My Journey with Raspberry Pi WebRTC

Tzu-Huan Tai

Who am I

I was a Mechanical Engineer
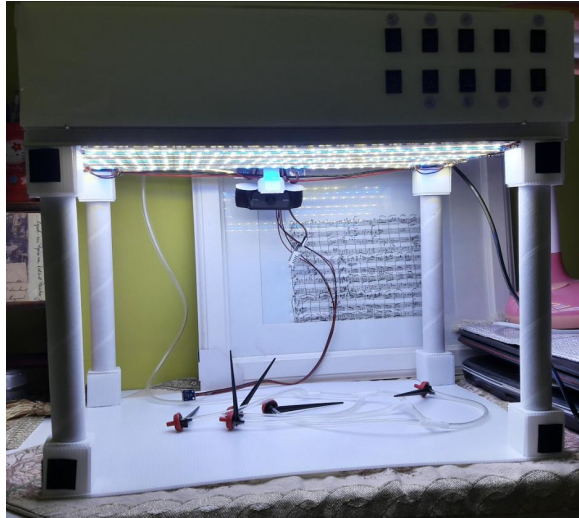
I studied in Renewable Energy

I became a Software Engineer

I'm in the U.S. now

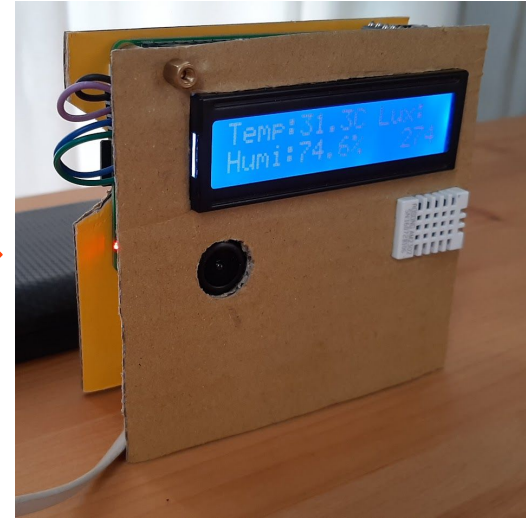# The story begins with the Small Greenhouse [ref]

v1.0

v2.0

Security Cam

Why not Proprietary Service

I couldn't find a tool that worked for me!

So I made my own...

Why open source it

Tech layoffs since COVID-19
Source: https://layoffs.fyi

I couldn't find a job that worked for me!

So I made my own…

~~Leetcode~~

[ref]

[ref]

Source: Indeed

fred.stlouisfed.org

Shaded areas indicate U.S. recessions.

Raspberry Pi WebRTC

`libwebrtc` `m115.5790`   `downloads` `541`   `C++` `20`   `release` `v1.0.5`   `License` `Apache 2.0`

Turn your Raspberry Pi into a low-latency home security camera using the V4L2 DMA hardware encoder and WebRTC. [demo video]

- Pure P2P-based camera allows video playback and download without a media server.
- Support multiple users for simultaneous live streaming.
- Support signaling via WHEP or MQTT.
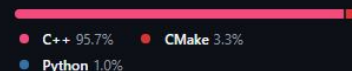
Started getting noticed

Star History

TzuHuanTai/RaspberryPi-WebRTC

PiCamera.js

Pi Camera
Tzu Huan Tai

I was taken advantage of!

Rejection

Posted on Hacker News! [ref]

