Jinay Dagli
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Department of Electrical Engineering

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Education

Degree	Institution	CPI/%	Year
B.Tech	IIT Gandhinagar	8.84	2020 - Present
Class XII	The New Tulip Int. School, Ahmedabad	97.2	2019-2020
Class X	The New Tulip Int. School, Ahmedabad	98.8	2017-2018

Work Experience/ Research Experience

- **Summer Research Intern, SRIP'22, IIT Gandhinagar** **[May 2022-Aug 2022]**
  Guide: Prof. Joycee Mekie
  - Analysed and simulated various exact and approximate multipliers in terms of accuracy, power, area, and latency.
  - Proposed an approximate fixed-posit multiplier that significantly improved power, area, and latency at the system level while maintaining the accuracy of the Neural Networks.
- **Web Development Intern, Institute Building Projects (IBP)** **[Aug 2021-Feb 2022]**
  Guide: Prof. Dhiraj Bhatia
  - Constructed a custom web scraper in a team of 2 as a part of Institute Building Projects(IBP).
  - Worked towards automating the Grantopedia website of IIT Gandhinagar to filter important and relevant grants and fellowships for students and faculty.
  - Check it out here.

Publications

Papers

- T. Glint, K. Prasad, **J. Dagli**, N. Shah, K. Gandhi, A. Gupta, V. Patel, and J. Mekie, "*Hardware-Software Codesign of DNN Accelerators using Approximate Posit Multipliers.*" **(ASP-DAC 2023) [Nominated for Best Paper Award]**
- K. Prasad, **J. Dagli***, N. Shah*, M. Pidagannavar, and J. Mekie, "*Impact of Operand Ordering in Approximate Multiplication in Neural Networks and Image Processing Applications.*" **(VDAT 2022)**

***Equal contribution as authors.

Projects

- **Approximate Computing for Neural Networks** **[Dec 2021-Apr 2022]**
  Guide: Prof. Joycee Mekie
  - Working under Prof. Joycee Mekie, I understood the benefits of approximation in reducing the hardware for ML applications.
  - Designed approximate compressor-based integer multiplier and implemented it on Neural Networks to check for accuracy and violation of the commutative property of multiplication.
- **Posit Number System (A new representation for floating-point numbers)** **[Dec 2021-Apr 2022]**
  Guide: Prof. Joycee Mekie
  - Understood the new data type proposed by John Gustafson: Posit and Fixed-Posit.
  - Worked on designing Posit-based multipliers to be used in Neural Networks, and observed that these consume much lesser power as compared to the conventional multipliers.
- **Implementation of a Reconfigurable SRAM-based PUF with multiple CRPs** **[Sept 2022-Dec 2022]**
  Course Project
  - PUFs (Physically Unclonable Functions) have come up as an emergent solution for hardware security. In a team of two, we implemented a reconfigurable SRAM-based PUF in Cadence.
  - We observed that the number of challenges can be increased (the PUF can be made stronger) by giving different challenges to different SRAM cells.
- **Hardware implementation of Image Enhancement** **[September 2022]**
  Course Mini-Project
  - As a part of the VLSI Design course assignment, implemented image enhancement by applying smoothening, sharpening, and normalization to give an enhanced image using Verilog HDL.

- **Design of SPI communication protocol** **[September 2022]**
  Course Mini-Project
    - As a part of the VLSI Design course assignment, understood and implemented the Serial Peripheral Interface (SPI) communication protocol using Verilog.
- **Enhanced Encryption-Decryption algorithm based on Numerical Methods** **[Feb 2022-May 2022]**
  Course Project
    - Implemented a symmetric encryption-decryption algorithm to enhance cryptography.
    - Used the Diffie-Hellman algorithm to get the one-way function for encryption.
- **Mathematical Modeling of Tumor Cell Volume Growth** **[Aug 2021-Dec 2021]**
  Course Project
    - Modeled the growth of volume of a tumor cell using the Gompertz equation.
    - Compared the Gompertz and Logistic models and showed that the former is better when modeling the tumor cell volume growth.

Positions of Responsibility

- **Executive, Entrepreneurship Initiative IITGn [EII]** **[May 2022-Present]**
    - Organising events like the case-study competition and entrepreneurship-based debates under the entrepreneurship cell of the institute.
- **Technical Team Member, Electronica'21 (Amalthea IIT-Gn)** **[November 2021]**
    - Designed questions for the Digital Electronics part for Round 1 of an electronics contest conducted by the Technical Summit of the institute.
- **Marketing Executive, Amalthea, IIT Gandhinagar** **[Nov 2020-July 2021]**
    - Designed and searched content for social media posts and read about the algorithms of various social media sites.

Achievements

- **Secured the Scholarship for Academic Excellence 2021-22:** Offered by the institute for securing the highest CPI in the discipline.
- **Dean's List for all eligible semesters (Sem II-IV):** Dean's list is awarded by the Dean of Academic Affairs every semester for academic excellence.
- **VDAT 2022 Fellowship:** Secured fellowship to present our paper and attend the 26th International Symposium on VLSI Design and Test, held at IIT Jammu.
- **Ranked *2310* in JEE Advanced 2020 out of over 150000 appearing candidates**: JEE Advanced is a national-level examination to get into the premier engineering colleges of India.
- **Excellence award by Deputy Chief Minister, Gujarat:** Awarded to recognize academic excellence in the AISSE examination.

Relevant Coursework

- **Completed Courses**: Deep Learning Specialization; VLSI Design; Analog Circuits; Probability and Random Processes; Digital Systems; Electronic Devices; Signals, Systems, and Networks.
- **MOOCs**: Neural Networks and Deep Learning; Improving Deep Neural Networks: Hyperparameter Tuning, Regularization, and Optimization; Structuring Machine Learning Projects; Convolutional Neural Networks; Sequence Models (all offered by DeepLearning.ai in collaboration with Coursera).

Skill Summary

- **Languages:** Python, C, C++, Verilog, HTML5, CSS3, Javascript(Basic)
- **Tools:** Cadence Virtuoso, Xilinx Vivado, Docker, Autodesk Inventor Professional, VSCode, LaTex, Matlab, Cadence Genus

Extra-Curricular Activities

- Core-Committee Member (VLSI and IoT hobby group).
- Active member of clubs and hobby groups like Mean-Mechanics (Robotics club) and Annuity (Finance Club).