Arnab Bhattacharya

Technical Architect, Embedded Firmware, IoT, Robotics

📍 Kolkata, 700084, West Bengal, India

👤 Online Profile

🎂 22ⁿᵈ February 1990   ✉ arnabseacom@yahoo.com   📞 +91 9830787947

Design and implementation of innovative, smart, customized solution. Enthusiastic for learning new technologies to empower smart automation. Niche area includes embedded system, robotics, software development, Computer Vision.

WORK EXPERIENCE

Iskraemeco India Pvt. Ltd.   **(September 09, 2021 – Present)**
Technical Architect

Design and development of firmware architecture and application for Cellular IoT based solutions and metering application in the field of Advanced Metering Infrastructure (AMI).

Tata Steel Ltd.   **(September 30, 2019 – September 02, 2021)**
Senior Technologist, Instrumentation & Control, Automation

Working in the R&D sector with different architecture of embedded systems, IOT, instrumentation and machine vision for developing custom industrial automation-based solutions.

Danieli India Ltd.   **(December 03, 2018 – July 29, 2019)**
Senior Engineer

Level 1 (L1) automation for Steel Manufacturing Plants.

Wipro Limited   **(June 11, 2018 – November 23, 2018)**
Senior Project Engineer

Application development in Embedded systems project for Automotive applications.

Indian Centre for Space Physics
Junior Engineer   **(July 15, 2014 - June 08, 2018)**
Technical Assistant   **(July 04, 2012 – July 14, 2014)**

Development of instrumentation for space and near-space exploration. Embedded systems, programming, data analysis, robotics.

ACHIEVEMENTS

Awarded with University (Jadavpur University) Medal on annual convocation on 24/12/2014 for **standing first in order of merit** in M. Tech Intelligent Automation and Robotics.

CERTIFICATIONS

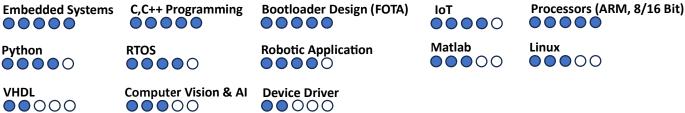**STM32Fx (ARM Cortex M) Custom Bootloader Development**
Udemy
🖼 https://www.udemy.com/certificate/UC-8f778534-06b8-4edb-be87-3e84c0c9eb20/

Mastering RTOS: Hands on FreeRTOS
Udemy
🖼 https://www.udemy.com/certificate/UC-085a66d4-d40e-4d45-8ada-5d9a45ad0b60/

SKILLS

Embedded Systems ●●●●●
C,C++ Programming ●●●●●
Bootloader Design (FOTA) ●●●●●
IoT ●●●●○
Processors (ARM, 8/16 Bit) ●●●●●

Python ●●●●○
RTOS ●●●●○
Robotic Application ●●●●○
Matlab ●●●○○
Linux ●●●○○

VHDL ●●○○○
Computer Vision & AI ●●●○○
Device Driver ●●○○○

PROJECTS

Custom Bootloader Design supporting Firmware Over The Air (FOTA) upgrade
Miniature, compact, low footprint custom bootloader for AMI. (Technologies: **Embedded C, 16 Bit MCU, FOTA, BareMetal**)

IoT solution for Advanced Metering Infrastructure (AMI) with Inter-RAT transfer management (4G fallback to 2G) with Firmware Over the Air (FOTA) and Configuration Over the Air (COTA)
Firmware application to take care of Cellular communication, network parameter monitoring, exception handling and retry mechanism to ensure communication between meter and Head End System (HES) for AMI. (Technologies: **RTOS, Embedded C, TCP/IP, FTP, ARM Cortex M, DLMS**)

Rhomboidity Measurement System of Steel Billets in Continuous Casting Machine
A Computer Vision (AI) based system to measure distortion (% rhomboidity) present in steel billets in CCM of steel manufacturing plant. The result is fed to a Level 2 database for dashboarding and further processing. (Technologies: **Linux, C++, OpenCV, Computer Vision, Camera**)

Computer Vision Based Torpedo Tracking System
Torpedo is a locomotive carrying molten steel (metal) in steel manufacturing plant. The locomotive has a serial number on it. Computer vision system installed at locations inside the plant identifies these locomotives using Optical Character recognition and logs them in a data base with time and location marking for monitoring. (Technologies: C++, **Linux, OpenCV, Computer Vision, Python, MQTT, TCP/IP**)

Auto Guided Vehicle (AGV) for Remote Operation in High-Risk Industrial Zones in Steel Manufacturing Plant
Auto Line Follower robot equipped with industrial bar / QR code scanner, RF links for optional remote control (2.4 GHz) by operator, FPV camera (5.8 GHz) and point-to-point communication (433 MHz) for transmitting scanned codes to operator's station. The Operator's station is equipped with ergonomic joystick, display unit etc. (Technologies: **Embedded C, ARM Cortex M, RC Controllers, Point-to-point RF Communication, Optical Sensors, Sensor Interfacing**)

Wireless Remote-Control Stop (C-Stop) for Locomotives at Marshalling Yard for Personnel Safety
A wireless remote control stop mechanism for locomotives (can be interfaced with other heavy machineries). The system comprises a master unit stationed inside the locomotive and two wireless handheld units for ground operators while engaging / disengaging loco rakes in marshalling yard. The ground operators can engage locomotive brakes (stop). from wireless handheld units. This imposes an interlock, and the loco pilot can't further operate until and unless the brake is disengaged from the same handheld unit. The master unit can communicate with cloud to store logs for monitoring. (Technologies: **Embedded C, RTOS, Point-to-Point RF Communication, MQTT, IoT, Linux**)

