



Guangkai Jiang

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ABOUT ME

I'm open-minded, curious about how things work and always keen to learn.
I'm capable of working independently as well as being a good team player.
Wondering in the world of Machine Learning, Data, Cloud, Security and Blockchain.

WORK EXPERIENCE

Software Engineer

Nokia [12/2022 – Current]

Address: Karakaari 7, 02610 Espoo (Finland)

I completed my master's thesis titled Neural Network and Distributed Computing in 6G L1, and continued to work on Interpretable Machine Learning. My role involves:

- Conducting extensive literature review on machine learning, parallel computing, and 6G.
- Implementing benchmarking tools with PyTorch's DistributedDataParallel packages.
- Experimenting with Nvidia's Multi-Instance GPU on Kubernetes.
- Conducting benchmarking and analysis of model training speed and performance.
- Deploying model explaining tools for Interpretable Machine Learning experiments.

Software Developer

Ericsson [03/2022 – 08/2022]

Address: Hirsalantie 11, 02420 Kirkkonummi (Finland)

As a part of the development team responsible for Web Communication Gateway products, I contributed significantly to the following:

- Building the Linphone app for both Android and iPhone enabling VoIP push notifications with FCM and APNs.
- Troubleshooting and fixing Technical Reports for Non-SIM Device Server and Web Access Gateway.

Software Engineer

Samsung R&D Institute Poland [07/2020 – 08/2021]

Address: Warsaw Spire plac Europejski 2/budynek C, 00-844 Warsaw (Poland)

Website: <https://research.samsung.com/srpol>

Name of unit or department: Visual Display - **Business or sector:** Professional, scientific and technical activities

I played a critical role in testing and enhancing Chromium and Cobalt, specifically for YouTube and other streaming applications. My responsibilities involved:

- Testing applications like YouTube, YouTube TV, Google Play Movies on Chromium and Cobalt, followed by an extensive analysis of traces and logs.
- Enhancing Chromium and Cobalt in C++ for Tizen OS.
- Diagnosing reported issues and creating comprehensive solutions.
- Constructing webRTC servers and implementing webRTC test cases in JS.

- Identifying and analyzing video playback issues related to MSE, EME, DRM, and Codec.
- Participating in code reviews and contributing to open source, while liaising with Google's issue tracker.

Notable Achievements:

- I significantly improved the performance of YouTube TV channel switching on Samsung Smart TV by addressing Cobalt's issues on the Tizen Operating system.
- I rectified the HTMLMediaElement.setMediaKeys() Web API and contributed the patch to Google's Cobalt open source community.

Translator & Quality Assurance Technician

Testronic Labs [06/2019 – 04/2020]

Address: Poleczki 21A, 02-822 Warsaw (Poland)

Business or sector: Professional, scientific and technical activities

I undertook localization and quality assurance tasks while working on League of Legends: Wild Rift. My key responsibilities included:

- Translating reports between China, US, and Poland.
- Identifying and reporting graphic issues.
- Addressing text issues and suggesting potential fixes.
- Conducting rigorous testing of game logic and providing detailed bug reports.

EDUCATION AND TRAINING

Master of Science

Norwegian University of Science and Technology [08/2022 – 07/2023]

City: Trondheim

Country: Norway

Website: <https://www.ntnu.edu/>

Field(s) of study: Security and Cloud Computing

Level in EQF: EQF level 7

Thesis: Parallel Training of Neural Networks in 6G L1

Blockchain Technologies and Cryptocurrencies

Wireless Network Security

Advanced Ethical Hacking

Adversarial Machine Learning (Specialization Project)

Master of Science

Aalto University [08/2021 – 08/2023]

Address: 02150 Espoo (Finland)

Website: <https://www.aalto.fi/>

Field(s) of study: Security and Cloud Computing

Level in EQF: EQF level 7

Type of credits: ETCS – **Number of credits:** 60

Thesis: Parallel Training of Neural Networks in 6G L1

Information Security

Cryptography

Cloud Software and Systems

Full Stack Web Development

Principles of Algorithmic Techniques

Multimedia Services in Internet

Methods of Data Mining

Machine Learning

Big Data Platforms

Bachelor of Science in Engineering

Warsaw University of Technology [02/2018 – 02/2021]

Address: plac Politechniki 1, 00-661 Warsaw (Poland)

Website: <https://www.pw.edu.pl/>

Field(s) of study: Computer Science and Information System

Level in EQF: EQF level 6

NQF Level: Level II – Type of credits: ECTS – Number of credits: 210

Thesis: System for rehabilitation of people with cognitive impairments

Mathematics:

Calculus, Discrete mathematics, Differential equations, Numerical methods, Probability, Differential geometry

Computer Science:

Computer network, Computer statistics, Digital systems, Data transmission, Algorithms and data structures, UNIX operating systems, Databases, Object oriented design, Artificial intelligence, Machine learning, Automata theory and formal languages, Algorithms and computability, Graphic Processors in Computational Applications

Development:

Application and Distributed Systems Development in the Google Cloud Platform, Programming multilayered and mobile apps based on React, Programming in Graphical Environment, Software Engineering, Linux for Embedded Systems

Programming language:

C, C++, C#, JavaScript, Python, R, MATLAB

LANGUAGE SKILLS

Mother tongue(s): **Chinese**

Other language(s):

English

LISTENING C1 READING C2 WRITING C1

SPOKEN PRODUCTION C1 SPOKEN INTERACTION C1

Levels: A1 and A2: Basic user; B1 and B2: Independent user; C1 and C2: Proficient user

DIGITAL SKILLS

Programming

Programming in C/C++/C#/Python/JavaScript / Data mining / Parallel programming with CUDA / Programming for Linux Embedded System / Basic computer graphics and image processing / Data analysis with R, Matlab / Solidity Smart Contract / Machine Learning With Pytorch

Development

Web development with React / Mobile development with React Native / Full-stack cloud development / Firebase / Node JS / Nginx / MongoDB / Docker, Terraform, CI/CD / WebRTC streaming

General

High proficiency in Git, Gerrit, Jira / High proficiency in Linux, Windows / Wireless Security / Information Security

Big Data Platforms

Apache Airflow / Apache Cassandra / Apache Kafka / Apache Nifi / Apache Spark / Rabbit MQ

PROJECTS

System for rehabilitation of people with cognitive impairments

The system is designed to help people with cognitive impairments to recover better by doing a series of specially designed exercises.

