

# Gihan Chanaka Jayatilaka

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## Interests

Algorithmic programming    Machine intelligence    Pattern recognition  
Image/video processing    Numerical computing    Algorithm specific architectures

## Education

**2015-Now**    Bachelor of Science in Computer Engineering    **Current GPA: 3.90/4.00**  
Faculty of Engineering, University of Peradeniya, SL.  
**2012-2014**    High School - Dharmaraja College, Kandy, SL.  
**2001-2011**    Primary School, Middle School – Vision International School, Kandy, SL.

## Research experience

**2019**    Visiting Research Student at Living Analytic Research Center,  
**Feb-Jul**    School of Information Systems, Singapore Management University.  
(Machine learning aided screen – camera communication)

## Publications

[J] Journal paper

[C] Conference paper

[P] Preprint

**2019 [P]**    Hasindu Gamaarachchi, Chun Wai Lam, **Gihan Jayatilaka**, Hiruna Samarakoon, Jared T. Simpson, Martin A. Smith, Sri Parameswaran. GPU Accelerated Adaptive Banded Event Alignment for Rapid Comparative Nanopore Signal Analysis  
<https://doi.org/10.1101/756122>

**2019 [C]**    **G.C. Jayatilaka\***, H.S. Weligampola\*, S. Sritharan\*, P. Pathmanathan, R. Ragel, I. Nawinne. Non-intrusive Infant Sleep Apnea Detection. International Conference for Industrial and Information Systems 2019. <https://arxiv.org/abs/1910.04725>

**2019 [J]**    S.S.P. Vithana, E.M.M.B. Ekanayake, E.M.H.E.B. Ekanayake, A.R.M.A.N. Rathnayake, **G.C. Jayatilaka**, H.M.V.R. Herath, G.M.R.I. Godaliyadda and M.P.B. Ekanayake, “Adaptive hierarchical clustering for hyperspectral image classification: Umbrella Clustering”, J. Spectral Imaging 8, a11 (2019).  
<https://doi.org/10.1255/jsi.2019.a11>

## Achievements

[C] Competitive programming

[S] Scientific computing

[D] Development

[R] Robotics

[E] Examination

**2019 [S]**    StatHack 2.0 – nationwide inter university statistical data analysis competition (90 teams) organized by Dept. of Statistics, University of Colombo. Winners

**2019 [C]**    **IEEEExtreme 12.0:** (World wide algorithmic programming competition : 4300 teams) National Runners up, World Rank 67.

**2019 [S]**    Dialog Axiata Datathon – first data science hackathon in SL on smart city planing (for students and data science professionals). Best data engineer award.

**2018 [C]**    ACES Coders v7.0 (National level inter university algorithmic programming competition: 120 competing teams) Champions.

**2018 [C]**    ACES pre coders v7.0 (Intra university): Champions.

**2018 [C]**    **Google Code Jam** (24,000 student and professional participants)  
Qualification round : Perfect score, Best performance in SL, World Rank 298.

**2018 [C]**    **IEEEExtreme 12.0:** (World wide algorithmic programming competition : 4000 teams) National Runners up, World Rank 79.

