Wei Chen

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CAREER SUMMARY

Machine learning engineer with over 1.5-year working experience and 3-year research experience on **deep learning, deep reinforcement learning** and **development of large distributed numerical simulation software**. My expertise lies in:

- Design, train, tune and deploy state-of-the-art machine learning model to solve real-world and research-oriented problems.
- C++ and Python based large software development, with **optimization** in speed and memory.

EDUCATION

Stanford University, CA, US   Sep. 2019 - present
PhD in Artificial Intelligence and Numerical Linear Algebra in Engineering, CEE Department. GPA: 4.0/4.0
Tongji University, Shanghai, China   Sep. 2015 - Jul. 2019
Bachelor in Engineering, awarded Outstanding Graduate of China Civil Engineering Society, First prize of Chinese College Students Mathematics Competition. GPA: 93.67/100, 1st/439

PROFESSIONAL EXPERIENCE

AI Team Lead, Collov. inc, Redwood city, CA   Sep. 2020 - present
Lead the software development team (**8 members**) in US and China to create **web-based AI system** to aid the home interior design, and build the E-commerce recommendation system.

- Furniture and design **recommendation system**
  - Utilized computer vision algorithms/frameworks including **EfficientNet, CLIP, MASKRCNN, STYLEGAN** to do commodity and design generation/recommendations based on submitted design projects, contributing over **3M** revenue per year and serving **5000+** customers.
  - Designed and deployed CNN models in furniture field with classification accuracy over **98.5%** based on dataset with 2M goods. Worked on the **AI-aid interior design system** based on similarity search and style analysis to reduce the design period by **80%**.

- **Set prediction and recommendation** system
  - Constructed the **enterprise heterogeneous large knowledge graph** including goods, users and interior design case as nodes utilizing **1M** goods, **5K** customers and **10K** design cases.
  - Designed domain-specific graph neural network to do goods recommendation (**0.2** recall for top 50, and **0.6** precision), furniture similarity analysis (with **99.7%** precision, over CNN model), and decision making (increase the revenue of after-design shopping by **13%**, reduce the deliver time of design product by **65%**).
  - Used **GraphRNN** and deep reinforcement learning to do set prediction, generating the design automatically.

- **3D-AR-AI** virtual showroom for furniture
  - Used graph neural network recommendation system to select the background and exhibits for different users.
  - Lead the team to develop ios software to leverage the 3D-AR showroom with web-based AI service.

Research Assistant, Stanford Civil and Environmental Department, CA   Sep. 2019 - present
- Large distributed numerical simulation platform (**Geocentric**) for parallel solver of multivariate differential equations.
  - Implemented 3D numerical solver for coupled partial differential equations for solid deformation, multiphase fluid flow and chemical reaction. Optimized the memory (**-14%**) and runtime (**-20%**) in unit test using iterative numerical solver.
  - Incorporated state-of-art laws of physics, and designed generic preconditioner matrix to converge highly nonlinear partial differential system.

RESEARCH EXPERIENCE

CNN-aided Solver of Partial Differential Equation (PDE), Stanford | Advisor: Prof. Ronaldo Borja   Jun. 2020 - Jan. 2022
- Designed an architecture (**ResNetUNet**) to combine ResNet and UNet to facilitate the heterogeneous PDE solver, with **0.52%** relative error for solution in static case.
- Used ResNetUNet as the pretrained model and design both **transformer** and **LSTM** to conduct time series video prediction with **0.61%** relative error.

Fast landslide simulation using graph neural network, Stanford | Advisor: Prof. Ronaldo Borja   Jan. 2022 - present
- Designed and trained **graph neural network** to represent physics laws in linear elasticity, and Drucker–Prager plasticity.
- Designed state-of-the-art GNN architecture to learn the geomechanics simulation conducted by SPH.

CORE COMPETENCIES

- Programming: Python (proficient), C/C++ (proficient).
- Operation System & Database: Linux/Unix, Windows, MongoDB, Flask.
- Machine Learning & Cloud Services: TensorFlow, Pytorch, Pytorch Geometry, Amazon AWS, Google Cloud, Docker, VSCode.
- Data Analytics: Jupyter Notebook, Pandas, Seaborn, Re, Weights and bias.