Sanjeew Kanagaraj

sanjeew.kanagaraj@gmail.com
sanjeewk.github.io
+852-51225593
Sanjeew Kanagaraj
github.com/sanjeewk

EXPERIENCE

Rice Robotics
April 2021 - Present

Software Engineer

- Developed multimedia pipelines to enable **teleoperation, 4k video streaming, recording, two way intercom and deep learning inference** using **Gstreamer, AsyncIO, Python** and **Typescript**, reducing processing and memory requirements **by upto 80%**
- Trained and optimised computer vision models to perform various tasks including **mask, gate and intruder detection**, achieving **over 90% accuracy** on limited hardware using **PyTorch, ONNX, OpenVINO** and **Google Cloud**
- **Improved self docking success rate** by implementing a graceful controller for parking at firmware level using **C++**
- Acted as technical project manager, **liaising with clients and engineers to develop timelines and deliver requirements**

Robot Data
Sept 2020 - April 2021

Software Engineering Intern

- Developed computer vision models for real world use cases using **Tensorflow** and **PyTorch**; optimized and deployed inference on edge devices using **Docker, TensorRT and Nvidia Deepstream SDK**
- Implemented real time face mask detection in conjunction with temperature checking with **precision of over 95%**
- Trained U-Net and PraNet image segementation models to detect tumors in ultrasound scans, **achieving DICE accuracy of 92%**

Hanson Robotics
June 2020 - Sept 2020

Robotics Engineering Intern

- Co-authored paper titled **A Neuro-Symbolic Humanlike Arm Controller for Sophia the Robot**, researching the use of Convolution Neural Networks coupled with symbolic AI for object grasping (https://arxiv.org/abs/2010.13983)
- Implemented AI behavior tree algorithms to enable complex behavior patterns on Sophia, integrating with the Hanson Robotics SDK Improved Sophia's human-robot interaction heuristics and **reduced interaction delay by 50%**

Makerbay
Sept 2019 - Jan 2021

Software Engineering Volunteer

- Led student and AI teams of the coral reef mapping robot project, created data pipelines to train deep learning models for coral identification - **reducing time taken by marine biologists to annotate images by 90%**

EDUCATION

University of Hong Kong
September 2017 - May 2021

Bachelor of Engineering, Computer Engineering

Courses: *Computer vision, Machine Learning, OOP in Java, Operating Systems, Data Structures, Networking, Software Engineering*

SKILLS

Languages: Python, C++, Java, Javascript

Frameworks: PyTorch,Tensorflow, Transformers, Pandas, Scikit-learn, OpenCV, BeautifulSoup, NLTK, Spacy, Django

Tools: Docker, GIT, VIM, Linux, Windows, GCP, Arduino

PROJECTS AND RESEARCH

- **NewsCrunch:** Summarisation and classification of daily news scraped from reputable outlets using a combination of extractive summarisation and BERT based abstractive summarisation *Stack: Django, PyTorch, Transformers, PostgreSQL*
- **Raytracer:** Raytracer written from scratch, capable of handling anti-aliasing, different textures and objects, camera positions, defocus blurring and light sources *Stack: Python, Numpy*
- **Federated Learning in Robots:** Continuous improvement of human robot interaction on the NAO robot using a novel Federated Learning framework to retrain a Seq2Seq chatbot and face detection model *Stack: PyTorch, Networks, OpenCV*
- **PointpillarsNet:** Research into implementation and optimization of PointPillars point cloud object detection model on FPGA boards, conducted under the supervision of Dr. Ngai Wong *Stack: PyTorch, VitisAI*

AWARDS

- HKU Foundation Scholarship covering tuition upon admission
- HKSAR Government Scholarship
- Awarded a grant by the Gallant Ho Experiential Learning Fund to lead an interdisciplinary team researching marine conservation methods in partnership with the University of the Philippines
- Funding to conduct research on marine robotics at the HKU Innovation Wing