

# Annim Banerjee

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Github Profile

Country: India

I help and develop Hardware and Software Startups and Established Tech Companies to build and bridge between hardware and software for their Products.

## WORK EXPERIENCE - 6 YEARS

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### **Fiverr, UpWork**

Kolkata, West Bengal, India

Job Title - Embedded Hardware Engineer : Fiverr Profile, UpWork Profile

February 2016 - Present

- **Air Quality Measurement - Kolkata: Jan, 2020:**

- \* Ambient Air Quality slave device with Solar Harvesting, Li-ion Battery Charger Power Section, PM 2.5, PM10, NO<sub>2</sub> and local redundant Relative Humidity, Temperature sensors.
- \* Device contains low power ARM Cortex M0 32 Bit Microcontroller.
- \* Firmware developed for the same with FreeRTOS in C Programming Language to have better power optimised performance and to send data via 4G-LTE Module to cloud server by making HTTP Post requests.
- \* Battery Management System(BMS) is also made for telemetry observation of battery's charging and other vital stats including Battery Fuel Gauge.

- **Bluetooth Low Energy SoS and Tracker Device - Kolkata: Dec, 2019:**

- \* A small tracking slave device which connects to master device over BLE RF Radio, nRF51822 SoC.
- \* Signal Strength or RSSI to be monitored by master device.
- \* Device is accompanied by 9 Axis IMU sensor and device is powered by Coin Cell Battery.
- \* Firmware developed over Nordic's SoftDevice pack along with SDk using Keil IDE and debugging the same over SWD line using JTAG debugger.
- \* All RF based Hardware design were designed keeping important Policies and Standards into account like FCC, CE and to ensure the hardware perform better in EMI and EMC stress environment.

- **Electric Stove Monitor and Control Suit - Xiamen, China: Dec, 2019:**

- \* 3 Slave and 1 Master Suit of Hardware based on BLE, Monitoring Human Motion Sensor, and environment of kitchen and controls the electric stove.
- \* This master device is connected to cloud via Wi-Fi SoC (FreeRTOS) and cloud is also developed over HMVC Codeigniter Framework, PHP with MongoDB, NoSQL. Better and Responsive UI Design is been given to Dashboard webpage.
- \* A Basic Monitoring and Control Android Application written over MVC framework developed with MQTT protocol for real time telemetry.
- \* Field Testing and executing Test plans to test hardware as Black Box Testing for RF Radio performance and testing range testing.

- **Cow Health and Vitals Monitoring Hardware Suit - Xiamen, China: Nov, 2019:**

- \* 1 Sensor Slave and 1 Master Suit of Hardware based on LoRa, Monitoring Basic Vitals of Cow.
- \* Slave Node is accompanied by 3 Axis Accelerometer and temperature sensor, powered by properly managed Li-Ion battery.
- \* Master gateway is based on ARM Cortex M0 microcontroller and collects analog based gas sensor data, which requires Analog Front End (AFE) for sensors to integrate with MCU which has 12 Bit ADC rated gpio input.

- \* This master device is connected to cloud via 4G module and cloud is also developed over MVC Codeigniter Framework with MySQL, JSON format preferred to exchange data between cloud REST End Point and hardware.
- \* Executed Field Tests and short test plans to check hardware as Black Box for RF Radio performance and testing range testing.

- **Compact Mobile Asset Tracking Device - UpWork: Jun, 2018:**

- \* 4 Layer PCB Layout, Compact Device for asset tracking application applied with SAT modem transmitter, 4G modem and an IMU Sensor, powered by battery.
- \* Peripherals mapped over UART, I2C and SPI(NAND Flash) communication protocols to MCU, running Firmware based on FreeRTOS(Real Time Operating System).

- **Camera based application - Kolkata: Oct, 2018:**

- \* Schematic Bring Up, 6 Layer HDI Printed Circuit Board Design with 5MP CMOS Camera Sensor connected to Allwinner Cortex A7 V3S 1GHz Image Processing dedicated Processor over Digital Video Port parallel(DVP) output interface.
- \* SD Card, Wi-Fi, Bluetooth Low Energy 4.0 mapped over USB 2.0 channel to the CPU Chip.
- \* Power distribution and management was done by AXP203 PMIC for power path path selection, battery charging and load distribution among DDR2 RAM, Core, Camera and other peripherals.
- \* Buildroot Linux OS ported for this custom target board, Board support Package and device drivers developed and added for IMU sensor, Camera CMOS Sensor.
- \* Assisting for PCB Fabrication where PCB Stack Up, Layer Planning and controlled impedance , trace length matching, power delivery copper trace thickness matters.

- **Linux Based Gateway Device - Fiverr: Nov, 2017:**

- \* Embedded Hardware System Design, 6 Layer High Density Interconnect PCB, Packed Device running ARM Cortex A5 core, 500MHz with MMU unit, LPDDR2 RAM, 8GB eMMC NAND Flash, Ethernet-RMII, USB2.0 with USB-C Type Port, BLE 5.0(NRF52) over UART, LoRa Transceiver over UART, GPS GLONASS module and a LTE Module over UART channel.
- \* Power Section and distribution design for the board which can intake DC and Battery power along with solar panel with certain limit in Watt.
- \* Buildroot Linux OS from direct source code found in repository so hosted on github, ported for this custom target board, board support package template, device drivers developed for LoRa and BLE peripheral.

