Abarajithan GNANESWARAN

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STATEMENT

Dedicated and versatile individual with strong creative, technical, and problem-solving skills and a wide experience in leading and working with teams of local and international students, seeking research opportunities in digital architecture design for machine learning inference.

PUBLICATIONS

- "Kraken: An Efficient Engine with a Uniform Dataflow for Deep Neural Networks" [arXiv]
  o Submitted to *IEEE Transactions on Circuits and Systems I: Regular Papers* (TCAS-1), under review
  o Outperforms state-of-the-art (TCAS'21, TCOMP'20) on AlexNet, VGG-16, and ResNet-50
  o One dataflow and bare-bones PE for any convolutional & fully connected layer and matrix products
  o Implemented at 600 MHz with TSMC 65nm
  o Passion project – 3 years of part-time, personal research

- [Title not disclosed to conform with double-blind peer review]
  o Submitted, under review at *IEEE International Symposium on Circuits and Systems* (ISCAS'22)
  o Virtual CAS teaching methods adopted in 3 universities (including mine) in 3 countries

EXPERIENCE

RTL DESIGNER (R&D)   : LEMURIAN LABS (CANADIAN STARTUP)   **2021-CURRENT**

Designing digital circuits for exotic arithmetic systems. Developed inference frameworks and analyzed error propagation in CNNs from novel compression techniques.

CONSULTANT (PART-TIME) : UNIVERSITY OF MORATUWA   **2021-CURRENT**

Taught parts of SoC design, Digital IC Design; Introduced git-based project evaluation

LECTURER IN CONTRACT   : UNIVERSITY OF MORATUWA   **2020-2021**

Initiated a series of public webinars 'ENTC: Missing Semester' with a series on SystemVerilog, TA for Digital Signal Processing, Mentoring. Designed a module 'Software Design' for the new curriculum.

RESEARCH INTERN   : DATA61 CSIRO (The National Science Agency of Australia)   **2018**

Developed the end-to-end pipeline for machine learning in robotics optimized for handling large datasets in supercomputers and deploying the trained models to embedded devices during the 6-month internship.

VISITING INSTRUCTOR   : UNIVERSITY OF MORATUWA   **2018**

50 hours of teaching and demonstration for EN2532 Robotics Design and Competition module

TUTOR   **2015-2019**

Four years of tutoring local and international school and university students on a variety of subjects including Advanced Level Mathematics, C++, Computer Architecture Design and Electronics.

EDUCATION   **UNIVERSITY OF MORATUWA**   **2015-2020**

Graduated with first class honors in BSc. (Hons) in Electronics and Telecommunications Engineering

GPA: **3.92** (out of 4.2), **3.86** (out of 4.0), Deans List

ACHIEVE-MENTS

- National Best Quality Software Awards by British Computer Society: Won Gold   2020
  Vision Based Traffic Control Project; Now contesting in Asia Pacific Level
- Field selection exam in the most sought-after university of the country: ranked among top 3%   2015
- Mahapola Higher Education Merit Scholarship granted by the Government of Sri Lanka   2015
- GCE A/L (nationwide competitive exam): Z Score of 2.4511, ranked among top 0.4%   2014
- Best Student of the Year Award: St. Sylvester's College, Kandy   2014

TECHNICAL SKILLS (REGULAR USE)		
	• Digital Design	: SystemVerilog, TCL scripting, Vivado, Vivado SDK, Cadence Genus & Innovus
	• Machine Learning	: Tensorflow, Keras, TensorRT (C++ & Python)
	• Machine Vision	: Object Detection CNNs, Object Tracking
	• Programming	: Python - Numpy , MATLAB, C++, Embedded C, Git (version control)
	• Publication	: LaTeX, Inkscape (figures), Matplotlib/Seaborn/Pandas (figures)

SOFT SKILLS

COMMUNICATION SKILLS

- Language skills:
    - o English : Bilingual proficiency, IELTS: [**Overall 8** | listening 9 | reading 8.5 | speaking 7.5 | writing 7.5]
    - o Tamil : Native proficiency
    - o Sinhala : Limited working proficiency – Speaking

- Presentation skills: Chief resource person for multiple technical and community development workshops

LEADERSHIP & TEAMWORK

- Experience in leading and working with multiple teams of foreign and local students
- Project group leader for eight out of ten undergraduate projects
- Student representative of the Department of Electronics and Telecommunications

OTHER TECHNICAL PROJECTS
[CLICK TITLES FOR MORE INFO]

• Vision Based Traffic Monitoring and Control on FPGA (Undergraduate thesis project)	2020
• Serial System Bus with Priority Based Arbitration and Split Transactions	2019
• SOC Design to Apply Two 7x7 Kernels to a 1080p YUV Video Stream at 30 FPS	2019
• Development of End-to-End Pipeline for Machine Learning in Robotics (CSIRO Internship)	2018
• Custom Processor on FPGA; ISA, Compiler & Simulator for Image Processing (Group)	2018

COMMUNITY PROJECTS & OTHER RESPONSIBILITIES
[CLICK TITLES FOR MORE INFO]

• 'SystemVerilog for Digital Design, Synthesis and Simulation': Hands-on, independent webinar 170+ live participants, 1300+ downloads in a month, overwhelmingly positive feedback	2020
• Chief Resource Person, 4 Basic Robotics Workshops around The Country	2017
• Co-Founder & Director of External Relations: Kavigai Foundation	2017
• Co-Leader, Project Feel Lanka 11.0 (Tourism Development)	2017
• Vice President, Project Switch Off 4.0 (Energy Awareness)	2017
• Exchange Participant, Project SEP in Vietnam (Awareness Against Sexual Abuse)	2016
• Volunteer, Baseline Analysis of Development Opportunities for Thondamanaru Lagoon	2014

INTERESTS

- Backpacking, Hiking
- Reading: Science fiction (Asimov, Arthur C. Clarke), Historic fiction (Ken Follet), Non-Fiction (Sapiens)
- Movies & Shows: Nolan, Mel Brooks, Narcos, Silicon Valley

REFERENCES

DR CHAMIRA US EDUSSOORIYA
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