David Lohmann

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Experience

Google - Geo Extended Maps & Tiling: 2022

Worked on building infrastructure to serve and render vector map data on maps clients (web and mobile) using data from server backends of other teams, and specifically the pipeline and server to serve these render operations. Worked on a pipeline to process map data and validate it for correctness so it can be accessed and served by the server efficiently and with logging and unit tests. This entire project was in C++.

Google - Geo People Follow & Place Follow: 2020 - 2022

Migrated Google Maps's People Follow services from monolithic architecture to microservice architecture. Worked on migrating the backend endpoints serving tactile (web) and mobile (iOS and Android) People Follow services on Google maps from using Google Web Service To Boq (Google's microservice architecture). Added onto Mapsfe, Google Maps' boq implementation. Worked with and assisted a team in Tokyo that completed the migration. Made algorithmic improvements to infrastructure using stubby to sync changes to followed place lists, increasing efficiency. This task required learning Apache Beam (Flume), Stubby, gRPC, Protocol Buffers, Boq, GWS, Google Apps Framework, Producers, Guice, and other technologies completely in Java.

Google - Geo Indoor Maps: 2020

Worked on auto-generating indoor maps based on location data. The goal of this project is to use aggregated location trace data to replace the slow surveying process normally used to generate indoor maps (with human operators) with a fast, automatic, and scalable way to generate indoor maps and related point of interest relations. The goal was to eventually put these changes into Google Maps' databases, thus benefitting Geo's ecosystem and improving user experience. Used Google Colab, Python, and SQL for data visualization. Wrote Apache Beam (Flume) C++ pipelines to process indoor walkways and intersections. Generated edits to add these changes, and ensured that these new walkways were registered within certain buildings. Worked on a feature to refresh indoor walkways and remove stale walkways. Created a metric for the indoor walkway refresh pipeline to determine whether a building's walkways are up to date, by classifying walkway changes as large-scale rebuilding, or small remodels. Wrote a design summary for most work done so far on the auto-generated indoor maps team.

Google - Play Apps Search Quality: 2019 - 2020

Worked on Play Apps Search's related query suggestions cluster. Filtered out queries for apps that are not in the play store, so they will not be suggested to users. Worked on a pipeline to generate follow-up queries to be recommended in the related query cluster for play store apps searches. Wrote a Flume C++ pipeline to determine which apps are commonly searched for, but that are not in the play store, and filtered those apps out of the "related searches" suggestions in play store search. Gained experience working with related queries, which are used by many teams in several product areas (ie Play, YouTube, Image Search), and writing unit tests and Flume pipelines.

Wrote Flume pipelines to scrape play logs and query sessions to find information about how users refined their queries, and how they engaged with the related query cluster on the play store app. When

users search and cannot find the app they are looking for, they typically refine their search terms and keep searching. Wrote Flume pipelines to process original search terms and most common follow-up search terms and process these to calculate several key metrics to measure how good the related searches suggestions were. Queried infrastructure to find information about the apps that these queries would have resulted in. Extracted signals from these apps and output this data in a file for training play's machine learning model to rank related queries in the related query cluster better.

Software Skills

- <u>Advanced</u>: **C++**, *Python*
- <u>Proficient</u>: **C**, *Java, SQL, HTML*
- <u>Moderate</u>: *Pthread*, *CUDA*, *OpenMP*, *OpenMPI*, *XML*, JSON, *C#, MATLAB*, *JavaScript/Typescript*
- <u>Tech/Libraries</u>: *numpy*, *scipy*, *matplotlib*, *pandas*, *BigQuery, Apache Beam*, *Protocol Buffers*, *gRPC*, *Bazel*, *GoogleTest*, *CMake*, *Make*, *OpenGL*, *Abseil*, *Spanner*
- *Bash Terminal* in *Linux, Git, Perforce*, *Mercurial*, *Regex*, *Docker, SSH* and *Jupyter/Colab/VsCode/Kaggle notebook*

Engineering Skills

- *Azure MLOps Challenge*
- *Data Processing* pipelines
- *Unit testing, Code reviews*
- **Design documentation**
- *Arduino* Microcontroller, *MIPS Assembly*
- *Computer Networks*
- *User metrics*, *Statistics*, *Math*
- *Geographic Information Systems*. *ArcMap* (ESRI), and *Google Maps*. *Spatial Analysis, and Modeling (GIS)*, *Geographic data*
- Built dlohmann.me with *Azure Static Web App* and *Bootstrap*.

Education

UC Merced
Major: **Computer Science & Engineering, B.S.**

Minor: **Applied Mathematics**
Graduation: **May 2019**