JINGYI LI

Distributed System Programming | Geospatial Data Analytics & Engineering | Software Development

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SUMMARY OF QUALIFICATION

Computer Science & Software Development:

- Distributed Systems, Front-end & Full-Stack Development
- Computer Graphics, Computer Vision, AI, NLP, Neural Rendering & NeRF
- Automated Testing, Debugging & Troubleshoot, DevOps, Product Engineering

Data Engineering:

- ETL, Cloud Database, Cloud Computing, Data Visualization, Dashboard, Interactive Web Map

Geospatial Analytics & GIS:

- Geospatial Relational & NoSQL Database, Geospatial Data Analytics, Vector & Raster Data Analysis

Design & Planning

- Digital Heritage, Architectural Design, Cultural Resource Management, Preservation Planning

SKILLSET HIGHLIGHT

Programming Language : C/C++, Python, Java, Javascript, PostgreSQL , SQL, MySQL, YML, Bash
Database: Relational Database (SQL) **,** MongoDB (NoSQL), Key-Value Store
Geographic Information System: ESRI ArcGIS Pro, ESRI ArcGIS Online, ArcGIS Storymap, HEC-RAS, HEC-HMS
Cloud Platforms: Google Cloud Platform, Azure
Computer Aided Design: Sketchup, AutoCAD, Rhino, Grasshopper, Vray, Lumion
Miscellaneous: Qt Creator, Docker, VMware, Git & Github, Microsoft Office Suite, Adobe Creative Suite

EDUCATION

University of Pennsylvania, Stuart Weitzman School of Design, Philadelphia, PA Present
Master of Science in Historic Preservation, Preservation Planning

- **Courses in Engineering**: **CIS5050** Software Systems | **CIS5480** Operating Systems Design and Implementation | ***CIS5530*** Networks Systems | **CIS5800** Machine Perception | **CIS560** Interactive Computer Graphics | **CIT590** Program Languages and Techniques | **MUSA611** Javascript Programming for Planners and Designers | **ENVS570** Modeling Geographic Space
- **Courses in Planning & Design**: **HSPV660** Documentation, Research, Recording | **HSPV625** Preservation Economics | **HSPV7010** Historic Preservation Studio

Harbin Institute of Technology, School of Architecture, Harbin, China Jun 2020
Bachelor of Engineering in Architecture
Architecture Portfolio

- **Courses in Engineering & Science**: Advanced ***Algebra*** I and II | ***Mathematical Analysis*** I and II | Analytical ***Geometry*** | Elementary Number Theory | Single Variable Analysis | ***Probability*** Theory and Mathematical ***Statistics***

PREVIOUS EMPLOYMENT

Department of Computer & Information Science, Penn Engineering , Philadelphia, PA Present
Teaching Assistant for CIS5050 Software Systems (2023 Spring)

- I use my knowledge in distributed systems and currency programming to hold office hours and tutorials.
- I am the Lead TA for a group of four on developing a distributed system (PennCloud) that provides webmail and cloud storage services.

Department of City Planning, Stuart Weitzman School of Design, UPenn , Philadelphia, PA Present
Machine Learning & NLP Research Assistant for Prof. Elizabeth Delmelle (Ongoing)

- I am developing a typology for using machine learning and NLP approaches to map the longitudinal pathways of neighborhood changes.
  (Python, NLTK, Bert, Word Embeddings, Tensorflow, Deep Learning, Matplotlib, ArcGIS Pro)

Department of City Planning, Stuart Weitzman School of Design, UPenn , Philadelphia, PA Present/Dec 2022
Teaching Assistant for MUSA5090 Geospatial Cloud Computing & Visualization (2023 Spring)
Teaching Assistant for MUSA611 Javascript Programming for Planners and Designers (2022 Fall)

- I use my knowledge in full-stack development, geospatial data engineering and cloud computing to hold office hours to assist students with querying Geospatial databases, building scripts with Python/Javascript, developing automated and cloud-based data pipelines, and visualizing geospatial data.
- I conducted DevOps and product management tasks for in-class collaborative projects.
- I wrote automated tests for PostgreSQL queries, sets up PostgreSQL linter for assignments and review codes from pull requests.

