Amal Vincent

Sessional Instructor · Simon Fraser University
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"If we knew what we were doing, it wouldn't be called research, would it?"
- Albert Einstien

Education

Simon Fraser University — *Burnaby, BC, Canada*
Master of Science in Interactive Arts and Technology — *September 2017 - June 2021*
Senior Supervisor: Dr Chris Shaw
Thesis topic: Design and In Pandemic Validation of Correlation Visualisation for Sleep Data Analytics
Research Areas: Data Analytics, Health Informatics

College of Engineering, Trivandrum — *Trivandrum, India*
Bachelor of Technology in Electronics and Communication Engineering — *July 2010 - May 2014*

Research Experience

Simon Fraser University — *Surrey, BC, Canada*
Graduate Research Assistant — *September 2017 - August 2021*

I am Research Assistant to Dr Chris Shaw in the BioViz lab at Simon Fraser University.
Responsibilities:
- Collaborating with lab members in the development and validation of multiple health informatics applications.
- Literature review for the projects and maintaining Mendeley archives for the references
- Effectively communicating project ideas and presenting prototypes to different stakeholders.
- Software development for the health informatics applications (Most of the applications were Ruby on the rails projects)
  - Front end and back end development
  - Testing, deployment, and maintenance
  - Maintaining Git Repositories for the projects
- Designing needs-analysis studies and user studies for the applications built in the lab
- Drafting research proposals for REB approval of studies
- Conducting studies using methods such as interviews and surveys for the studies in the lab, analysing the quantitative and qualitative data
- Writing and publishing research work done in the lab
- Presenting research at academic conferences

Sardar Vallabhbhai National Institute of Technology — *Surat, India*
Research Assistant — *April 2015 - November 2015*

The research project involved developing a Gaze-Estimation technology based on regular laptop web camera and display, for human-computer interaction using image-processing, computer-vision, and machine learning primitives. The project made use of OpenCV and other python libraries.

Teaching Experience

Simon Fraser University — *Surrey, BC, Canada*
Sessional Instructor — *Summer 2019*

Introduction to Technological systems (IAT 267), Summer 2019
- Introduction to the core technologies and systems used in media-rich interactive environments, including computer hardware, operating systems, input and output technologies, networking, and media. The concepts were examined by working in a high-level media programming environment. The course involves both lectures and workshops with a total class size of 72 students.

Simon Fraser University *Surrey, BC, Canada*

Teaching Assistant *September 2017 - August 2021*

1. Introduction to Technological systems (IAT 267) with Eric Yang, Summer 2021
    - Experience handling a class size of 64 students
    - Successfully mentored multiple student projects involving electronics Arduino and Human-Computer Interaction
2. Introduction to Technological systems (IAT 267) with Helmine Serban, Spring 2021
    - Experience handling a class size of 72 students
    - Successfully mentored multiple student projects involving electronics Arduino and Human-Computer Interaction
3. Introduction to Technological systems (IAT 267) with Helmine Serban, Fall 2020
    - Experience handling a class size of 70 students
    - Successfully mentored multiple student projects involving electronics Arduino and Human-Computer Interaction
4. Information Design (IAT 235) with Paul Brokenshire, Summer 2020
    - Experience handling a class size of 96 students
    - Successfully mentored multiple student projects involving information design with an emphasis on web design
5. Introduction to Technological systems (IAT 267) with Helmine Serban, Spring 2020
    - Experience handling a class size of 68 students
    - Successfully mentored multiple student projects involving electronics Arduino and Human-Computer Interaction
6. Introduction to Technological systems (IAT 267) with Helmine Serban, Fall 2019
    - Experience handling a class size of 48 students
    - Successfully mentored multiple student projects involving electronics Arduino and Human-Computer Interaction
7. Introduction to Technological systems (IAT 267) with Helmine Serban, Spring 2019
    - Experience handling a class size of 72 students
    - Successfully mentored multiple student projects involving electronics Arduino and Human-Computer Interaction
8. Computational Media (IAT 455) with Helmine Serban, Fall 2018
    - Successfully mentored various student projects involving Computer Vision, Computer graphics, Signal/Image processing and Human-Computer Interaction.
    - Class size of 14 students
9. Introduction to Technological systems (IAT 267) with Helmine Serban, Summer 2018
    - Experience handling a class size of 48 students
    - Successfully mentored multiple student projects involving electronics Arduino and Human-Computer Interaction
10. Introduction to Technological systems (IAT 267) with Helmine Serban, Spring 2018
    - Experience handling a class size of 72 students
    - Successfully mentored multiple student projects involving electronics Arduino and Human-Computer Interaction
11. Advanced Human-Computer (IAT 351) with Dr Brian Fisher, Fall 2017
    - Led tutorials involving discussions on Human-computer interaction
    - Helped students design, develop, critique and evaluate software projects
    - Class size of 48

