Chanwut **Kittivorawong**

Efficient Video Inference Systems · Data Visualization

chanwutk.github.io | chanwutk | chanwut-k | chanwut_k | Chanwut Kittivorawong | Berkeley, CA

I am a PhD student at UC Berkeley researching efficient video analytics systems that leverage **video's spatiotemporal redundancy to accelerate video inference**. My preferred programming languages are Python and TypeScript. I designed and developed Spatialyze, a geospatial video analytics system published at VLDB 2024, where I explored optimization techniques that balance accuracy and throughput in video analytics tasks. Through its development, I gained a deep understanding of how spatial and temporal knowledge can minimize expensive ML operations, the trade-offs between model precision and compute cost, and the challenges in large-scale video inferences. I interned at Google, researching autogenerated video understanding evaluation for Gemini, at OctoML, developing web-based ML model visualizers, and at DocuSign, optimizing cloud infrastructure. With expertise in ML inferencing and training infrastructure, I am seeking an **internship in ML systems and optimization**, focusing on large-scale ML acceleration and infrastructure.

Education

University of California, Berkeley — *California, U.S.A*

Ph.D. in Computer Science — *2021 - 2026 (expected)*

Advisor: Prof. *Alvin Cheung @ Sky Lab* — **GPA**: 3.8

Area: Video Understanding, Efficient Video Inference Systems

University of Washington, Seattle — *Washington, U.S.A*

Combined BS/MS in Computer Sci. and Eng. — *2016 - 2021*

Research Mentor: Prof. *Jeffrey Heer @ IDL* — **GPA**: 3.83 (MS), 3.91 (BS)

Area: Data Visualization Tools, Data Interaction Tools

Work Experience

Google — Student Researcher (Intern) — *May 19 - Aug 8, 2025*

- Researched Gemini's video understanding evaluation through auto-generated video-QAs (question-answer pairs regarding the content of given videos).
- Developed methods to auto-generate QAs with Multimodal LLMs and verify their correctness using human domain knowledge.
- Our approach scales the QA generation with minimal human understanding of the video content.

Sky Lab (RISE Lab) + EPIC Data Lab, UC Berkeley — Graduate Student Researcher — *Aug 18, 2021 - Present*

- Researching efficient video inference systems through spatiotemporal knowledge. With cost-based optimization, our system trains proxy ML models to minimize the execution of expensive oracle ML models through input compression and fine-tuning of the oracle models.
- Designed and developed Spatialyze: a video data analysis system, focusing on geo-spatial-related queries and optimizations. Through our programming paradigm, Spatialyze executes less expensive ML operations by integrating geospatial metadata, achieving more than 2x speed.

OctoAI — Software Engineering Intern — *June 15 - Sept 25, 2020 & June 7 - Aug 6, 2021*

- Designed and created a visualizer for deep-learning models and their performance using D3+TypeScript.
- The visualizer is a part of the optimizer tool (Octomizer) that optimizes deep-learning models compiled by TVM and measures their performance.

Interactive Data Lab, University of Washington — Undergraduate + Graduate Research Assistant — *Jan 1, 2018 - June 4, 2021*

- Contributed to **Vega-Lite** (*github.com/vega/vega-lite*), a web-based high-level grammar of interactive graphic for generating easy-to-understand visualization. Designed and implemented grammar for creating error bars/error bands, enabling users to create error bar/band charts without the need to manually compose different types of marks. As a result, the specification for creating an error bar chart is shortened by half.
- Contributed to **Arquero** (*github.com/chanwutk/arquero-sql*), a query processing library in JS. Designed and implemented Arquero-SQL as an alternative execution engine to Arquero's own engine in JS. Arquero-SQL executes Arquero queries on an SQL server to achieve better performance and scalability.

DocuSign — Software Engineering Intern (Product Development: Manage & Optimize) — *June 17 - Sept 9, 2019*

- Design & develop AWS services as part of the Advanced Analytics Platform, used to extract, sanitize, and store usage data.
- Design AWS Lambdas to automatically shut down idle EMR clusters and notebooks, preventing unnecessary billing. Design spark jobs to keep the schema of the service's database up-to-date and to clean up unused files from failed data ingestion, thereby preventing dirty data from being analyzed.

Publications & Projects

Spatialyze: A Geospatial Video Analytics System with Spatial-Aware Optimizations **VLDB Conference* — *2024*

Chanwut Kittivorawong, *Yongming Ge, Yousef Helal, Alvin Cheung. Accepted at VLDB 2024 (dl.acm.org/doi/10.14778/3665844.3665846, spatialyze.github.io)*

Design Study for a Geospatial-Video Data Analysis Query Language — *2022*

Chanwut Kittivorawong, *Shadaj Laddad, Andrew Lenz, Amy Lu*

Efficient Distributed Data Loading for Large-Scale Machine Learning Model Training with Parax — *2021*

Sheng Shen, ***Chanwut Kittivorawong*** *(chanwutk.github.io/parax-dataloader-paper)*

Legible Label Layout for Data Visualization, Algorithm and Integration into Vega-Lite **Master's Thesis* — *2021*