(PostgreSQL, PostGIS, GCP Big Query, Python, Javascript, Node.js, Git & Github, Jest, Sqlfluff, Leaflet, Mapbox, Google Earth Engine, CSS, Turf.js, Carto)

Astoria AI Inc, New York, NY Jun 2022 - Aug 2022

Software Developer Engineer & Data Analysis Intern (Remote)

- I developed a prototype for customer service chatbot for online recruiting platforms using Natural Language Processing algorithms.
- I wrote scripts to automate the harvesting of public-sourced data (generated 1000 rows of data per day).
- I deployed applications on Azure.

(Python, NLTK, Bag of Words, Tensorflow, Numpy, BeautifulSoup, Playwright)

Center for Architectural Conservation, Philadelphia, PA April 2022 - Jan 2023

Digital Technology Intern for Pennsylvania Hospital CMP & Wupatki National Monument

- I conducted GIS, hydrology analysis and Geospatial data visualization for Wupatki National Monument.
- I created a website, with interactive maps and visualized 3D Geospatial data for the Pennsylvania Hospital Conservation Management Plan Project (CMP). (Website)

(Front-end Development, Javascript, Mapbox, Leaflet, HTML, CSS, ESRI ArcGIS Online Storymap, CesiumJS)

China Architecture Design and Research Group, Beijing, China Nov 2019 - Mar 2020

Intern Architect, Ju Atelier Department

- I completed conceptual design, 3D modeling and architectural drawings of a boutique hotel project.
- I conducted site research, analytical diagram drawings and construction drawings for an industrial park competition located in Henan, China. The proposal was nominated as one of the finalists for the competition.

(AutoCAD, Sketchup, Revit, Adobe Creative Suite, Rhino, Visualization of Architectural Concept and Design)

ACADEMIC PROJECT

Web Development (Frontend/Full-Stack) & Geospatial Data Visualization

- **Full-Stack App: Crowd-Sourcing Geospatial Data for Community-Centered Preservation of 7th Ward in Philadelphia (Github)**
  (Javascript, RESTful API, Node.js, Express, HTML, CSS, JQuery, MongoDB, Geospatial Cloud Database, DOM, Bootstrap)
  - Full-stack web programming and API development, and working with cloud databases.
  - I used NodeJS to write server-side JavaScript, NPM to install package and deploy applications on the cloud.
- **Frontend Web App: Filtering Preservation Geodatabase of Philadelphia (Github)**
  (Javascript, Leaflet, HTML, CSS)
  - The app was for historic preservation researchers to efficiently locate a historic assets in its Geospatial context
  - I loaded, processed and visualized GeoJSON data from public data sources

Distributed Systems Programming & Geospatial Database

- **Data-Centric Full-Stack App for Geospatial Cloud Computing (Ongoing)**
  (PostgreSQL, PostGIS, ETL, Geospatial Database Engineering, Data Pipelining, GCP Big Query, Python, Javascript)
  - I am building a data pipeline (on the cloud) and a dashboard for large Geospatial dataset(e.g. 500K parcel data).
- **Penn Cloud - A Cloud Platform Supporting Webmail and Storage Services Based on Distributed Key-value Store**:
  (C/C++, Distributed/Software Systems, gRPC, Cloud-native Application Development, High Availability and Low Latency Server Design, Distributed Data Management, NoSQL Database, VMware)
  - I programmed a scalable distributed key-value pair database (3 groups of servers, 3-node replication per group).
  - I collaborated with other three students and implemented load balancing, data partition, replication, fault tolerance, scalability, consistency and leader election among nodes.
- **SMTP and POP3 Email Servers Implementation for a Real Email Client (Supporting Local and Non-local users/ Mail Relay)**
  (C/C++, Linux/Unix, TCP/Stream Socket Programming, Server Design, Implementation of RFC-style Protocol Specifications, Multi-node Distributed System, Multithread Server Architecture, Low-latency, High Availability)
  - I built two multithreaded servers: SMTP & POP3 for sending and receiving emails.
- **Distributed Multicasting Chat Servers**
  (C/C++, Linux/Unix, UDP/Datagram Socket Programming, Support for Unordered, FIFO and Total Ordering Multicast with More Than 15 Servers/Nodes and 300 Clients)
  - I implemented a replicated chat server that uses multicast to distribute chat messages to different replicas.
- **Penn-shell: Implementation of an Interactive Shell**
  (C, Linux/Unix, Docker-Based Development , OS Implementation & Design)
  - I teamed up with another student and implemented foreground & background processes, terminal control & job control, standard in/output redirections and pipelines.
- **PennOS: Implementation of a User-level Unix-like Operating System (Ongoing)**
  - I am creating a kernel, a file system and a shell to interact with users within a group of five.

