

ALLEN JOSHEY

Address: #94, Himagiri Meadows, Bannerghatta Road, Gottigere, Bangalore- 83

Phone(s): +91 9740945754 | E-mail: allenjoshey1995@gmail.com

Education

Manipal Institute of Technology, Manipal
B.Tech Electronics and Communication

2014 - 2018

Experience

Sirena Technologies

Aug 2018 - Feb 2020

Responsible for developing robot firmware on a proprietary SoC (LS6 - Mediatek core), a platform running Linux(Android Kitkat). Took ownership of the flagship product - 'Nino', to develop, test and improve upon its walk algorithm. Worked with MatLab to test and model the system, used Python to carry out automation tasks to check real time results. Worked with STM32 MCU family to interface and acquire data from various sensors. Was also in charge of the cloud interaction between the bot and the AWS server.

Internships

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- **Sirena Technologies** **Jan-Jun 2018**
Internship and final year project at Sirena Technologies. Objective was to make a cost effective humanoid. Working mainly on an embedded level, successfully implemented a stable open loop walk based on a linear oscillator. Derived from the ground up, modelled its kinematics and dynamics involved.
 - **Ignitarium Technologies** **June 2017**
Performed SOC testing and verification activities on DesignStart ARMCortex M0 Design kit.
 - **Mirafra Technologies** **June-July 2016**
Designed a 16 bit ALU with single port RAM and presented to the board of directors.
 - **Rockforest Technologies** **May 2015**
As a hardware intern, was in charge of debugging faults in LED driver circuits.

Projects Undertaken

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- **NINO & NINO -V3:** Worked on the application layer on the proprietary SoC (Linux platform) and had to ensure its functioning from media activities, cloud connectivity to walking and other actions. Responsible for running the inverse and forward Kinematics algorithms including trajectory tracing responsible for the walk of the robot on board the SoC.
 - **Custom Wake Word Engine:** Was part of the team that ported the Higher level Keras implementation to C code. Experimented with different techniques such as fixed point implementations leading to more optimised results.
 - **Sirena Cloud:** Had to ensure that Multiple Bots could interact with the AWS server. Worked extensively on the Networking side (TCP/IP based communication) both on the cloud as well as on the Device side, successfully integrated Amazon Polly and Google Speech-to-Text.

- **Sireef (custom Servos):** Solely responsible for the research and implementation of a custom servo built from the ground up. Was in charge of the custom firmware deployed on an STM32F3xx series mcu in order to interface various peripherals such as the ADC, UART etc. Had to implement a control loop and thus a PID controller to maintain the angular position of the main shaft.
- **Custom LiDar :** Part of a two person team responsible for developing a crude mapping mechanism of a given environment. Was successful at making this viable on an embedded level thus following a serial protocol, based on half-duplex UART and had to solely develop the firmware required for this. A python script was later implemented in order to visualize the environment mapped (2D).
- **Half Duplex UART Bootloader:** Successfully implemented with guidance from a senior, a half duplex uart bootloader on the STM32 mcu family capable of dumping the bin file to the internal flash memory of the device.

College:

- **Final Year Thesis “Humanoid Robot” : Advisors - Dr Ujjwal Verma & Karthik Ram:**
Modelled the legs of the humanoid on MatLab by thus deriving the inverse kinematics responsible for the legs. Walk trajectory and Forward kinematics was first simulated on MatLab. A linear oscillator model was employed for the final walk. Communication to the robot was achieved wirelessly. The highlight of the project was that it's actuation was entirely made of lower cost RC servos that made it affordable . Was able to implement this entirely on an embedded level (running on an STM32F4 Discovery Board) and the job of emulating serial servos was also done.
- **‘S.W.A.R.M robotics Team’ Under IEEE Student Branch Manipal:**
Head (September 2015– December 2016) of Coding and Software Subsystem.
Team Leader (January 2017-January 2018)
Objective: To design an open source platform to implement swarm Behaviour.
Was in charge of implementing Software libraries on embedded C (AVR C) for the various features to be used on the Atmega328p. Firmware for the function of the bot including odometry, obstacle avoidance, basic correction of speed using PID and serial Communication.
- **Embedded system for the tracking of Commercial Vessels:** The aim of the project was to help small boats of fishermen lost at sea have a system that could help to track these boats. Worked on an STM32Nucleo board and interfaced a GPS and GSM module.
- **Gesture based unlocking system:** Implemented a gesture based unlocking system using OpenCV, wherein based on hand gestures an application could be unlocked. Convex hull was employed in order to achieve this.
- **Implementation of Scheduling on Traffic Lights:** Implemented a task scheduler to show it's working principle by mimicking tasks as Traffic lights and a higher priority task to be an emergency situation for Traffic to be able to go through.

Programming

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- Embedded C (STM32, AVR, HAL and CMSIS Drivers),
 - C (moderate), C++ (moderate)
 - Python (moderate)

Software Packages and Frameworks

- MatLab
- OpenCV
- Tensorflow(basics),Keras(basics),ScikitLearn(basics),Numpy
- Flask,AWS

Operating Systems

Linux-Ubuntu,Windows,Free_RTOS(basics)

Technical Skills

- Worked with and integrated various sensors and modules that require a good knowledge of communication protocols such as UART, I2C and SPI on kits such as Arduino, Raspberry Pi and PSoC.
- Good working Knowledge of FreeRtos and Os concepts.
- Good hands on experience with applied physics concepts,Kinematics and Dynamics.
- Knowledge of System modelling and Simulations.
- Good Working knowledge of Circuits and Electronics

Online Courses Undertaken

Deep Learning Specialisation - DeepLearning.AI (Coursera):

- 1)Neural Networks and Deep Learning -(audited)
- 2)Improving Deep Neural Networks-(audited)
- 3)Structuring Machine Learning Projects-(audited)
- 4)Convolutional Neural Networks -(audited)
- 5)Sequence Models -(audited)

AI for Medicine Specialisation - DeepLearning.AI (Coursera):

- 1)AI for Medical Diagnosis - (certified)

Extra-Curricular Activities

Sports – Football

Vice Captain for school football team (2009-2012)
SPT football Club (2012-2014)

Music – Keyboard

Trained for 4 years at Yamaha Music School Singapore.
Trained for 6 years under a home tutor.
Professionally trained for a cumulative amount of 10 year.

Jesus Youth - An Active participant and core team member of the Jesus Youth Movement.