Chanwut Kittivorawong *(chanwutk.github.io/label-thesis)*

Community Cellular Networks Coverage Visualizer — *2021*

Chanwut Kittivorawong, *Sirapop Theeranantachai, Nussara Tieanklin, Esther Jang, Kurtis Heimerl (chanwutk.github.io/ccn-coverage-vis-paper)*

Fast and Flexible Overlap Detection for Chart Labeling with Occupancy Bitmap **IEEE INFOVIS Conference* — *2020*

Chanwut Kittivorawong, *Dominik Moritz, Kanit Wongsuphasawat, Jeffrey Heer IEEE VIS Short Paper, Oct 2020.*

Pleiades: Interactive Composing Tools for Vega-Lite Charts — *2019*

Chanwut Kittivorawong, *Manesh Jhawar, Sorawee Porncharoenwase (chanwutk.github.io/pleiades)*

Skills

Languages	**Python, TypeScript, SQL, C**, Vega-Lite, Vega, Java, C++, C#, HTML5, CSS, LaTeX
Tools/Libraries	**NumPy, PyTorch, D3, Cython**, React, Docker, Chart.js, Git, Node.js, bash, Jekyll, Apache Spark, AWS
Technical	**Video Inference Systems, Computer Vision, Deep/Machine Learning, Data Visualization**, DBMS, Software Development

Services

Data Systems & Foundations Seminar at UC Berkeley *Berkeley, CA*

Seminar Organizer (tinyurl.com/dsf-seminar-2025) *2025 - 2026*

- Invite external speakers, including DSF-related professors and industry professionals.
- Organize speakers meetups with our lab members (dsf.berkeley.edu) to expand and maintain our lab's connections to external research groups.

Thai Students Association (ThaiSA) at the University of Washington *Seattle, WA*

Head of Public Relations Team *2017 - 2018*

- Supervised and maintained communication between ThaiSA and the UW communities regarding our hosted events.
- Coordinated with UW Alumni Association Thailand for hosting a new students orientation session in Bangkok.

Talks

Polytris: Video Content Packing for Efficient Object Tracking *Oct 20, 2025*

EPIC Fall Advance 2025, UC Berkeley – Slides, Video (github.com/chanwutk/epic-advance-2025)

Efficient Video Inference with Spatiotemporal Knowledge *Jan 14, 2025*

Sky Winter Retreat 2025, UC Berkeley – youtu.be/FaE254pkr1c

Spatialyze: A Geospatial Video Analytics System with Spatial-Aware Optimizations *Aug 29, 2024*

VLDB 2024, Guangzhou, China

Video Preprocessing and Optimization for V-DBMS with Geo-spatial Metadata *Mar 8, 2022*

Data Systems And Foundations Seminar, UC Berkeley

Minimizing Expensive ML Operations in Video Data Exploration Tasks using Geo-Spatial Metadata *Oct 26, 2022*

EPIC Inaugural Advance, UC Berkeley

Design Study for a Geospatial-Video Data Analysis Query Language *May 11, 2022*

Data Systems And Foundations Seminar, UC Berkeley

D3.js Deep Dive *Oct 20, 2020; Apr 29, 2021*

A part of CSE 512 & 442: Data Visualization course, University of Washington

Fast and Flexible Overlap Detection for Chart Labeling with Occupancy Bitmap *Oct 28, 2020*

IEEE VIS (InfoVis) 2020 – youtu.be/bi6FfsWV_9k?t=1318

Teachings

INFO 290T: Human-Centered Data Management @ UC Berkeley — *Reader for Aditya Parameswaran (30 students)* *2023*

Graded students' reading assignments

CSE 512: Data Visualization (For Grdaute Students) @ UW — *Teaching Assistant for Jeffrey Heer (120 students)* *2021*

Taught D3.js Tutorial, graded students' assignments, and answered students' questions in discussion board.

CSE 442: Data Visualization @ UW — *Teaching Assistant for Jane Heffernan and Jeffrey Heer (120 students)* *2020*

Taught D3.js Tutorial, graded students' assignments, answered students' questions in discussion board, and held weekly office hours.

CSE 331: Software Design and Implementation @ UW — *Teaching Assistant for Dan Grossman (100+ students) and Kevin Zatloukal (179 students)* *2019, 2020*

Taught React Tutorial, taught class sections, graded students' assignments, answered students' questions in discussion board, and held weekly office hours.

CSE 442: Data Visualization @ UW — *Teaching Assistant for Matthew Conlen (120 students)* *2020*

Graded students' assignments, answered students' questions in discussion board, and held weekly office hours.

Courseworks

Database System Internal	Computer Vision	Intro. to Distributed System	Adv. Topics in Computer Systems
Machine Learning	Introduction to Deep Learning	PL Analysis & Implementation	Building User-Centered Prog. Tools
Data Visualization	Natural Language Processing	Artificial Intelligence I	UI Design and Development

Honors & Awards

2016	**16th place**, ACM Pacific Northwest Regional Programming Contest	*Seattle, Washington*
2016	**1st place**, ACM University of Washington Qualifier Round	*Seattle, Washington*
2015	**Undergraduate through Ph.D. Full Scholarship**, Royal Thai Scholarship	*Bangkok, Thailand*
2014	**Silver Medalist, Highest score within the region**, The 10th Thailand Olympiad in Informatics	*Ubon Ratchathani, Thailand*