CHIEN-KAI KUO

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Education

University of Illinois Urbana-Champaign *2024-Present*
Master of Computer Science (On-Campus)

National Cheng Kung University *2018-2023*
Bachelor of Science in Architecture : Engineering Division

Work & Research Experience

Software Engineer - Academic Expertise and Social Network Analysis Platform *Feb. 2023 – Jun. 2023*
National Science and Technology Council & Knowledge Discovery Laboratory, Engineering Science dept., NCKU Tainan, Taiwan
- Developed nationwide website for analyzing and presenting Taiwan scholars' research orientations and social networks (over 7900+ scholars and 60K+ projects) in Single Page Application(SPA) using Angular and Django framework.
- Implemented 10+ dynamic interactive graphs/charts and search bars through Bootstraps and ng-Zorro in framework with a human-centered dashboard via RESTful APIs & HTML5/CSS3/JavaScript/TypeScript, optimized 30% graph rendering time.
- Designed intuitive User Interface (UI) prototype website for main visualization page and through Figma in Responsive Web Design.

Android App Developer and Researcher - AR Game Development for Spatial Interaction *Feb. 2022 – Aug. 2022*
Sync Laboratory, Architecture dept., NCKU Tainan, Taiwan
- Developed gyroscope-based AR Android Game App using C# on Unity Engine platform.
- Designed 3 space escape games with image recognition and gesture detection using Mediapipe, ManoMotion and Vuforia Engine AR SDKs in NCKU Architecture departmants, enhancing 67% spatial awareness of participators.

Blockchain Developer *Oct. 2021 – Mar. 2022*
NCKU BlockChain Club & Distributed Ledger Laboratory, Computer Science and Information Engineering Dept., NCKU Tainan, Taiwan
- Implemented core architecture of Hyperledger Fabric, involving network construction, and node deployment via Chaincode.
- Developed ERC20 tokens / ERC721 NFTs contrasts and published to Rinkeby testnet in Remix IDE.
- Deployed Gaming DApp with web3.js, jQuery, and Infura on AWS EC2 server, tested on Ganache env.

Architecture Design and 3D Rendering Intern *Jul. 2020 – Sep. 2020*
IHES Architects Tainan, Taiwan
- Conducted 25+ related cases analysis and on-site base surveys for government bidding proposals.
- Developed 5+ 3D models of architecture projects using Rhinoceros and SketchUP, and simulated 15+ high-quality effect images with GPU-accelerated Rendering Pipeline, enhancing architectural designs' visualization for impactful presentation.

Mechanical Engineer Intern *Jan. 2019 – Mar. 2019*
KUOMEX Industrial Company, Ltd. Taichung, Taiwan
- Operated multi-axes CNC turning center for metal fabrication and programming tool paths.
- Developed 10+ machining processes based on 2D/3D drawings on AutoCAD for simulation verification.

Competition

2022 NASA Hackathon - Visualizing the JOVIAN System *Sep. 2022 – Oct. 2022*
NASA Space Apps Challenge Kaohsiung, Taiwan
- Conducted 5 sets of image processing and generating sequential Jovian graphs using Numpy and OpenCV from JunoCam database.
- Led the interdisciplinary team of 4 members to cooperate and collaborate (Design/Electric Engineering/Biology).

2022 IEEE AIOT Competition - Smart Stadium Group **1st PRIZE** *Mar. 2022 – Jul. 2022*
IEEE Signal Processing Society & Taiwan Tech Taipei, Taiwan
- Developed real-time dashboard website with interactive BIM-Revit 3D Digital Twin models on Cloud via Autodesk Forge APIs and visualization data charts.
- Integrated IoT sensors (Eagle Eye & ADI Air Detector) via Raspberry Pi SBCs to detect ambient air parameters and synthesize location of people.

Projects Experience

The Implementation of Computer Vision Based Robotic Fabrication *Aug. 2022 – Jan. 2023*
NCKU CSIE Robotics Laboratory & NCKU Robot Aided Creation Construction studio
- Developed stereo disparity map, automated optical inspection and 3D reconstruction using OpenCV with graphical interface (GUI).
- Achieved 98% prediction accuracy on multi-label classifiers for object recognition using ResNet50 and VGG19 models in PyTorch.
- Operated ROS for Robotic Arm hand-eye calibration and Tof Depth Camera to conduct Point Cloud modelling via Real-Time Appearance-Based Mapping (RTAB-Mapping).

The Digital Tectonics Construction by Human-Robot Collaboration *Feb. 2022 – Aug. 2022*
Architecture Capstone Project in Robotic Arm Tectonics Studio (RATs)
- Designed and implemented a full-scale pavilion (7m*10m*3m) fabrication at NCKU campus using 2 Industrial KUKA KR 300 Robot Arms for multi-dimensional drilling and milling of standard wooden lumbers.
- Developed Voronoi-based roof pattern algorithm with Grasshopper and created Python-based tree-bionic algorithm to manipulate parameters for better branch generation.

The Integration of GPU-Accelerated Graphics Pipeline on 3D Modeling Platform *Sep. 2020 – Jan. 2021*
Sync Laboratory, Architecture dept., NCKU
- Implemented the acceleration of NUBAS-based 3D object rendering with CUDA and OpenGL on the Rhinoceros 3D Platform.
- Leveraged real-time ray-tracing simulation on multiple material and texture processing, enhancing visual fidelity and realism.

Publication

Building Bert-based No-code Chinese Text Classification Pipeline with MLOps and AutoML: Examples for Specific Topics on Social Media Platforms *Nov. 2023* **IN PREPARATION**
2024 International Journal of Interactive Multimedia and Artificial Intelligence (IJIMAI)

The Development of Mixed Reality Application Based on Gesture Recognition: A Study of Spatial Interaction and Perception Enhancement *Mar. 2023* **ACCEPTED - 2nd Author**
2023 International Design Conference on Integrated Interdisciplinary Innovation (IDCIII)
Virtual-Real Integration and Digital Interaction domain

Technical Skills

Programming Languages: Python, Java, C/C++, C#, Solidity, HTML/CSS/JavaScript, TypeScript, LaTex, RESTful API
Frameworks & Databases: Node.js, Angular, ReactJS, Django, jQuery, Web3.js, CUDA, PyTorch, OpenCV, NumPy, MySQL, AWS, Hadoop
2D/3D Softwares: Adobe, Revit(BIM) , Fusion 360(CAD/CAM), Rhinoceros, Grasshopper, Blender, Vray 4, Figma, Unity3D