

EDUCATION

- **Master - EE - Beihang University** Beijing, China
Exempt Entry Exam; Finish courses and research publishing mission during the 1st semester Sep. 2016 – Jan. 2019
- **Bachelor - EE - Beihang University** Beijing, China
Exempt NCEE; Honors College(top 50 among 3000+ freshmen); GPA 3.7 Sept. 2012 – Jun. 2016

COMPETITIVE PROGRAMMING

- **Google Code Jam Kickstart 2017**
Top 5%, rank 108th globally. [scoreboard](#), [id:WeiYong1024](#)

CAREER

- **Mindverse AI(MindOS)** Hangzhou, PRC
Infra Tech Lead (4-person team), Kubernetes, Docker, OpenAI, Java, Linux, Azure, Tencent Cloud Jun. 2022 - Now
 - **DevOps**
 - * **Multi-cluster Environment Management:** All microservices containerized and deployed on Kubernetes; Built Dev/Test/Pre/Prod multi-cluster architecture based on Kubernetes; Created a distributed GitServer (Gitlab) using Helm, ensuring code maintainability across the company through Ownership and Readability-based CodeReview pipelines; Developed a distributed CI/CD pipeline (Jenkins) incorporating packaging, approval, deployment, and regression, using Helm, Jenkins, Python, Shell, etc., with scalable parallel build and deployment capabilities.
 - * **Production Tool System Construction:** Managed private networking; Set up and maintained distributed configuration centers (Apollo, Nacos), rate limiting (Sentinel), and other middleware; Implemented operational tools (Rancher, JumpServer, Octant, etc.); Worked on offline data tools (MySQL, Redis, Clickhouse, Superset, Grafana, etc.); Managed logging and application performance monitoring tools (Loki, DataDog, Tencent Cloud CLS, Skywalking, etc.), providing all necessary tools for tech development.
 - * **Cloud Resource Management:** Responsible for the lifecycle management of the company's IaaS and SaaS resources, user permission management, and precise control of cloud and third-party service costs, creating and maintaining cost dashboards.
 - **AI Infra**
 - * **OpenAI Base Layer:** Built Springboot services for the algorithm team, encapsulating basic services - for OpenAI accounts, implemented pooling and proactive/passive health checks, traffic scheduling for availability, including concepts of AzureOpenAIService's region, service instances, deployment, and model versions.
 - * **Mutil-LLM Encapsulation:** Provided the algorithm team with a service layer for interfacing with large models from third-party SaaS services like OpenAI GPT and Google Plam2, and implemented automated cost monitoring.
 - * **GPU Computing Scheduling Platform:** Designed a GPU computing scheduling platform for training tasks, but it remained a technical reserve due to company strategy.
 - **Data&BI**
 - * **Online and Offline Data System:** Built and maintained an online/offline data stream based on OLTP (MySQL) -> CDC (external supplier) -> OLAP (Clickhouse) -> DataVisualization (Superset+Grafana), used for data development, anonymization, etc., and an asynchronous data stream based on message queue (RocketMQ) -> basic service (Springboot), for user behavior data analysis. Served as a dashboard and reporting tool for product, development, and operations teams.
 - * **A/B Testing Tool System:** Developed and maintained an entire experiment tool system, including experiment configuration/result analysis platform (GrowthBook), front-end embedding (GoogleAnalytics), and back-end embedding (Springboot implementation, including engineering and algorithm). Supported front-end, page, and algorithm experiments and switches.
 - * **Product Privacy Compliance:** Implemented a series of privacy compliance standards based on Vanta, including but not limited to data anonymization, internal training, etc., ensuring MindOS met USDP and GDPR standards.
 - **Business Layer Development**

- * **Middleware Basic Services:** Provided generic basic services like encrypted storage, web crawlers, offline data read-write for business backend systems, output in forms of RestfulAPI, binary libraries, RPC interfaces, etc.