Simon Fraser University *Surrey, BC, Canada*

Guest Lectures

1. Web Design and Development (IAT 339), Spring 2019
2. Interdisciplinary Design Approaches to Computing (IAT 806 - Graduate level), Fall 2018

Industrial Experience

Cambian *Surrey, Canada*

Mitacs Intern *September 2020 — June 2021*

Project ABC, funded by Canada's Digital Technology Supercluster, deploy technologies that enable the BC health system to deliver a high volume of COVID-19 tests to the patients who most urgently need them, and when available, vaccination/immunisation. As the Mitacs Intern for Cambian in Project ABC I worked on the following:

- Needs analyses to gather the knowledge and flexibly assess Information needs and capabilities with respect to the Project ABC systems being developed
- Usability testing to experimentally validate the usability and accessibility of the ABC Project systems, such as the online booking system, to ensure that these systems are accessible and responsive to citizen's needs

Indian Railways *Bangalore, India*

Senior Section Engineer *December 2015 — July 2017*

Electrical general services under South Western Railway at Bengaluru, India

- Responsibility in maintaining power supply and electrical assets in good condition
- Experience in managing over 100 employees (including technicians) in electrical machinery installation and maintenance

Projects

Graduate

Surrey, Canada

PROJECTS

September 2017 - June 2021

- Project ABC - Authorization, Booking, and Coordination of widespread serological testing and immunisation
  Ensuring efficient and effective disease testing during a pandemic requires the integration and automation of complex, versatile assessment, scheduling, and planning tools. A citizen's access to the health care system at multiple points, and current tools enabling tracking that data, are labour intensive and are insufficient to cope with addressing the volume of tests required during a pandemic. Project ABC is aiming to remove bottlenecks with a solution that will enable automated assessment, authorisation, booking, and coordination of widespread testing and, when available, immunisation in the context of COVID-19. The project is in collaboration with Cambian Inc.
  Keywords: Health Informatics; COVID-19

- SWAPP: Web-based application for logging and analysing sleep-related data for children
  SWAPP is a web-based application designed to help parents/caregivers record a child's sleep/wake behaviours. Parents of children with brain-based disabilities record a large amount of information about their child's medication, sleep, and wake behaviours. The sheer quantity of medical and non-medical records can be overwhelming for the parents and the clinicians. Our team at the BioViz Lab created SWAPP to help parents and clinicians track a child's behaviours. The app adopts a user-centred approach to collecting information, allowing parents to 'own their data' and individualise what they keep track of on a long-term basis. Also, tracking short-term data that is requested by a clinician, such as positive or negative effects of prescribed medication, allowing for immediate follow-up, if necessary. Hyperlink: https://www.swapp.iat.sfu.ca/
  Keywords: Health Informatics; Data Analytics; Visual Analytics