**2018 [S]**    **IEEE Region 10 Humanitarian Technology Conference** (Asia / Australia region)

- Humanitarian Technology Products Competition for grad/undergrad students. Champions. Project: Infant sleep apnea detection system.
- 2018 [S] SLIIT Codefest: Emerging Innovator nationwide open competition: Champions – Gold award. Project: Infant sleep apnea detection system.
- 2018 [S] BrainStorm: Sri Lanka’s The Premier Biomedical Competition in Sri Lanka. Runners up – Silver medal. Project: Infant sleep apnea detection system.
- 2018 [S] Dialog NB-IOT Hackathon (Invitational undergrad and professional dev hackathon) Project : Infant sleep apnea detection system: Runners up.
- 2018 [S] United Nations’ Social Innovation Challenge: Shortlisted for national innovation camp and to the per-incubation program (Top 14 out of 700+ teams)
- 2018 [R] Sri Lanka Robotics Competition (Inter university robotics competition) Project Galvans : National rank 4.
- 2017 [C] **IEEEExtreme 11.0: National Champions, World Rank 124.**
- 2017 [S] ACES Hackathon 2017: (Intra university hackathon) Project: Expert miner: Software section winners, Best idea of the competition.
- 2016 [C] **IEEEExtreme 10.0: National Champions, World Rank 62.**
- 2016 [C] ACES Coders v6.0 Champions.
- 2016 [C] ACES pre coders v6.0 (Intra university): Champions.
- 2016 [D] ACES Hackathon 2016: Project Motify: Software section winners, Most popular idea of the competition.
- 2016 [E] HDTS Scholarship award in recognition of 2014 GCE AL performances.
- 2015 [E] Mahapola merit scholarship for performance in GCE Advanced Level examination
- 2015 [E] Member of the SL national team for International Physics Olympiad.
- 2015 [E] Member of the SL national team for Asian Physics Olympiad.
- 2015 [E] Sri Lanka Mathematics Olympiad: National rank 25, High distinction.
- 2014 [E] GCE Advanced level examination. Mathematics A, Physics A, Chemistry A. z score 2.55 , National rank 86.
- 2014 [E] Sri Lanka Physics Olympiad: National rank 8, Silver Medal.
- 2014 [E] Sri Lanka Mathematics Olympiad: High distinction.
- 2013 [E] Star Quest - Astronomical quiz competition: National rank 4.
- 2013 [E] National Chemistry Quiz (iChem, SL): National rank 2, High distinction.
- 2013 [E] Sri Lanka Mathematics Olympiad: National rank 35, High distinction.
- 2011 [E] GCE Ordinary level examination: 9A for 9 subjects.
- 2010 [E] International Assessment for schools: (held by UNSW) Highest score in the region (South Asia and Middle East) for Science, and highest score in SL for Mathematics and Computing.
- 2009 [E] International Assessment for schools: Highest score in the region for Science.
- 2007 [E] International Assessment for schools: Highest score in SL for Mathematics.
- 2006 [E] International Assessment for schools: Highest score in SL for Mathematics.

### **Skills**

Programming languages	Java, C, Python, CUDA C
Numerical computing packages	MATLAB, Octave, Numpy
Scientific computing	Scikit, Keras
Procedural programming	ARM Assembly
Hardware programming	Arduino C, Verilog HDL
Operating Systems	Linux (Bash shell), Windows
Documentation	Latex, Libre Office, Microsoft office
Version control	git
Languages	English, Sinhala
Computational Mathematics	Numerical mathematics, Discrete mathematics, Statistics and Probability, Machine learning

