Wanyu Zhang

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EDUCATION

University of Southern California — Los Angeles, CA
Master of Science, Computer Science (Multimedia and Creative Technologies) — *Jun 2022 – May 2024*

Hefei University of Technology — Hefei, China
Bachelor of Engineering, Computer Science (Digital Media and Visualization) — *Sep 2016 – Jul 2020*

WORK EXPERIENCE

ByteDance — Shenzhen, China
Interaction Engineer Full Time — *May 2021 – Jun 2022*

Offline Cloud Rendering

- **Stickers Income:** Developed and launched offline rendering stickers on Capcut such as Camera Shake / Camera Bounce / Particles Dissipate in Asia and Americas regions. Camera Shake was rated S level among users from Pakistan and Bengal on TikTok and peak QPS of service reached 80. Acquisition reached 220K and activation reached 3.06M.
- **Backend Service Development:** Participated in development of offline cloud rendering framework, and developed two reusable components of task scheduler with C++ object-oriented design, Golang and ffmpeg. Developed a general pipeline with standard API for different stickers. Combined frameworks such as KiteX for Golang RPC framework, CGO for interfaces between server and render, and Mesa for OpenGL rendering.
- **DevOps:** Deployed and operated hundreds of instances in total with CI/CD tools such as gitlab, Cmake, SCM, Jenkins and cloud platform and performed stress testing on multiple types of GPU. Maintained usage of CPU/GPU of single instance under 70%, service time of generating a video under 3000ms and video size under 3MB. Established error monitor system on twenty types of error with automatic alerts using Kafka and visualized on Grafana.

Real-time Cloud Rendering

- **Backend for WebRTC (Web Real-Time Communication):** Participated in beckend development of WebRTC: Live streamers use web page and camera for live broadcasting with abundant filters, and system will send each frame to server for rendering, avoiding web-assembly for OpenGL or client installation. Decreased service latency of each frame to 200ms with deployment on edge servers.
- **Cloud Rendering SDK Development:** Encapsulated low-level RTC API into SDK with C++, supported operations such as Join Room, Subscribe User, Push Frame and callbacks as Room Joined and Frame Received. Developed gRPC connections with edge adapter to send heartbeat packet to adapter and maintain active status of worker.

ByteDance — Beijing, China
Big Data Engineer Full Time & Intern — *Dec 2019 – May 2021*

- **Data Warehouse Development**: Constructed data pipeline of Fanqie Novel with Spark and Python. Performed ETL process on 120B tracking event data daily from Kafka and relational databases to HDFS and constructed interaction modules (including behaviours such as comment, reply, like etc.) of data warehouse on four layers.
- **DevOps:** Deployed and operated 60+ Spark tasks with ByteDance distributed system and Hive on Spark. Created multiple SLA standards for every task based on data lineage, tagged three priority levels on tasks and assigned to different YARN queues. Created 60+ alarms on data quality and task latency to ensure data meets SLA standard.
- **Spark Task Optimization:** Estimated elapsed time of each stage, found and solved possible data skew in shuffle process with SparkUI and DAG graph and decreased large task computation time from two hours to thirty minutes.

PROJECTS

Ray Tracing with BSP Tree Acceleration | *C++* — Oct 2022 – Nov 2022

- Constructed BSP Tree for given scene and implemented voxel walking algorithm to find the nearest primitive
- Tested correctness of shadow, reflection and refraction effects
- Decreased running time from 2400+ms of brute-force method to less than 50ms

Real-Time and Realistic Graphics Rendering | *OpenGL, GLSL* — Jul 2018 – Aug 2018

- Learned 3D rendering technics and OpenGL rendering pipeline
- Learned from two different shaders and applied them into scene
- Used ray tracing, bump mapping and 2D-3D transformation to make a shader, availble for view on Shadertoy

SKILLS

Languages: C++, GLSL, SQL, Golang, JavaScript, Java, Python, Shell

Developer Tools: Git, Docker, Cmake, OO Design, Distributed System, CI/CD, Hive, Cloud Platform, VS Code