Wireless Dip-Lance for Measuring Temperature of Molten Steel in Steel manufacturing Plants
Dip-Lance, a thermocouple equipped device, is dipped in molten metal to measure temperature. The output of the thermocouple runs through a few meters long cable to reach the data acquisition and conversion device. The long wire could incur trip and fall hazard in a high-risk industrial zone. Wireless dip lance eliminates this hazard and the data acquisition device here is also capable to transmit data to cloud for further processing and monitoring. (Technologies: **Embededd C, PS2 Controller, Camera Interfacing, Robotic Vehicle**)

Pipeline Inspection Robot
Small Robot with 360° camera coverage, remote control, differential drive wheels with live view and recording facility for. The robot was used to monitor health of protective layer inside power plant's boiler's exhaust pipes. (Technologies: **Embedded C, PS2 Controller, Linux, C++, OpenCV, Camera Interfacing, Ethernet, Robotic Vehicle**)

Web Browser Automation Software to Automatically Download Data with Provided User Options
Python and Selenium based web browser automation using Mozilla Firefox and Gecko driver to download data from NASA's International Reference Ionosphere – IRI2012 model webpage. User options with a text-based configuration file. (Technologies: **Linux, C++, Python**)

Live Dashboarding of Dosimetry due to Solar X-Rays and Cosmic Rays at Different Altitude of Aviation Range over India
Matlab scripting for downloading solar activity information from GOES satellite's webpage and generating 2D and 3D graphical representations from data analysis using Monte-Carlo simulation using GEANT-4. Data dashboarding was done in webpage. (Technologies: **Linux, MATLAB**)

IMU Sensor Based Platform to Point at any Given Orientation (Azimuth & Altitude)
IMU sensor calibration (bias, hard iron & soft iron effects), calculation of Azimuth & Altitude using sensor infusion method, user input of orientation angles through keypad / GUI and maneuvering the platform using IMU sensor's feedback. The GUI displays animation corresponding to the platform's movement. (Technologies: **Linux, C++, IMU 9-DOF MEMS Sensor, Embedded C, Low Level Driver Development, MATLAB**)

Photosensor Based Sun Tracking Robot
Robotic platform tracking and pointing towards maximum intensity of light based on the photosensors' feedback. (Technologies: **Microcontroller Architecture, Embedded C, Robotics, DC Motor Interfacing and Control, MCU Timer for PWM Generation**)

Visualization of Sky from Recorder Data of IMU Sensor in High Altitude Meteorological Balloon Borne Payload for Scientific Experiments
Matlab program to plot the Sky view (starts) in Horizontal Coordinate System with a defined field of view based on calculated Euler's angles (Yaw, Pitch & Roll) from recorded raw data of IMU sensor on a High-Altitude balloon borne payload for scientific study. (Technologies: **Linux, C++, MATLAB**)

EDUCATION

Jadavpur University
M. Tech in Intelligent Automation and Robotics (E.T.C.E.)   Passing Year: 2014   Score: 9.53 out of 10

Seacom Engineering College (W.B.U.T. now MAKAUT)
B. Tech in Electronics and Communication Engineering   Passing Year: 2011   Score: 8.87 out of 10

Jadavpur N K Pal Adarsha Sikshayatan
Higher Secondary (10+2) (WBCHSE)   Passing Year: 2007   Score: 75.71%
Madhyamik Pariksha (10) (WBBSE)   Passing Year: 2005   Score: 82.25%

PUBLICATIONS

MEASUREMENT OF SECONDARY COSMIC RAY INTENSITY AT REGENER-PFOTZER HEIGHT USING LOW-COST WEATHER BALLOONS AND ITS CORRELATION WITH SOLAR ACTIVITY, R. Sarkar, S. K. Chakrabarti, P. S. Pal, D. Bhowmick & **A. Bhattacharya** in AdSpRes, 60, 991-998, DOI 10.1016/j.asr.2017.05.014, (2017)

STUDY OF HIGH ENERGY PHENOMENA FROM NEAR SPACE USING LOW-COST METEOROLOGICAL BALLOONS, S. K. Chakrabarti, R. Sarkar, D. Bhowmick & **A. Bhattacharya** in Exp Axtron, 43(3), 311-338, DOI 10.1007/s10686-017-9540-7, (2017)

UNIQUE HIGH ENERGY EXPERIMENT INITIATIVE BY ICSP WITH WEATHER BALLOONS, Sandip K. Chakrabarti, Debashsis Bhowmick, Ritabrata Sarkar, **Arnab Bhattacharya**, Susanta Middya, Proc. '22nd ESA Symposium on European Rocket and Balloon Programmes and Related Resarch', Tromso, Norway, 7-12 June 2015 (ESA SP-730, September 2015), pp 557-563

STUDY OF PROPERTIES OF COSMIC RAYS AND SOLAR X-RAY FLARES BY BALLOON BORNE EXPERIMENTS, S.K Chakrabarti ,D Bhowmick, S Chakraborty, S Palit, S K Mondal, **A Bhattacharya**, S Midya, and S Chakrabarti, Indian Journal of Physics April 2014, Volume 88, Issue-4, pp 333-341

A NEW PARADIGM IN SPACE BASED EXPERIMENTS USING RUBBER BALLOONS, S.K. Chakrabarti,D. Bhowmick,S. Palit,S. Chakraborty,S. Mondal,**A. Bhattacharya**, S. Middya, S. Chakrabarti, 2013, Proceedings of the 21st ESA Symposium on European Rocket and Balloon Programmes and Related Research, Thun Switzerland.

LANGUAGES

Bengali
Native Proficiency
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English
Professional Proficiency
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Hindi
Professional Proficiency
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INTERESTS

Photo Editing   **Programming**   **Listening Music**   **Reading Books**

Date: 13/12/2023
Place: Kolkata, West Bengal, India