star-history.com
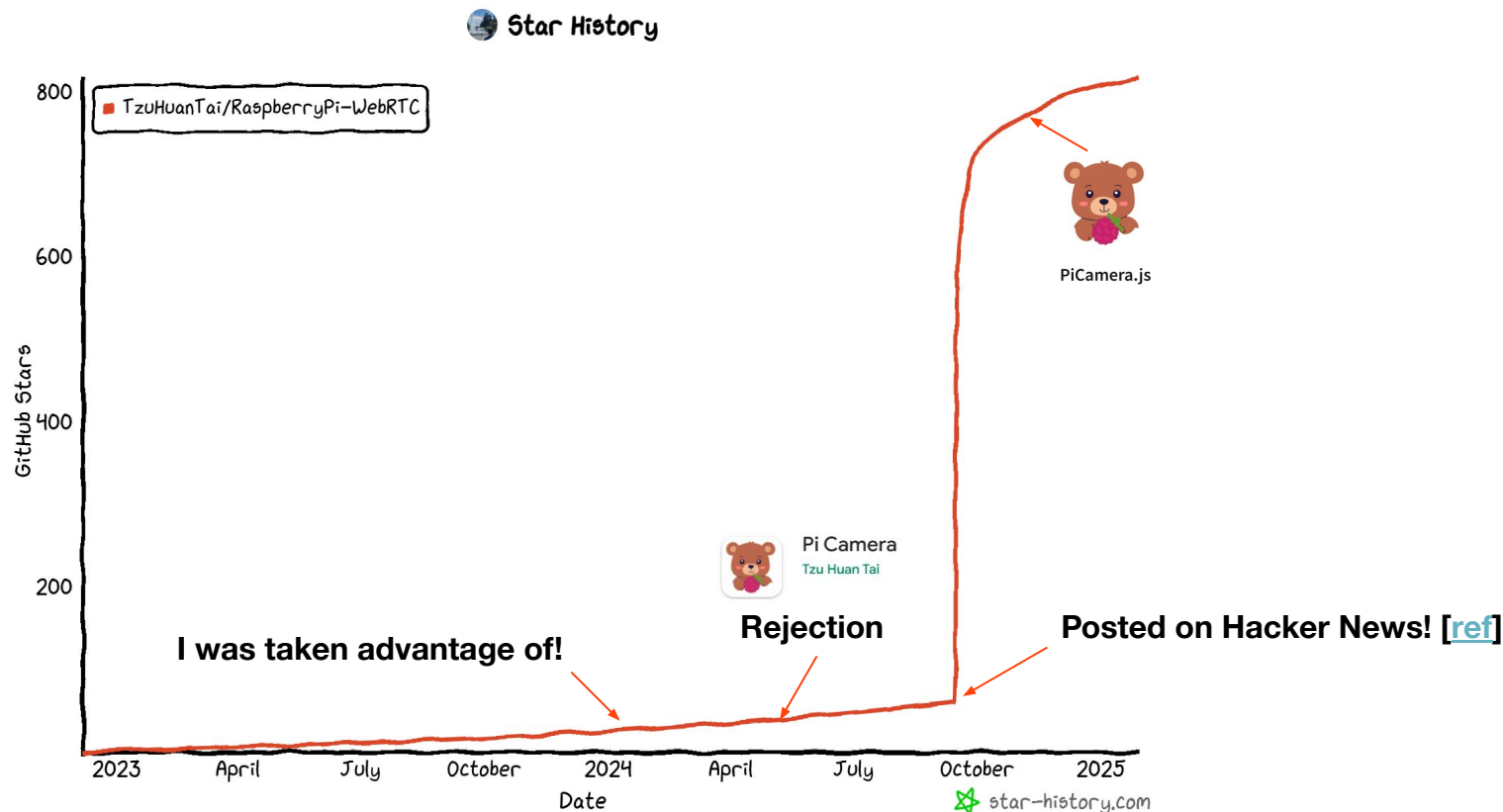
DoorBell

Robot

Watch

[ref]

OpenAI

I was invited to interview.

Because of my open source side project!

What they're planning?

[ref]