- **Alibaba Cloud**

Senior Engineer (P6 like GoogleL4), Backend, Java, Springboot, Alibaba Cloud

Hangzhou, PRC

Aug. 2020 - May. 2022

- **Traffic Scheduling Middleware:** : In the high-availability team at Alibaba Cloud, responsible for internal traffic scheduling middleware. This Java project, based on Alibaba's internal PandoraBoot (an enhanced version of Springboot), provides container-level second-by-second health monitoring on the cluster, 3σ outlier detection, and implements minute-level traffic scheduling and recovery for microservices using Alibaba's internal RPC framework HSF's weight table mechanism. During my tenure, the product was integrated into all core applications of Alibaba Group, supporting over 400,000 containers, and served as a core security component safeguarding the peak traffic of 600,000 QPS during the 2020 Double Eleven shopping festival.
- **Private Cloud Management Platform:** As part of the P8 team, the goal was to build a private cloud management system for government scenarios. Developed using the Java framework Springboot, the system is divided into three subsystems: application operations, resource operations, and general management. I was responsible for backend development of the application operations center subsystem. The subsystem's base layer included cloud resource listing, monitoring and inspection, usage statistics, custom interface inspection, SQL inspection, etc. On top of this, we built expert reports such as slow SQL statistical analysis, business dashboards, and health check reports. This system is currently commercially deployed in over 6 locations nationwide, supporting projects like elementary school admissions in a provincial capital city in 2021 and nucleic acid testing during the 2022 Spring Festival.
- **Lightweight Delivery for Government Cloud Management:** As a new P9 team member, the goal was to deliver private clouds for government use in 7 regions. Initially, developers used the Rainbond interface to deploy microservices from different teams onto customer K8S clusters, but the complicated configuration led to long delivery cycles. To address this, I developed a lightweight deployment delivery solution using docker-compose, based on generic environment initialization scripts and delivery step documents. By maintaining environment variables for different customer sites, we centralized control and integrated over 20 microservices from various older teams. I edited the WBS and SOP, organized training for outsourced staff on the delivery process, and trained outsourced individuals could deliver or upgrade a site in 2 days. With this solution, the team's monthly commercial output capacity increased from single to double digits.

- **Pony.ai**

Engineer, Infra, C++, Python, Linux, Bazel, Strict Code Quality Standards

Beijing, PRC

Feb. 2019 - Mar. 2020

- **Driving Recording Toolchain:** Autonomous vehicle road tests required an accompanying engineer to record issues via an external keyboard. To eliminate the need for this, a driving recording toolchain was developed using microphones and physical buttons as the hardware solution. Firstly, an input device interface library evdev, licensed under BSD, was integrated into the Bazel main project. Based on this library and Linux's ALSA audio driver, a daemon was written responsible for hardware detection, listening for signals from external buttons and the vehicle system process's pipeline, triggering and stopping microphone recording, and storing issue information as audio files on the industrial computer during the drive. In the data processing stage, a speech-to-text service was set up on GCP. Python scripts were used to extract the contents of the audio files, and Google's Protobuf tool was used to serialize the original information into the QA data stream.
- **Onboard Car Voice System:** The original onboard voice module used Google's Pico TTS library to play hardcoded voice content text in real-time during driving, leading to issues of language monotony and repetitive consumption of computing resources for TTS processes. The new onboard voice system uses an audio file-based workflow, aimed at reducing the computational load on the vehicle's industrial computer and supporting voice I18N. For this, 1. A Python-based internal CLI tool, `car_sound_utils` (referred to as CLI), was developed for engineers to create and modify existing corpora and manage voice pack versions. First, an entire TTS service built on AWS using CloudFormation and Lambda functions was encapsulated in the CLI for creating audio commands. Then, commands for uploading and downloading voice files and uploading voice packs to the internal storage server were added to the CLI, along with a caching mechanism to speed up uploads and downloads. 2. In the onboard system, the main process initializes the voice module using Linux's ALSA driver to load the audio stream into RAM, and plays it when the voice module receives a playback request message.

INTERNSHIP

- **Airbnb:** In the summer of 2018, Airbnb expanded into the Chinese market, and as one of the first 8 interns in the Mainland China office, developed the domestic version of the annual host review page with full-stack tech.
- **Megvii(Face++):** During the cooperation between Megvii and VIVO in early 2018, participated in the development of the facial recognition module for the X21 model and conducted mobile model search optimization based on InceptionV3(a type of CNN) for mobile devices.