Geographic Information System (GIS) & Geospatial Analytics

- **Mapping the Flood Susceptibility for Historic Properties and Districts in Philadelphia (Report)**
  (ArcGIS Pro, Model Builder, Raster Calculation, Public-Sourced Data, Hydrology Analysis)

- **Mapping Pre/Post-war Larissa, Greece - Geo-referencing and Digitization using ArcGIS (Report)**
- **Grading System of Locating a Community Garden in Rio de Janeiro, Brazil (Report)**
  (ArcGIS Pro, Raster Data Classification and Calculation)
    - I normalized and classified raster data to understand population, water, transportation, topography and land use.

Computer Vision & Computer Graphics

- **Mini Minecraft Game (Demo)**
  (C++, OpenGL, GLSL, Qt Creator, Shaders, 3D Data Generation and Rendering, Concurrency Programming)
    - I implemented procedural terrain, efficient terrain rendering & chunking, multithreaded terrain generation, texturing, texture animation, game engine tick function, player physics, NPCs & AI, and third-person mode.
- **Mini Maya (Demo)**
  (C++, OpenGL, Qt Creator, 3D Modeling Software Development, Half-Edge Mesh, Catmull-Clark Subdivision, Skeleton & Skinning, Object-Oriented Programming)
    - I implement half-edge data structure and visualized the mesh using OpenGL vertex buffers
    - I implement Catmull-Clark subdivision algorithm, bound a half-edge mesh to a skeleton (json file) and deformed the mesh on the skeleton.
- **OpenGL Shader Fun (Demo)**
  (OpenGL, Qt Creator, Shader, GLSL)
    - I programmed portions of OpenGL's graphics pipeline by writing different vertex and fragment shaders to apply different coloration effects to the surface of 3D models.
- **3D Reconstruction from 2D Images (SFM), Two-View Stereo & Plane-Sweep (multi-view) Stereo**:
  (Python, OpenCV, SFM, COLMAP, Two-View Stereo, Plane-Sweep (Multi-View) Stereo, Photogrammetry Pipeline)
    - I implemented Structure-From-Motion algorithms to reconstruct 3D object from 2D images.
    - I implemented two-view and plane-sweep stereos to generate a sparse and a dense point cloud from 2D images.
- **Augmented Reality with AprilsTag (Result)**
  (Python, OpenCV, PnP, P3P, Procrustes Problem)
- **Call of Duty - Java Console Game (Github)**
  (Java, Objected-oriented Programming)

Historic Preservation & Interdisciplinary Study

- **Master Thesis: The Study on the Differences between NeRF and Photogrammetry and on the Possibility of using NeRF as an Alternative to Photogrammetry in the 3D reconstruction of Heritage Sites.**
    - This research is about optimizing the 3D reconstruction workflow for heritage sites and exploring the interdisciplinary realm between computational technology, AI and historic preservation.

Algorithms & Data Structures

- **Algorithms, Part I and II** *(Coursera, Princeton University)*
- **The Web Development Bootcamp** *(Udemy)*

ACTIVITIES & LEADERSHIP

The Penn Preservation Student Association (PPSA)

- We advocate on behalf of students' interests, meaningfully engage with faculty, and foster a sense of community among students and focus on three main areas: curriculum development and faculty relations; career planning and professional development; and social events and outreach.
- We hold regular meetings, bringing speakers to campus, and organizing events.