

Ruchir Aggarwal

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EDUCATION

UNIVERSITY OF MICHIGAN | M.S. IN COMPUTER SCIENCE

Ann Arbor, MI | College of Electrical Engineering and Computer Science | Exp. 2020

PURDUE UNIVERSITY | B.S. IN COMPUTER ENGINEERING

West Lafayette, IN | College of Electrical and Computer Engineering | Aug 2014 - May 2018

Dean's List (All Semesters)

Cum. GPA: 3.78 / 4.0

INTERNATIONAL EDUCATIONAL EXPERIENCE

NATIONAL UNIVERSITY OF SINGAPORE | SEMESTER EXCHANGE PROGRAM

Singapore | College of Engineering | Aug 2017 - Dec 2017

TECHNO-COMMERCIAL SKILLS

ADVANCED MATHEMATICS AND STATISTICAL PROFICIENCY:

• Verification Forecasting • Advanced Regression Analysis • Exploratory Data Analysis • Significance Testing

LINUX PROFICIENCY:

• Shell-Scripting • Parallel Processing • Big Data Management and Analysis

PROGRAMMING

Advanced: Python • C • HTML

Intermediate: CSS • C++ • PHP • Assembly • System Verilog

Intro: Swift • C# • MySQL

IDE/TEXT EDITORS:

• MATLAB • PyCharm • IntelliJ IDEA • Xamarin • Microsoft Office • XCode • Mentor GRAPHICS Questa Sim • Keil MDK 4
• Xilinx Vivado 2015.2 • Eagle CAD • Vim • Sublime Text • Atom • Notepad++

HARDWARE:

• Digilent Nexys 4 based on Xilinx Artix 7 FPGA • STM32F0 Micro-controller with Discovery Board

RESEARCH EXPERIENCE

SUMMER UNDERGRADUATE RESEARCH FELLOWSHIP | UNDERGRADUATE RESEARCHER

May 2017 – August 2017 | West Lafayette, IN

- Coordinated with Prof. Margaret Gitau to create WQUICK (Water Quality Index Calculator), an application that calculates and presents a visual analysis of Water Quality Index data
- **Water Quality Data Analysis:** Applied regression techniques to find the relation of water quality indices over time
- **Program Optimization:** Reduced runtime of the application by 6 times through vectorization of data

PUBLICATIONS

PEER REVIEWED MANUSCRIPTS/ARTICLES

- Mehan, S., Aggarwal, R., Gitau, M.W., Flanagan, D.C., Wallace, C., and Frankenberger, J. (2018). Time evolution of hydrology and nutrient dynamics in changing climate in a tile drained watershed. *Science of the Total Environment* (will be submitted soon for publication)

MANUALS

- **Aggarwal, R.,** Rangarajan, G., Shridharan, S., and Roy S. (2018). Sensostick User Manual. Senior Design, Purdue University, West Lafayette, IN, May 2, 2018
- **Aggarwal, R.** WQUICK User Manual. Water Quality Index Calculator, Purdue University, West Lafayette, IN (under Internal review with PI - Dr. Margaret Gitau)

INDUSTRIAL EXPERIENCE

WATER RESOURCES AND ECOHYDROLOGIC ENGINEERING GROUP

UNDERGRADUATE COMPUTER CONSULTANT

Jan 2018 – May 2018 | Purdue University, IN

- **SWAT Model Output Data Analysis:** Data management, analysis, and visualization using Python, MATLAB, and R
- **Program Optimization:** File Management and runtime improvement of computer models using Python
- **Code Documentation:** Reported and commented code for replicating study
- **Script Automation:** Automated scripts to help them run on Purdue clusters in single run

ELECTRONIC DEVICES AND DESIGN LABORATORY | UNDERGRADUATE TEACHING ASSISTANT

Jan 2018 – May 2018 | Purdue University, IN

- Provided assistance to students in laboratory exercises and laboratory experiments
- Supervised 24 students at a time to ensure their adherence to appropriate laboratory safety procedures and techniques
- Performed tasks such as attending meetings, grading, and entering data into the computer

INGEN INFOTECH PVT. LTD. | SOFTWARE INTERN

May 2016 – August 2016 | Gurgaon, India

- Collaborated with a small group of highly skilled and experienced engineers to serve to IT needs of the local businesses
- **Local Business Management:** Developed an app 'myLocalShopper' using C# helping local businesses increase their market share and profits through online trans-actions
- **Mobile app Development:** Enhanced knowledge of developing multi-platform applications for smartphones