**Selected Projects** [Code and reports @ <https://gihan.me/projects/>]

- 2019**  
[Research]  
[Image Processing]
- Dark Arts: Low light image processing algorithm development**  
Ongoing thesis project
- 2019**  
[Research]  
[Video Processing]
- Deeplight : screen to camera communication**  
A video processing pipeline inspired by computer vision deep learning architectures to enable screen to camera visible light communication.  
*Technologies: Python, Tensorflow, OpenCV*  
*Techniques: Deep neural networks, signal processing, error correction codes*  
*Contribution: Algorithm development, evaluation, reporting.*
- 2018**  
[Research]  
[Video Processing]
- Infant Sleep Apnea detection**  
A portable video processing device that can detect sleep apnea condition in infants.  
*Technologies: Python, numpy, scipy, OpenCV, Raspberry Pi, Keras*  
*Techniques: Deep neural networks, Edge detection, subspace filtering, sensor fusion.*  
*Contribution: Proposing, algorithm development, testing, report writing, paper writing*
- 2017**  
[Research]  
[Video processing]
- Foreground estimation in dynamic background conditions**  
Video processing research project.  
*Technologies: MATLAB, python, numpy*  
*Techniques: Statistical / probabilistic models (Gaussian/ other mixture models), adaptive filtering, unsupervised learning, hierarchical algorithms for use-cases.*  
*Contribution: Proposing, algorithm implementation, development, reporting.*
- 2018**  
[Numerical computing]
- Novel finite element based structural analysis algorithm improvement**  
Attempting to improve the time and space efficiency of a new structural analysis algorithm based on finite element technique.  
*Technologies: MATLAB, Python, C, Cuda C*
- 2017-18**  
[Research]
- Hyper Spectral Imagery**  
Developing automated HSI pixel classification algorithms using spectral pattern recognition for limited training data. Developing automated spatio spectral pattern recognition algorithms to classify HSI pixels for remote sensing.  
*Technologies: MATLAB, python, numpy, scipy*  
*Techniques: Existing and novel feature extraction, supervised, unsupervised and hybrid learning algorithms (e.g. variants of manifold embedding).*  
*Contribution: Algorithm development, implementation and testing.*
- 2018**  
[Robotics]
- Galvans**  
Two robots (one stationary and one moving). Moving robot had capabilities to follow a line maze, identify coloured boxes and transmit the colour to the stationary bot that could shoot a ball to the colored target. The mobile bot could follow a wall as well.  
*Technologies: Arduino.*  
*Contribution: Programming the navigation/control algorithms.*
- 2017**  
[Robotics]
- Theseus**  
A robot that can find it's way through a wall maze, pick up a coloured payload and deliver it along a path marked by the particular coloured arrow.  
*Technologies: Arduino.*  
*Contribution: Programming the navigation algorithm.*

**Mini Projects** [Code and reports @ <https://gihan.me/projects/>]

- 2018 **BCI** : Mapping the EEG signals from Visual Cortex to what a person is seeing.
- 2017 **CPU**: An implementation of the ALU, registers, program memory, cache and RAM using the behavioural model of verilog HDL.
- 2017 **ALU**: An implementation of the complete ALU and registers using the gate model of verilog HDL.
- 2017 **Basic Image Manipulation**: Basic image manipulation app in ARM assembly.
- 2017 **Fractals**: Multi threaded application for fractal visualization in JAVA.
- 2017 **Auction Server**: Multi threaded socket server for stock auctions in JAVA.
- 2016 **Motify**: A basic desktop notification software for moodle e learning system ( assignments, courses) with JAVA.
- 2016 **Who is speaking**: A speaker identification software with basic signal processing techniques.
- 2016 **Optical musical instrument**: A music instrument with basic optical data transfer techniques.

### Workshops / Training programs attended

- 2019 “Huawei seeds for the future 2019” two week study in China about Huawei technologies – telecommunication infrastructure, 5G, cloud etc:
- 2018 Hackadev National Social Innovation camp organized by United Nations Development Project and Malaysian Global Innovation & Creativity Center.
- 2017 Joint Indo-Sri Lanka workshop on big data analytics at 2017 IEEE International Conference on Information Systems.
- 2014-2015 Sri Lanka National Physics Olympiad Team training at University of Colombo, Department of Physics.

### Volunteering

- 2019 Volunteer instructor for GP106 Computing course labs for the freshman class (E17) of the Faculty of Engineering, University of Peradeniya.
- 2018 Instructor at “computational thinking” session series for algorithmic programming competition enthusiasts of University of Peradeniya.
- 2018 Volunteer instructor for GP106 Computing course labs for (E16)
- 2018 “Gold chasers” Sri Lanka iPhO (International physics olympiad) team support program, Roract club, University of Moratuwa.
- 2017 Speaker at “Intro to competitive programming” webinar for IEEE Student branch University of Wollongong.
- 2017 Instructor at Weekly “Interactive coding sessions” for freshman class of University of Peradeniya.

### References

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