- Correlation Visualisation for Sleep Data Analytics in SWAPP
  Sleep plays an important role in the overall health and well-being of a child. The relationship between sleep and daytime behaviours of children with sleep disorders is understood poorly; different aspects of a child's routine may interact with each other to contribute to sleep disorders. To diagnose, monitor and successfully treat many medical conditions pertaining to sleep, it becomes imperative to analyse the many aspects of a child's daytime and sleep behaviours. We built a visual analytic tool for studying the correlation between different variables pertaining to the daily life of the child. The tool allows clinicians to explore how the different aspects of a child's behaviour and activities affect their sleep and overall well-being. This tool is developed as an extension of an existing tool SWAPP, which allows caregivers and clinicians to log and monitor the child's everyday data. Later, we performed a remote usability study on the tool to demonstrate the efficacy of the tool. Finally, we generated actionable guidelines for improving the tool from the results of the study.
  Keywords: Health Informatics; Correlation Analysis; Data Analytics; Visual Analytics; Mixed Methods;

- FitViz: Fitbit based web application for monitoring physical activity of arthritis patients
  Rheumatoid arthritis (RA) affects 1 in 100 adults in Canada. Self-management of this disease requires the patients to maintain an adequate level of daily physical activity, while not overdoing it; excessive physical activity can be harmful to RA patients. The patients receive regular physical activity recommendations from their clinicians, based on their individual diagnosis. Current solutions for physical activity monitor does not satisfy the needs of the arthritis patients and their clinicians, as they do not allow the patients and the clinicians to know if the patients did the physical activity as recommended by the clinicians. Our team at the BioViz Lab developed a web application that monitors the patient's daily physical activity and generates visualisations to help the patients in the self-management of the condition.
  Keywords: Health Informatics; Arthritis

- Block Talks
  Block talks is a Tangible Augmented Reality toolkit to help kids ages 7-9 learn how to read. It is intended for a semi-supervised environment.
  Keywords: Augmented Reality; Computer Vision; Educational Technology

Undergraduate

Trivandrum, India

PROJECTS

2010 - 2014

- Online voting system powered by biometric security using steganography
  The project involved the development of a secure and time-saving interactive platform, wherein the voters in a digital democracy could easily cast their vote. The security for the system for the data transmission was provided using concepts of cryptography and steganography.
  Keywords: Information Security; Digital Democracy

- Home automation using a cellphone
  The objective of this project was to enable users to remotely control their home appliances and systems using a cell phone-based interface. The product uses the advantages of DTMF for the functioning and the DTMF codes are decoded and used for understanding the requirement or the order from the user. This helps to control your home appliances from a distant place using a mobile phone by just calling.
  Keywords: Embedded systems; Home Automation

Other

Surat, India

PROJECTS

2015

- Gaze Estimation using regular Webcam
  Gaze Estimation is the process of determining the point of gaze in the space, or the visual axis of an eye. This project was focused on developing a gaze estimation method for Human-Computer Interaction using an ordinary webcam mounted on the top of the computer screen without any additional or specialised hardware.
  Keywords: Computer Vision; Machine Learning; Human Computer Interaction

Publications

Published

- Amal Vincent. 2021. Design and in pandemic validation of correlation visualisation for sleep data analytics. Dissertation. Communication, Art & Technology: School of Interactive Arts and Technology. URL: https://summit.sfu.ca/item/21392
- Amal Vincent, Ankit Gupta, Ruoyu Li, Chris Shaw, and Saba Akhyani. 2019. Data acquisition and visual analytic tool-set for paediatric sleep data. In Proceedings of the 13th EAI International Conference on Pervasive Computing Technologies for Healthcare (PervasiveHealth'19). ACM, New York, NY, USA, 320-326. DOI: https://doi.org/10.1145/3329189.3329228
- Amal Vincent, Ankit Gupta, Chris Shaw, and Ruoyu Li. 2019. Correlation Visualisation for sleep data analytics in SWAPP (Sleep Wake Application). Electronic Imaging 2019, 1: 682-1-682–10. DOI: https://doi.org/10.2352/ISSN.2470-1173.2019.1.VDA-682
- Min Fan, Uddipana Baishya, Elgin-Skye Mclaren, Alissa N. Antle, Shubhra Sarker, and Amal Vincent. 2018. Block Talks: A Tangible and Augmented Reality Toolkit for Children to Learn Sentence Construction. In Extended Abstracts of the 2018 CHI Conference on Human Factors in Computing Systems (CHI EA '18). ACM, New York, NY, USA, Paper LBW056, 6 pages. DOI: https://doi.org/10.1145/3170427.3188576
- Krupa Jariwala, Upena Dalal, and Amal Vincent. 2016. A robust eye gaze estimation using geometric eye features. In 2016 Third International Conference on Digital Information Processing, Data Mining, and Wireless Communications (DIPDMWC). DOI: 10.1109/DIPDMWC.2016.7529379