SYSTEM EXPERIENCE & TECH STACK

- **System experience:** LLM, Cloud computing, HA, DevOps, Self driving vehicles
- **Tech stack:** Java, Python, Kubernetes and so on

教育背景

- **硕士 - 北京航空航天大学 - 电子与通信工程** 中国, 北京
保研; 研一上发核心期刊达毕业标准; 北京市优干 2016 年 9 月 - 2019 年 1 月
- **本科 - 北京航空航天大学 - 电子信息工程** 中国, 北京
物理竞赛保送; 沈元荣誉学院 (入学 top50/3000+); 北京市三好; GPA 3.7 2012 年 9 月 - 2016 年 6 月

编程竞赛

- **Google Code Jam Kickstart (谷歌 2017 全球校招赛)**
全球 108th, 中国 18th, 前 5% 计分板链接 (*id - WeiYong1024*)

工作经历

- **心识宇宙 (MindOS)** 中国, 杭州
基础设施 TechLead (4 人团队)、Kubernetes、Docker、OpenAI、Java、Linux、Azure、腾讯云 2022 年 6 月 - 至今
 - **DevOps**
 - * **多套集群环境管理**: 全部微服务容器化并上 Kubernetes; 基于 Kubernetes 构建 Dev/Test/Pre/Prod 多套集群架构; 基于 Helm 搭建分布式 GitServer (Gitlab), 并于其上构建 Ownership 和 Readability 的 CodeReview 流水线严格保证全司代码的工程可维护性; 基于 Helm、Jenkins、Python、Shell 等工具构建分布式的包含打包、审批、发布、回归一体的 CICD 流水线 (Jenkins), 具备可伸缩的并行构建发布能力。
 - * **生产工具体系构建**: 负责公司内部组网、科学上网等网络环境管理; 搭建并维护分布式配置中心 (Apollo、Nacos)、限流 (Sentinel) 等中间件; 搭建运维工具 (Rancher、JumpServer、Octant 等); 在离线数据工具体系 (MySQL、Redis、Clickhouse、Superset、Grafana 等); 日志及应用性能监控工具 (Loki、DataDog、腾讯云 CLS、Skywalking 等)。提供技术研发需要的全部工具。
 - * **云资源管理**: 负责公司 IaaS、SaaS 资源生命周期管理, 用户权限管理, 精细化管控用云、用三方服务的成本, 制作、维护成本大盘。
 - **AI Infra**
 - * **OpenAI 底座层**: 构建 Springboot 服务对算法团队封装基础服务——对于 openai 账号, 池化并在上层进行主动/被动探活、流量调度等可用性建设, 另外包括 AzureOpenAIService 的区域、服务实例、部署、模型版本的概念。
 - * **多大模型封装**: 对算法团队封装 OpenAI GPT、Google Plam2 等第三方 SaaS 服务大模型的调用层服务, 并做自动化成本监控。
 - * **GPU 算力调度平台**: 设计针对训练任务的 GPU 算力调度平台, 但由于公司发展战略该系统作为技术储备未实施。
 - **Data&BI**
 - * **在离线数据体系**: 构建并维护基于 OLTP (MySQL) -> CDC (外部供应商) -> OLAP (Clickhouse) -> DataVisualization (Superset+Grafana) 的镜像在离线镜像数据流 (可用于数据开发、脱敏等), 以及基于消息队列 (RocketMQ) -> 基础服务 (Springboot) 的异步数据流 (可用于用户行为数据分析等)。作为产品、研发、运营同事所关心的各类指标的大盘、报表工具。
 - * **A/BTest 工具体系**: 构建并维护包含实验配置/结果分析平台 (GrowthBook) + 前端埋点 (GoogleAnalytics) + 后端埋点 (Springboot 实现, 包含工程和算法) 的一整套实验工具体系。支撑前端、页面、算法等开关和实验。
 - * **产品隐私合规**: 基于 Vanta 提供的一系列隐私合规标准, 包括但不限于数据脱敏、内部培训等, 让公司产品 MindOS 达到 USDP 和 GDPR 标准。
 - **业务层研发**
 - * **中台基础服务**: 为业务后端系统提供加密存储、Web 爬虫、离线数据读写等通用基础服务, 并以 RestfulAPI、二方库 +RPC 接口等形式输出。

