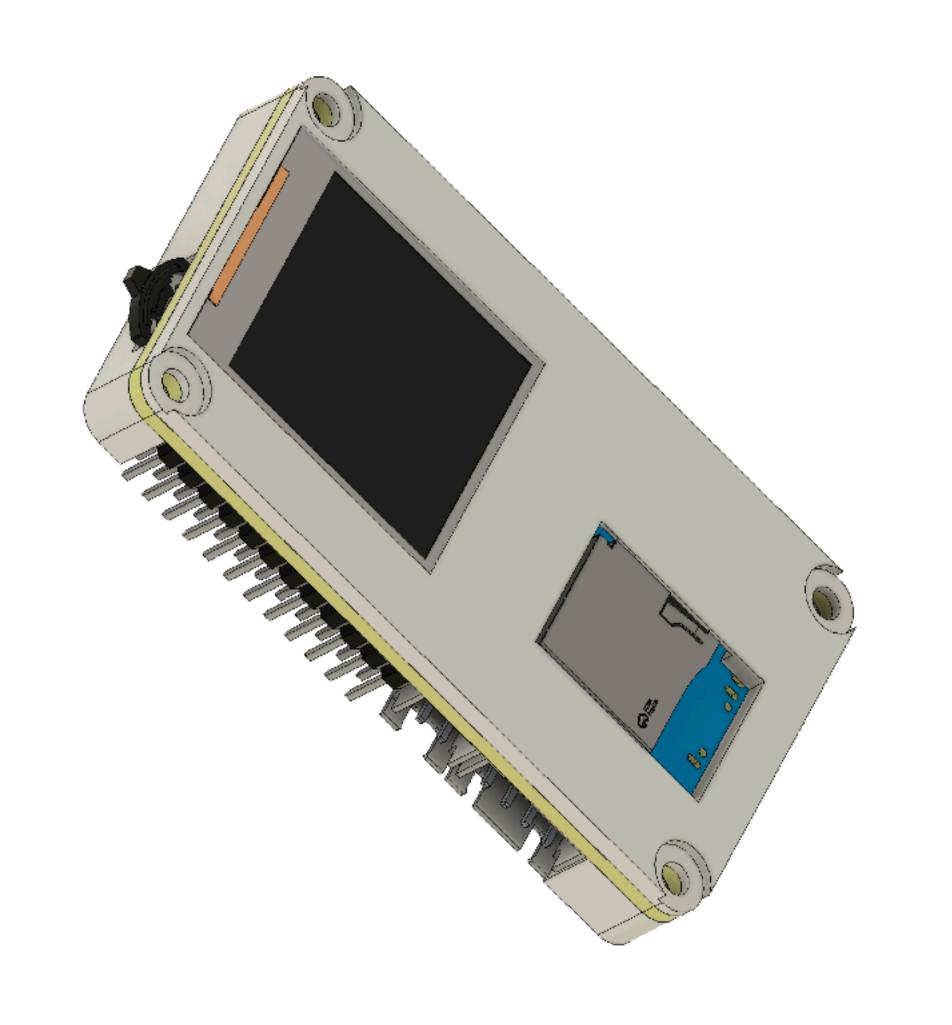


## 效果展示









# PIONEER: STM32F103智能小车开发板

基于STM32F103RCT6的开发板,为四轮智能小车应用优化 加速开展学校内部社团培训

STM32F103RCT6·72MHz·48K RAM·256K ROM CAN transceiver | SPI Flash | IMU (MPU6050) | USB | LCD(SPI)

#### 软件开发内容:

- · 基本的示例: CLK、Debug、IT
- 所有外设的驱动示例: GPIO、UART (DMA/IT) 、SPI (DMA/IT) 、 IIC (DMA/IT) , CAN
- 四轮小车应用的示例: 蓝牙手柄 (需ESP32配合), 控制驱动板
- · 基于USB-DFU的Bootloader: 直接使用USB下载程序(而不需要转 UART或者使用ST-Link)
- 集成FreeRTOS
- 移植LVGL(GUI框架):逼近极限的性能优化(SPI through DMA, manual malloc buffer, double frame-buffer) ,实现实际工程可用的 30fps@240\*240分辨率与RAM/ROM消耗

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



- questions .
- The questions were pertinent to the
- discussion and helped to clarify the topic.
- pertinent data

#### 100 certify<sup>6</sup>

- 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

- 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 • 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

