Shashwat Suri

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Specialized Skills

Machine Learning Skills

- *Deep Learning and Neural Networks* -MLPs, LSTMs, GNNs, RL-Models, GPT, ViT, Transformer models.
- *Classical ML Techniques* - SGD, KNN, KMeans, RBFs, SfM, CNNs, GANs etc.
- *Environments* - Pytorch, hydra, OmegaConf, W&B, Gymnasium

Graphics Skills

- *Geometry Processing* - Mesh/Topology Processing, B-Reps, NURBS, Point clouds, Implicit representations
- *Rendering and Rasterization* - Shaders, Differentiable Rendering
- *Simulation* - Discretizations (Eulerian, Lagrangian, Hybrid), Collision Detection, Neural Surrogates
- *Environments* - Autodesk/CAD, Unreal, Unity, Omniverse(Kit, Warp, USDs), Blender, Rhino, Eigen, Libgl,mitsuba3

Software Development Skills

- *DevOps* - Azure WebApps, Azure Functions, GitHub Functions and Azure/Docker Containers
- *Programming Languages* - Python, C#, C++, JavaScript, Bash, PowerShell, Java, SQL, Julia, Matlab, GLSL, C
- *Environments* - Autodesk (AutoCAD, Civil3D, Revit), Azure, Git, AWS, VS/VSCode, Vim/NeoVim, Windows, Linux

Computer Vision Skills

- *Neural Radiance Fields* - Human-oriented (ANeRF, DANBO, NPC), self-calibrating (SCNeRF, CamP)
- *Gaussian Splatting* - Optical Flow (4DGS, DeformGS), SfT (GaMeS, SuGaR), Simulation (PhysGaussian, SpringGauss)
- *Classic Vision Techniques* - SfM, PointNet, Bundle Adjustment, Text Analysis/Synthesis, CNNs, GANs etc
- *Environments* - Torchvision, Pytorch3d, OpenCV, COLMAP, SMPL, Pillow

Work Experience

Research Assistant - University of British Columbia
August 2023 − Present

Visual AI for Humans Lab and Sensorimotors Lab — Vancouver, Canada

- Implemented mesh interpolation through differentiable rendering and heightfields
- Leveraged point cloud based deformation fields to interpolate shapes between periodically captured human meshes for a sportswear brand
- Independently executed a 3D Capture Dataset of Humans under Dr. Helge Rhodin and Dr. Dinesh Pai.
- Invited as a Visiting Research Scientist to Bielefeld University in Germany to collaborate on research regarding deforming Gaussians under Dr. Rhodin

Software Developer - Mott MacDonald
May 2021 - August 2023

Digital Advancement Network — Vancouver, Canada

- Collaborated with data architects in building scalable machine learning pipelines using Azure
- Individually hosted and owned multiple Azure DevOps microservices through Docker, PostgreSQL, Redis and Azure containers. This was used by core engineering team for Toronto Transit Commission Scarborough Extension Project
- Built various plugins and extensions in Autodesk ecosystem to help build spline based structures in BIM
- Created various project templates for version history, data robustness and automated deployments using GitHub workflows, Azure Function Apps and GitHub Functions
- Co-developed a geometry data management API to attach archivable metadata to engineering models using Autodesk, Rhino3D, Speckle, amongst other AEC products
- Organized and collaborated on multiple digital advancement initiatives, developing system integrations, automating and streamlining release pipelines through Git and Azure tools, and documenting best development practices

Research Assistant - University of British Columbia
January − May 2021

Visual AI for Humans Lab — Vancouver, Canada

- Researched Direct Linear Transformations and their application in human pose estimation under Dr. Rhodin
- Developed human tracking scripts through visual computation to research the accuracy and robustness of my closed-form implementation.

Software Developer Co-op - Mott MacDonald
May − December 2020

Digital Advancement Network — Vancouver, Canada

- Demonstrated quick requirement assimilation and solution development by generating and presenting novel visualizations for stress testing in SAP applications
- Configured and enhanced existing engineering environments like Autodesk and Rhino by designing and implementing .NET Plugins, facilitating functional independence between station-based and modeling geometry.