• 阿里云

高级工程师 (P6)、后端、Java、Springboot、阿里云

中国, 杭州

2020 年 8 月 - 2022 年 5 月

- **流量调度中间件**: 在集团高可用团队负责阿里云内部流量调度中间件。Java 项目, 基于阿里内部的 PandoraBoot (Springboot 加强版) 提供集群上容器粒度秒级健康指标监控、 3σ 离群点检测, 依托阿里内部 RPC 框架 HSF 的权重表机制实现微服务的分钟级流量调度与恢复链路。任职期间推广产品纳管了阿里集团全部核心应用, 支撑 40w+ 容器, 作为核心安全组件护航 2020 双十一 60wQPS 流量洪峰。
- **私有云管理平台**: 时年 P8 团队目标建设政务场景下的专有云管理系统。基于 Java 框架 Springboot 开发, 该系统分应用运维、资源运营、总集管理三个子系统。我负责其中应用运维中心子系统的后端开发。应用运维中心底层构建云资源列表、监控巡检、用量统计、自定义接口巡检、SQL 巡检等原子能力, 并在上层此构建了慢 SQL 统计分析、业务大盘、体检报告等专家报表。该系统目前在全国超过 6 个局点商业化输出, 重保护航 2021 某省会城市小学入学等项目、2022 春节核酸检测等项目。
- **政务云管轻量化交付**: 时年新 P9 团队目标交付 7 个地方政务私有云, 早期由开发同学使用 Rainbond 界面化地将来自原不同团队的微服务组合部署在客户 K8S 集群上, 配置繁琐导致交付周期长。为解决该问题我基于 docker-compose 搭建单机版轻量化部署交付方案, 基于通用的环境初始化脚本与交付步骤文档, 仅通过维护不同客户现场的环境变量以中心化管控, 纳管来自各个老团队的 20+ 个微服务。编辑 WBS 和 SOP, 组织外包同学培训交付流程, 单个经过培训的外包可以在 2 日内交付/升级一个现场。基于该方案, 团队技术产品簇的单月商业化输出能力从个位数数据点上升到两位数。

• 小马智行

工程师、Infra、C++、Python、Linux、Bazel、严苛的代码质量标准

中国, 北京

2019 年 2 月 - 2020 年 3 月

- **行车录音工具链**: 无人车路测需要一位跟车工程师通过外接键盘描述记录路测 issue, 为去掉跟车工程师构建行车录音工具链, 以麦克风和物理按钮作为硬件方案。首先在 Bazel 项目中引入基于 BSD 软件许可的输入设备接口库 evdev, 并基于该库和 Linux 的 ALSA 音频驱动编写守护进程, 负责硬件检测、监听来自外部按钮的信号和车载系统进程的管道信息、触发与停止麦克风录音, 在行车过程中将 issue 信息存储为工控机上的音频文件。在数据处理阶段, 首先在 GCP 上搭建语音转文字服务, 并用 Python 脚本将音频文件的内容提取出来, 然后使用 Google 的 Protobuf 工具将原信息序列化汇入 QA 数据流。
- **车载语音系统**: 原车载语音模块使用 Google 的 Pico TTS 库在行车过程中将硬编码的语音内容文本实时播放, 从而导致语言单一和 TTS 过程重复消耗计算资源的问题。新的车载语音系统使用基于音频文件的工作流程, 旨在减少车载工控机的计算量并支持语音 I18N。为此 1. 研发环节用 Python 编写内部 CLI 工具 `car_sound_utils`(以下简称 CLI), 供内部工程师创建和变更现有语料库、管理语音包版本: 首先在 CLI 中基于 AWS 上用 CloudFormation、Lambda 函数计算搭建的整套 TTS 服务封装音频创建命令, 然后在 CLI 中添加上传、下载语音文件和上传语音包到内部 storage server 的命令, 以及缓存机制加速上传下载。2. 车载系统环节, 主进程初始化语音模块时使用 Linux 的 ALSA 驱动将音频流加载进内存, 并在语音模块接到播放请求消息时播放。

实习经历

- **爱彼迎**: 2018 年夏, 爱彼迎发力中国市场, 作为大陆首批 8 个实习生, 全栈开发了当年国内版房东年度回顾页。
- **旷视科技**: 2018 年初, 旷视和 VIVO 合作期间, 参与 X21 机型人脸识别模组的研发, 做基于 InceptionV3 (一种 CNN) 移动端模型搜索优化。

行业经历与技术栈

- **系统经验**: 大模型、云计算、高可用、DevOps、自动驾驶
- **技术栈**: Java、Python、Kubernetes 等