PRESENTATIONS

ORAL PRESENTATIONS

- Mehan S., **Aggarwal, R.**, and Gitau M.W. (2018). Assessment of Changing Climatic Conditions on Nutrients Fate and Transport in Tile Drained Watershed for Sustained Water Quality. 39th Annual Indiana Water Resource Association Symposium, Bloomington, IN
- **Aggarwal, R.**, Rangarajan, G., Shridharan, S., and Roy S. (2018). Sensostick. Senior Design, Purdue University, West Lafayette, IN, May 2, 2018
- **Aggarwal, R.**, and Gitau M. (2017). Development of A Water Quality Status and Trend Detection Tool*. The Summer Undergraduate Research Fellowship (SURF) Symposium, Purdue University, West Lafayette, IN, August 4, 2017

ACADEMIC PROJECTS

SENSOSTICK | SPRING 2018

Project Video can be found [here](#)

- Designed a walking stick for blind people to help them easily navigate through Purdue campus
- Developed the PCB design to efficiently pack the hardware
- Assisted the software leader with the coding of STM32f0 microprocessor to work with HC-SR04, Bluetooth, and Accelerometer with Gyroscope

DLXOS | SPRING 2018

- Understood the internal structure of DLXOS for modifying existing code to implement new features
- Implemented user traps, sys calls, conditional variables, heap, and file disk system
- Modeled and analyzed performance of different DLXOS components using DLXOS Hardware Simulator

ARM PROGRAMMING | FALL 2017

- Built an ARM-like processor with Digilent Nexys 4 board based on Xilinx Artix7 FPGA using Xilinx Vivado 2015.2 WebPACK

- Coded processor to work with Data Processing, Memory and Branch instructions of the ARM v3 instruction set on the processor
- Improved performance by applying Booth's algorithm reducing the effective number of clock cycles for multiplication(MUL) instruction to half

PEOPLE.CONNECT | FALL 2017

Project Code can be found [here](#)

- Worked in a team of 3 students to design an addressbook app catered to businessmen
- Reworked the entire UI for an easier navigation of the app
- Added features for listing people by tags, converting phone numbers in the national convention and adding password to the address book
- Performed automated testing of the implemented features using Junit and gradle

RC4 DECRYPTION AND SOBEL EDGE-DETECTION | SPRING 2017

Project Code can be found [here](#)

- Collaborated with 3 student to design an ASIC chip that RC4 decrypts and Sobel-Edge detects a given input image
- Ensured smooth data transactions through AHB-Lite and correct sobel-edge detection by writing Verilog code in Questa Sim
- Modified input method to edge-detection unit which improved the efficiency of the process by 450%
- Developed skills like performing simulations for a given verilog code by creating comprehensive test benches

STEGANOGRAPHY | SPRING 2017

- Created Python module to embed/extract images into/from other images
- Reduced the execution time of the module by 7 times through vectorization
- Created a GUI using PySide and Qt that facilitated the code with drag-and-drop feature

RUBIKS CUBE SOLVER | SPRING 2016

Project Code can be found [here](#)

- Worked in a team of 4 to create a Rubik's Cube Solver using Data Structures in Python
- Wrote code for the second stage which involved getting the right colors on the corners of the cube
- Assisted in creating a GUI using MATLAB that simulated each step of the solution obtained from the algorithm

SELF-PARKING CAR | FALL 2016

Project Code can be found [here](#)

- Responsible for the consistency of the design, engineering and installing interfaces between hardware and software
- Provided assistance to the software leader in developing working code for the car in Assembly and C
- Assisted calibrating quantitative infrared sensor readings to detect nearby objects accurately
- Presented in Purdue ECE Spark Challenge 2016

VOLUNTEER EXPERIENCE

ENGINEERING PROJECTS IN COMMUNITY SERVICE, CAMP RILEY | DESIGN LEAD

Jan 2016 - May 2016 | Purdue University, IN

- Chaired a team of 7 to deliver a sailboat to be used at Camp Riley(Indiana) for children with disabilities enhancing their learning experience
- Improved knowledge about systems and signals and their real-life applications like in working motors

FIRST STREET PEER MENTOR PROGRAMME | PARTICIPANT

Feb 2016 - May 2016 | Purdue University, IN

- Tutored students in Math and Physics courses: Calculus I, II, III and Classical Mechanics
- Assisted students to adjust with the campus life and take them to various events hosted by the Titan Club

ENGINEERING PROJECTS IN COMMUNITY SERVICE, DESIGN MANAGEMENT | WEBMASTER

Jan 2015 - May 2015 | Purdue University, IN

- Used HTML and CSS skills to design the front-end of the website for the Purdue International Programs
- Automated the process of monitoring events and 300+ students for the advisors to ease their workload

HONORS/AWARDS

2017	Recipient	Summer Undergraduate Research Fellowship	Purdue University
2017	Recipient	Eli Shay Electrical Engineering Scholarship	Purdue University
2016	Recipient	Walter V. Jones Memorial Scholarship	Purdue University
2015	Recipient	Charles W. Brown ECE Scholarship	Purdue University