Project Lead - University of British Columbia
January 2020 − May 2020

Emerging Media Labs — Vancouver, Canada

- Lead 3D Metabolism Project - an Augmented Reality solution to aid Biochemistry students visualize metabolism.
- Designed an AR app - *SynesthesiAR*, which maps Fourier Transform pitch detection into visuals.

Software Developer Co-op - Mott MacDonald   January − August 2019
Digital Advancement Network   *Vancouver, Canada*
- Implemented novel meshing algorithms to achieve interoperability within engineering modeling and CAD-based design software. These implementations were presented to engineers on the project
- Delivered new solutions and enhancements using existing low-code tools like PowerShell automations scripts to enhance software asset management and compliance in the company

Education

University of British Columbia   August 2023 − Present
Master's in Science, Majoring in Computer Science   *Vancouver, Canada*
- GPA: 4.0
- Awarded: International Tuition Award

University of British Columbia   August 2016 - May 2021
Bachelor's in Science, Majoring in Computer Science   *Vancouver, Canada*
- GPA: 3.7
- Awarded: Outstanding International Student Scholarship (OIS)
- Accomplished 16 months of industry experience under the Co-op program

Publications

SimMaterial: Evaluating Materials through Differentiable Simulations   March 2025
Targeting IEEE International Conference of Computer Vision   *Honolulu, Hawaii*
- Time Varying Gaussians to track the deforming object through optical flows
- Physics-informed neural network with differentiable simulators to estimate constitutive materials

Learning Simulatable Models of Cloth with Complex Constitutive Properties   January 2025
Submitted to 2025 IEEE Major Conference   *Vancouver, Canada*
- Differentiable Simulations to learn mass-spring connections and material parameters to represent cloth-like materials.
- Conference name avoided due to submission instructions, script and submission details can be provided upon asking

CasCalib: Cascaded Calibration for Motion Capture from Sparse Unsynchronized Cameras   August 2024
IEEE International Conference on Automatic Face and Gesture Recognition   *Istanbul, Turkey*
- Cascading style of calibration to address multiview calibration and synchronization.
- Devised novel direct linear transformation algorithms, multiperson conditions and time synchronization

HAR: Human Activity Recognition   December 2019
BC AI Showcase 2019   *Vancouver, Canada*
- Predicted human activity using smartphone accelerometer data
- Used Multi-class Logistic Regression (MLR) and Radial Basis Functions (RBF)

Projects

SDF Colliders in Material Point Method   September−December 2024
Sensorimotors Lab   *Vancouver, Canada*
- Designed and implemented implicit simulatable geometry though Signed Distance Fields
- Implemented code for detecting and handling collisions in Material Point Method in Nvidia Warp

Learning Heightfields through Physical Rendering   January-April 2024
Visual AI for Humans Lab   *Vancouver, Canada*
- Leveraging differentiable renderers like mitsuba 3 to learn heightfields
- Representing objects as a combination of heightfields helps in storage and texturing of meshes

Database: Human NeRF shape accuracy   September - December 2023
Visual AI for Humans Lab and Sensorimotor Systems Lab   *Vancouver, Canada*
- Implemented simultaneous capture of humans through motion capture, video capture, and scanning as a way to test shape accuracy of implicit models
- Have currently checked the database on multiple models including DANBO, NPC, and Vid2Avatar

Camera Preconditioning for Self-Calibrating Neural Body Models   September - December 2023
Visual AI for Humans Lab   *Vancouver, Canada*
- Used preconditioning for self-calibrating NeRF models using ZCA whitening to improve the robustness of NeRF models against camera noise
- Achieved a marked difference against synthetic camera noise on multiple Human NeRF models

Direct Linear Transformation for Human Pose Estimation and 3D Plane Reconstruction (Directed Learning Project)   January - May 2021
Visual AI for Humans Lab   *Vancouver, Canada*
- Formulated a closed form solution for 3D-Reconstruction using human pose estimation
- This solution was used and credited for pose based calibration in 2 theses: M-NeRF and CasCalib