The system contains two parts, a mobile application, and a web application. Mobile application is used by patients to do exercises, and web application is for doctors to manage patients. The system uses Firebase firestore as the database for both mobile and web. The mobile application is developed in React Native framework.

Link: <https://cognitive-rehab.web.app/>

Image text detection on Google Cloud Platform

Application deployed on Google App Engine combined with Google Cloud Function. Users can sign in with Google account and upload an image, which will be transformed, and text with the image will be detected by Vision API. The result of the detected text will be sent over email along with URLs of images. Data is passed through secured HTTPS communication and saved in Cloud Firestore. Images are stored with encryption in Cloud Storage.

Multivariate time series forecasting with fuzzy cognitive map

The project contains two parts, data aggregation, and a fuzzy cognitive map model. Data aggregation takes a period of normalized data and convoluted them. The fuzzy cognitive map model's shape depends on the number of elements in the dataset. The output of data aggregation will be used as input for a fuzzy cognitive map to forecast data in the following future time point.

WebRTC and HLS streaming

Real-time and on-demand video streaming with webRTC, with stun and turn servers, with and without Janus gateway, also with RTP forwarding and HLS conversion with ffmpeg and Nginx RTMP module.

Clustering of scientific papers and keywords extraction

Clustering over 1000 scientific papers in the field of computer science and extracting notable keywords from each cluster to have an overview of the topics. The project is done in JupyterLab.

N-body gravity simulation on GPU with CUDA

Parallel programming of gravity simulation with particle collision on NVIDIA GPU with CUDA. Thousands of particles are simulated with Newton's law of universal gravitation and conservation of momentum with consideration of elastic collision. The CPU prototypes in MATLAB and C# are used to test the physics. The GPU program is written in C with CUDA.

Images processing and computer graphics mini projects

A series of projects in the field of image processing and computer graphics: raster image processing, line drawing, anti-aliasing, filling, clipping, 3D scene transforming and projecting, face-culling, z-buffering, etc.

Smart contract and NFT on Ethereum blockchain

A car renting application that utilizes Smart contracts and NFT on Ethereum blockchain, which enables clients to rent cars by temporarily taking ownership of NFTs, which correspond to different cars available for renting and make monthly payments with cryptocurrency.

Adversarial Machine Learning

Overview of the taxonomy, history, and future of adversarial machine learning.

Parallel Training Of Neural Networks in 6G L1

This thesis revolves around the parallel training of neural networks, with a keen eye on the applicability within 6G L1. Recognizing the critical role that neural networks will play in the evolving landscape of 6G, the research aims to train neural networks with better resource utilization.

The thesis opens with a comprehensive overview of neural networks and their pivotal role in 6G L1. Parallel training methods, specifically data parallel using DistributedDataParallel (DDP), are introduced as key strategies for enhancing the efficiency of the training process.

A set of extensive experiments using CIFAR-10 and ImageNet datasets is conducted, with ResNet models utilized as stand-ins for 6G L1 models. This enables the focus to remain on optimizing parallel training strategies rather than model specifics. The experimental setup involves non-distributed GPU servers and Kubernetes environments with Multi-Instance GPU (MIG) and leverages PyTorch's DDP for distributed training. Significant attention is given to optimizing GPU throughput, disk bandwidth, and data loading for enhanced resource utilization.

The results obtained offer significant insights, with the key finding being that DDP leads to remarkable improvements in the training process of neural networks. Further, the thesis includes in-depth analysis and discussion on topics like the influence of global batch size on model performance and the utilization of MIGs.

COMMUNICATION AND INTERPERSONAL SKILLS

Teaching Assistant of Big Data Platforms

CS-E4640 Big Data Platforms, Aalto University.

Teaching Assistant of Blockchain Technologies and Cryptocurrencies

TTM4195 Blockchain Technologies and Cryptocurrencies, Norwegian University of Science and Technology

OPEN SOURCE CONTRIBUTION

Google Cobalt

Cobalt 21.LTS.4 Release

The Cobalt team has pushed critical patches to the [21.lts.stable](#) branch with tag [21.lts.4](#) ([21.lts.4.302899](#) push). Considering the importance of these patches, the Cobalt team strongly recommends that partners migrate Cobalt to this new version as soon as possible if you have **Cobalt 21.lts.stable** on your existing devices.

Media

- Improved **HTMLMediaElement::SetMediaKeys** to always associate with the new MediaKeys

Open Source Contributors

We sincerely appreciate the open source contributors for this release!

- Guangkai Jiang (Samsung)

Cobalt 22 LTS RC

Cobalt 22 LTS includes **Starboard API version 13** for porters and its release version will support all features that are required for **2022 YouTube Certification**.

Open Source Contributors

We sincerely appreciate the open source contributors for this release!

- Jiang Guangkai (Samsung)

Issue Tracker Google Partner Access: g.jiang@samsung.corp-partner.google.com

Links: <https://groups.google.com/g/cobalt-dev/c/VdDYZblvIoE?pli=1> | <https://groups.google.com/g/cobalt-dev/c/5gZ75V54P1A>
