ATHUL VIJAYAN - PR Number: 22/ED/16/004

ED11B004, Department Of Engineering Design, IIT Madras

EDUCATION

Course/ Examination	Institute	Year	CGPA / %
5^{th} Year Dual Degree in Dept. of Engineering Design	IIT Madras	2011-present	6.95
All India Senior School Certificate Examination (AISSCE)	JNV Idukki, Kerala	2009	92
Central Board of Secondary Education (CBSE)	JNV Idukki, Kerala	2007	91

FIELDS OF INTEREST

- Product Design, Embedded circuit design, Algorithms and Programming, Internet of Things, Machine Learning and Data mining, Neuroscience.

PROFESSIONAL EXPERIENCE AND IP

- **Internship at National Instruments, Bangalore**: Research towards 5th Generation wireless communication.
  - **Zero Down Time Cognitive Radio**: A novel improvement to the classical concept of cognitive radio is formulated and implemented in RF hardware.
  - Developed a modular, user-friendly implementation of point to point wireless communication using **Software Defined Radio (SDR)** and LabVIEW.
  - **Published a *white paper*** - a well organized tutorial on wireless communication and signal processing.
- Designed improved drying mechanism for washing machines.
  - Made a proof of concept for an alternate drying mechanism in washing machines sponsored by **Whirpool, India** in which we improved drying rate by **two times**.
  - Super-absorbent polymers are used for improving drying mechanism in washing machines. Filed for **provisional patent through IC&SR, IIT Madras** under **Patent ID: 146/CHE/2015**.
- **Internship at Wiitronics**- A startup in IIT Madras Research park working on Internet of Things solutions.
  - Worked on a smart car parking solution. Developed mesh networked sensors to detect the presence of car and alert the cloud server.
  - Gained experience on XBee mesh networking, Raspberry Pi, Django, MySQL and Embedded circuit and PCB design

PROJECTS

- Final year project in **Pattern recognition models** under **Prof. Hema A Murthy, CSE IITM** in collaboration with **Sur's Lab of Neuroscience, MIT**.
  - Develops Statistical models for data from various experiments in Neuroscience conducted in **Mriganka Sur's lab, MIT**.
  - Formulates and implements efficient models for **Big Data sets**.
- **Smart Library Management Project** under *IC&SR Student innovation project*: An Internet of things project aimed at connecting each books in a library to internet.
  - RFID reader integrated into each book shelf tracks all the books in the shelf. With this system we can locate every book in a library in real-time.
- **Driver sleep alert system using EEG and head movements**: A novel wearable technology which reads the brain activity as EEG signals and head movements of driver to estimate fatigue level.
  - Used Bluetooth to send the sensor data to a computing device like smart phone for utilizing its computation potential.
  - The product is a stylish headband which will alert the driver in case of drowsy driving.
- **Differential drive Line follower robot**: Built a fast and smooth differential drive robot which detects contrasting lines in the floor and follow the line using a PID algorithm. The robot won third place in inter-hostel competition.

P.T.O

- **Handwriting recognition of Telugu characters**: Used Gaussian Mixture Models (GMM)and Hidden Markov Models (HMM) for online Handwriting recognition and compared the results.
- **Speaker Identification**: Used HMMs to form sequential models for speaker identification.
- **Spoken digit recognition**: Used HMMs for individual digit recognition from utterances.
- **Image classification**: Developed brain inspired algorithm for image classification.
    - Formulated and implemented a **brain inspired cascading algorithm** for image classification.
    - Performance of various feature extraction methods are compared using **GMMs, HMMs, SVM and Deep learning (CNN)**.

SKILLS

- **Programming**: C/ C++, Python, MATLAB, R, LabVIEW, MySQL, HTML, CSS, Django Web Framework, LaTeX.
- **Electrical**: Embedded Systems - Arduino, AVR Microcontrollers, PIC, Raspberry Pi.
  Wireless - Worked with Bluetooth, XBee, RF transciever, RFID.
  Electronics, Digital Circuit design, PCB Design in Cadsoft Eagle.
- **Designing and Modelling**: Adobe Photoshop, Adobe Illustrator, Autodesk Inventor.

CO-CURRICULAR ACTIVITIES

- Member of the team represented IIT Madras for **ABU Robocon 2013** - An International robotics competition.
    - Team IIT Madras was awarded '**Fastest Job Completing Robot**' in the national level for the event.
    - Worked in Electrical section of team. Specialized in circuit design,component selection, PCB Design.
- Created a **Content Management Website for blogging and data sharing** under `www.candyflip.in`. The blog topics include statistical analysis and Embedded systems.
- Participated in **Texas Instruments India Analog Design Contest 2014** with two other team members.
- Conducted a PCB Design workshop for enthusiasts in the Institute.
- Developed circuits and PCBs for teaching purposes with Prof.Natarajan (Dept.of Physics, IIT Madras).

RELEVANT COURSES

- **Product Design**: Functional and Conceptual Design, Human Factors in Design, Design for X, Product Design Lab.
- **Electrical**: Analog and Digital circuits, Application of Microprocessors, Basic Electrical Sciences, Mechatronics.
- **Computer science**: Multivariate data analysis, Pattern Recognition, Applied Time Series, Mathematical Statistics, Process Optimization, Speech Technology, Algorithms and Data Structures, Computational Neuroscience, Digital Image processing.

POSITIONS OF RESPONSIBILITY

- **Graphic Design Coordinator** for Shaastra 2013, annual technical festival of IIT Madras.
    - Shaped a sense of good designs and gained experience in print design and web/ UI design.
- **Technical Affairs secretary** of Ganga Hostel.
    - Ganga placed second in manual robotics and third in autonomous robotics in intra-hostel technical competitions under my leadership.
    - Conducted training sessions in various technical areas like Robotics, Embedded System, Web development, Linux etc. I have authored an AVR Programming Tutorial series for the same purpose.