Prizes & Scholarships

Prizes

2017	**Second Runner Up,** Eduhacks 2017 - Designed Block Talks, a Tangible Augmented Reality toolkit to help kids ages 7-9 learn how to read. It is intended for a semi-supervised environment.	*Vancouver, Canada*

Scholarships

2020	**Simon Fraser University Graduate Fellowship,** competitive fellowship for academic and research merit	*Burnaby, Canada*
2019	**Simon Fraser University Graduate Fellowship,** competitive fellowship for academic and research merit	*Burnaby, Canada*
2010 - 2014	**MCM Scholarship,** Merit - Cum - Means Scholarship holder - Undergraduate Scholarship	*Trivandrum, India*

Activities

Graduate

Burnaby, BC, Canada

Simon Fraser University — *September 2017 - June 2021*

- School of Interactive Arts and Technology Graduate Student Association Executive member
- TSSU (Teaching Support Staff Union) Bargaining Committee member: Researching, drafting and negotiating the new Collective Agreement for all the members (over 1500 non-faculty teachers) of the TSSU with the Human Resources department of SFU; this involved designing surveys, focus groups, interviews, analysis of qualitative and quantitative data, and finally drafting proposals based on the data.
- TSSU (Teaching Support Staff Union) Trustee: Elected executive member of the TSSU responsible for the interpretation of the Bylaws.
- TSSU (Teaching Support Staff Union) departmental Steward: Advocate and point of information in the department for teaching appointment-related rights, benefits and problems.

Undergraduate

Trivandrum, India

College of Engineering, Trivandrum — *July 2010 - May 2014*

- Presentation in the departmental Research Colloquium: A-eye, Automation of the role of the third umpire in the game of cricket. The seminar involved the critical review, presentation and discussion on the computer-vision based technology for automation of the third umpire in the game of Cricket.
- Co-founder, and layout designer for VOYAGE (college newsletter) - https://www.facebook.com/voyagecet/

Certifications

LinkedIn Assessments passed	• Machine Learning • Python • MATLAB • MySQL
Coursera Certifications	• Algorithms design and analysis – 1 from Stanford University • Cryptography 1 from Stanford University • Digital signal processing from EPFL • Image and Video processing from Duke University • Usable security from the University of Maryland • Hardware security from the University of Maryland • Linear Circuits from Georgia Institute of Technology
EDX Certifications	• Introduction to computer science and programming in python from MIT • Signals and systems 1 from IIT Bombay

Lynda.com Certifications	• Building a Recommendation System with Python Machine Learning & AI • Artificial Intelligence Foundations: Thinking Machines • Ethical Hacking: Overview • PHP Essential Training • JavaScript Essential Training • Learning Git and GitHub • CSS Essential Training 1 and 2 • HTML Essential Training
Others	• TCPS 2 Core Research ethics from Panel on Research Ethics, Canada • Cybrary certification in cryptography

Skills

Programming	Python, MATLAB, C++, JAVA/ Processing
Machine Learning and Scientific Computing	TensorFlow, NumPy, Pandas, SciPy, matplotlib
Web Development	HTML, CSS, SASS, Javascript, Bootstrap, Ruby on rails, PHP
Database Management System	MySQL, PostgreSQL
Computer Vision	OpenCV, PIL
User Study design and implementation	Designing qualitative and quantitative studies; designing and implementing data collection methods such as surveys, questionnaires, interviews and focus groups; analysis of qualitative and quantitative data
Embedded System Design	Embedded system and PCB design using electronic components, Micro-controller and Arduino programming
Miscellaneous	Git and maintaining Git Repositories, LaTeX

Research Interests

- Artificial Intelligence, Machine Learning
- Health Informatics
- Human Computer Interaction