- **Motion and Location Tracker - Fiverr: Jul, 2017:**

- \* 4 Layer PCB, compact Device running ESP32, Xtensa microprocessors, GPS GLONASS module connected to master via bluetooth.
- \* Master CPU firmware written on FreeRTOS port provided by community.

- **IoT Hardware Suit for Restaurant - Fiverr: Feb, 2016:**

- \* Connected hardware suit(Internet of Things) developed to improve efficiency of response team in any restaurant.
- \* HMI Capacitive Touch feature of ESP32 is been employed, connected to could via Wi-Fi. Cloud Web App and Android Watch application is also developed for this project.

- **SKW75 Mediatek Base board - Jan, 2016:**

- \* Multi layer PCB base board for SKW75 Mediatek Mini Router to power this module up, and USB Master Port.

- **Company - Thinqbot Technologies Private Limited - thinqbot.com**

Job Title - Lead Firmware Developer : Full Time

Bangalore, India

Jul 2015 - Feb 2016

- **Product Development:**

- \* Designing the new board Architecture or arrangement, setup of peripherals and subsystems before porting for a new Embedded Electronics Product given a good amount of experience to be an Product Architect.
- \* Developing Schematic, Porting hardware to BLE NRF51822 System On Chip product line of the existing electrical and electronics product which comprises of Sensors and Actuators with HMI Interface on hardware and Mobile Application for the company.
- \* Firmware written and debug based on Nordic's SDK and the application for the device written over the top of SoftDevice.
- \* Leading a small team of Firmware developers and also involve in Discussion and taking decisions which requires analytical skill, constructive problem solving attitude and also to manage and meet deadline of deliverable.

**• Company - Bewo Technologies Private Limited : bewotechno.com** Bangalore, India

Job Title - Firmware Developer : Full Time

Jun 2015 and Feb 2016

○ **Product Management:**

- \* Developing Firmware based on Requirements and Specification in C++ for New Peripherals addition on to the POS Device - Thermal Printer and Smart Chip Card Reader.
- \* Documentation of firmware and hardware using DOxygen and Latex respectively and managing the Git versioning repository.

**• Company - Baseapp Systems Private Limited — baseapp.com** New Delhi, India

Job Title - Embedded Hardware Developer : Full Time

Mar 2014 and May 2015

○ **Agile Work Environment:**

- \* Electronics hardware development and verification based on requirements and keeping communication and collaborating with clients directly.
- \* Developing Web App and managing Back End work for deployment of app and keeping it updated which are based on PHP, Python using CodeIgniter and Bottle, Flask and Django.
- \* Desktop Application Development in C for hardware products which requires such software.

**• Yuktix Technologies Private Limited**

Job Title - Internship : Full Time

Bangalore, India

Oct 2013 and Feb 2014

○ **Internship Job:**

- \* Learning and testing Communication Protocol like UART, I2C, SPI, RS232, RS485, Modbus, CANBus test runs, troubleshooting, making Design Documentation, presentation of the work of Hardware and Software.
- \* Learning and Preparing Draft of Mechanical designs of Enclosure of the Products on DesignSpark Mechanical CAD Software.
- \* Learning and Preparing Demos of Hardware Design, PCB Routing, circuits, schematic, SMT parts adn footprint based on IPC Standards with Eagle Cad, Altium Designer and DesignSpark PCB Freeware Software for prototype development, PoC. Running Design Rule Check(DRC), Inspecting and Verification of Gerbers and NC Drill file bundles before it goes for PCB Fabrication.

## PROGRAMMING SKILLS AND TOOLS

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**• Languages**

C, C++, C .NET, Python, Java, PHP.

**• Scripting**

Javascript, JQuery, CSS, Shell Scripting, SQL.

- **CAD Software And Design Tools**

Altium Designer, Solidworks, Eagle Cad, DesignSpark PCB, DesignSpark Mechanical.

- **Tools and IDEs**

Git Version Control or Source Control Tool, Digital Logic Analyzers, BLE Network Analyzer or Sniffer, Oscilloscope, Latex, DOxygen, Eclipse, System4Workbench, Keil, Visual Studio, Android Studio, Sublime

- **OS and Libraries Experience**

Windows, Linux, Mac, OpenGL.

- **App Development**

Native Android Mobile with MVC Design Pattern,  
Win32 Desktop Application, Web App Development,  
Linux Device Drivers Development.

## CERTIFICATIONS AND COURSES

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- **Advance HDI Design Course - 2016**

Altium Designer : Fedeval Academy.

- **Beginners PCB Design Course - 2014**

Altium Designer : Fedeval Academy

- **Application Testing Course with QSpiders - Aug 2013, Bangalore India**

Beginners Manual and Automation Testing

- **PTC Certified PRO-E WildFire 4.0 Course - 2007**

WildFire 4.0 : CAD Academy - Bhilai, CG, India

## EDUCATION

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- **Chhatrapati Shivaji Institute of Technology**

Bachelor Of Engineering in Computer Science

Jun. 2009 - Jun. 2013

Durg, Chhattisgarh, India

Engineering; CPI: 7.9

- **English Medium Senior Secondary**

Intermediate XII

Durg, Chhattisgarh, India

Mar, 2009

## COMMUNICATION SKILLS - LANGUAGES

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- **English**

Can Write and Read

Conversational

- **Hindi**

Can Write and Read

Fluent

- **Bengali**

Cannot Write and Read

Speaks Good