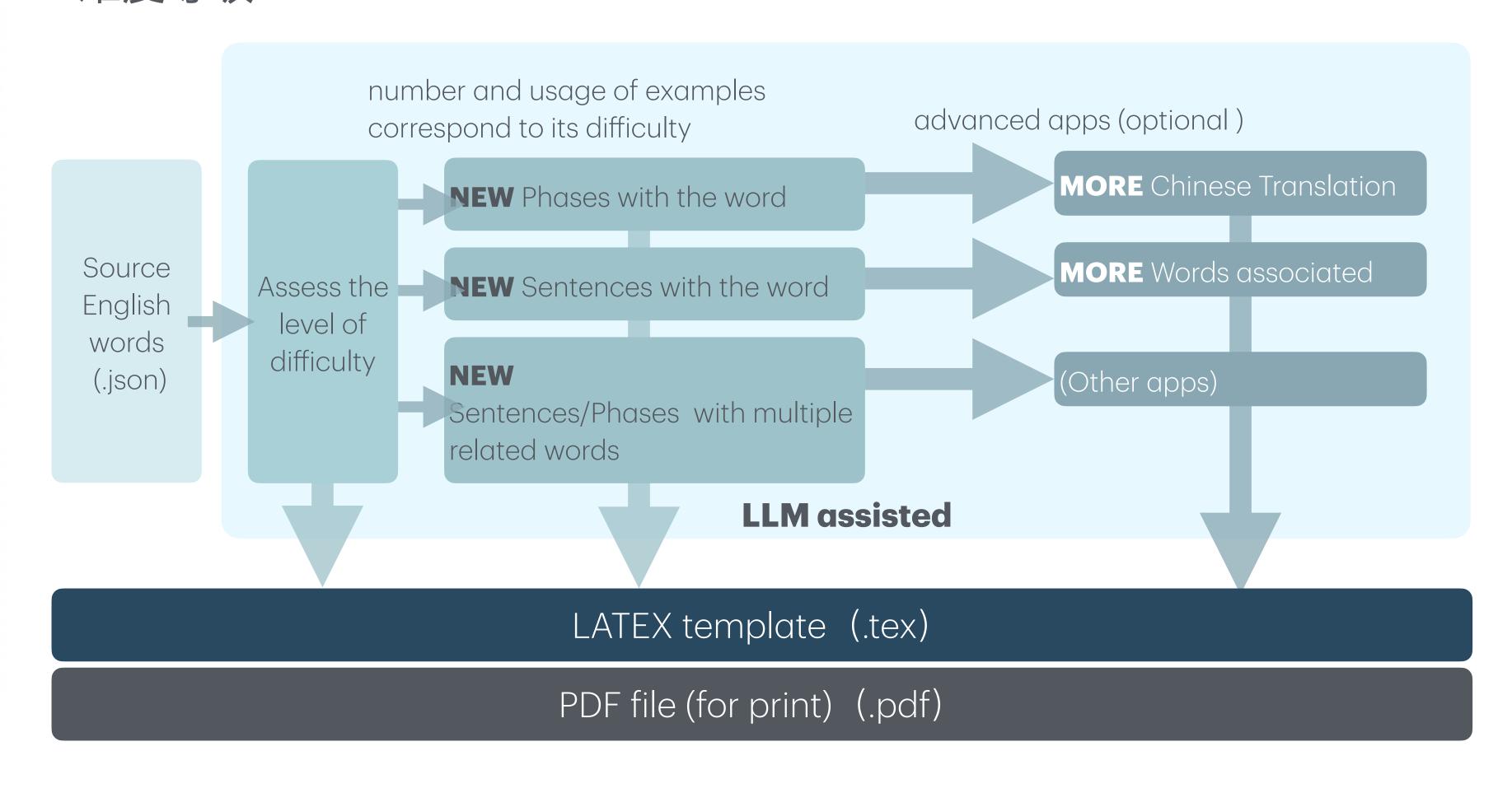
#### $104 \text{ endorse}^6$

• I can endorse their opinion whole-

## MEMORIZE: 大语言模型单词记忆辅助

大语言模型评估单词难度,创建不同规模的例句,生成LATEX/PDF文档

- 本地大语言模型
- 评估单词在真实语境下的难度(而非依据单词长度),右上角数字即为 难度等级

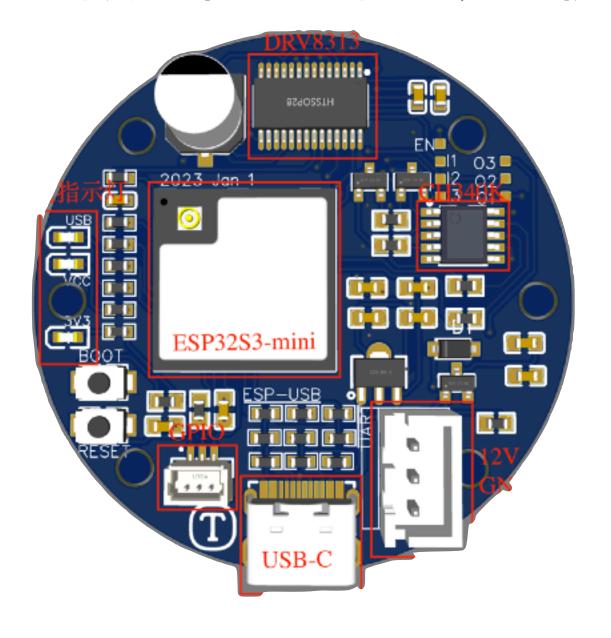




# 无刷电机驱动控制器 ▼TAng 发布于2023-02-02 11:58:06 CC BY-NC协议 分类: 嵌入式 ① 侵权投诉 下载我的方案 <del>¥0</del>

# 无刷电机驱动控制板

高性能低成本的无刷直流电机FOC驱动控制器



- ESP32-S3 主控
- DRV8313驱动器 (集成MOS)
- AS5600 磁编码器
- C/C++编写
- 移植FOC算法
- Wi-Fi/BLE调试