ESP32

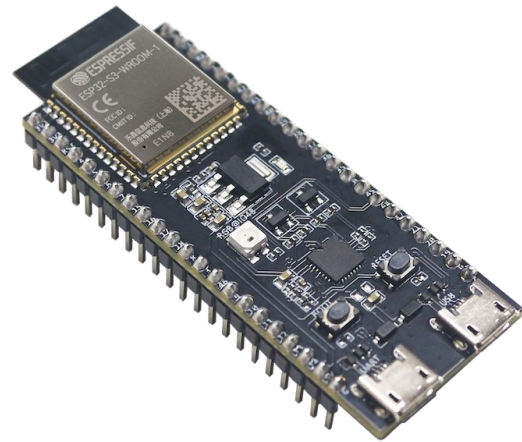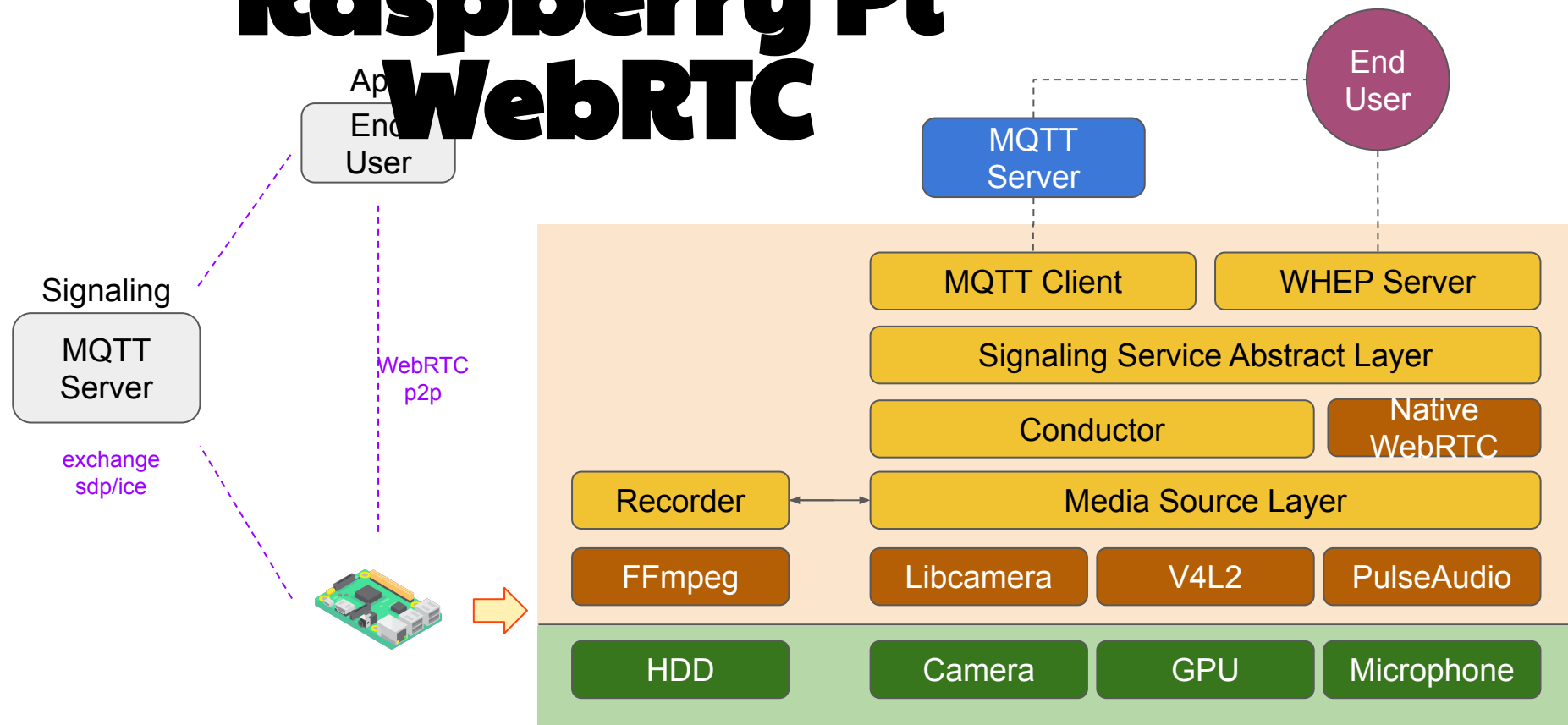**Run audio AI on embedded platform via WebRTC.**

The Rising Star: WebRTC

COMMON HTTP LATENCIES TODAY	REDUCED LATENCY	LOW LATENCY	NEAR REAL-TIME
One-way streams of live events to large audiences, linear programming	OTT providers, live streaming news and sports	UGC live streams, game streaming and esports	Two-way web conferencing, telepresence, real-time device control (e.g., PTZ cameras, drones)

TYPICAL LATENCY FOR HD CABLE TV

| 45+ seconds | 18 seconds | 05 seconds | 01 second | < 01 second |

Apple® HLS
MPEG-DASH

HLS Tuned
DASH Tuned
RTMP

Low-Latency HLS
Low-Latency CMAF for DASH
RTMP Tuned
SRT
RTSP/RTP

WebRTC

[ref]

The Rising Star: WebRTC

OBS
Open Broadcaster Software

ONVIF®

FFmpeg

gstreamer

Raspberry Pi WebRTC

App

End User

Signaling

MQTT Server

WebRTC p2p

exchange sdp/ice

MQTT Server

End User

MQTT Client

WHEP Server

Signaling Service Abstract Layer

Conductor

Native WebRTC

Recorder

Media Source Layer

FFmpeg

Libcamera

V4L2

PulseAudio

HDD

Camera

GPU

Microphone
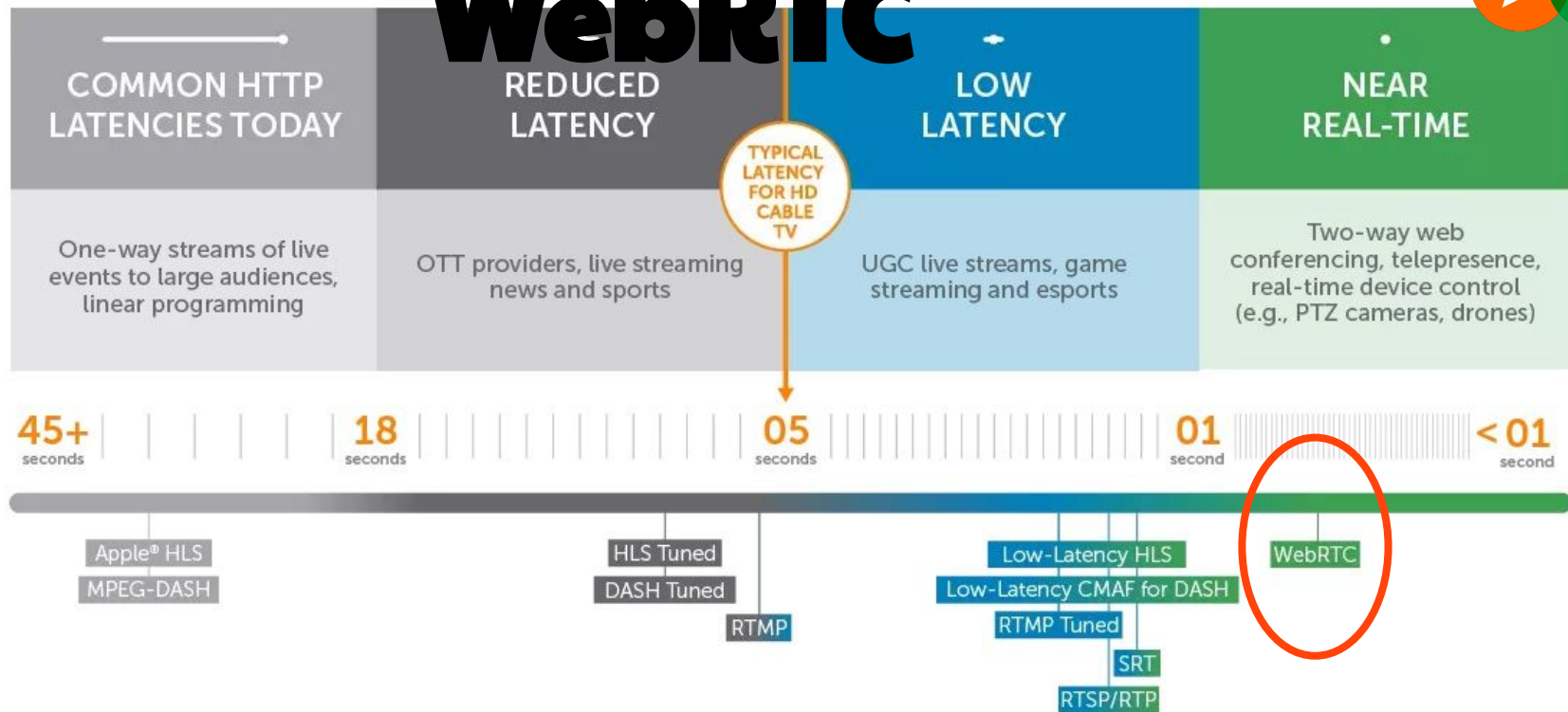
Future Plan

Home Assistant

Performance

Cloud Media Service

Ant Media

JANVS WEBRTC SERVER

Opportunity

What I learned

- **Learning**

- **Personal Brand**

- **Determination**

- **Luck !**

Q&A

THANK YOU VERY MUCH