Bhushan Venkatesh

Product Development Engineer

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CAREER OBJECTIVE

Product development Eng. with 5+ years of experience in designing and prototyping. Have broad experience in developing biomedical devices, robotics & automation systems, and MEMS devices. I am a strong conceptual thinker and a goal-driven product developer with the ability to align teams to achieve strategic business objectives in the field of research & development, project lifecycle management, topology & manufacturing optimization, and project leadership. Seeking a senior position as a Product Development Eng. or a Product Owner. Looking forward to a growth-oriented and challenging career, where I can contribute my knowledge and skills to the organization.

RESEARCH EXPERIENCE

Jan 2018 – Nov 2020 | Biomedical and Electronic (10^{-6}-10^{-9}) Engineering Systems Laboratory, Department of Electronic Systems Engineering, Indian Institute of Science, Bangalore
Project Investigator: Dr. Hardik J. Pandya, Assistant Professor

Research Assistant

- Supported Ph.D. scholars with research problems related to catheters, neural signal acquisition, & MEMS sensors integration and develop product-looking prototypes.
- Designed and developed multiple biomedical devices, involving MEMS devices & packaging, PCBs & flexible PCBs, Mechatronics systems, Microfluidics, PDMS Moulding, and characterization tool.
- Worked in class 1000 & class 10000 clean room, which follows GMP protocols. Handled and worked with basic wet and dry lab equipment.
- Collaborated with clinicians and researchers globally to develop cytology-based devices, point of care diagnostics devices, screening devices, and surgical tools.

Research Intern

- Designed and performed a feasibility study for a portable cytology-based cytocentrifuge smearing platform (Cytospin), in collaboration with Mazumdar Shaw Medical Foundation, Bangalore.

Teaching Assistantship

Jul 2019 – Dec 2019 | National Programme for Technology Enhanced Learning (NPTEL)

- "Op-AMP Practical Applications: Design, Simulation, and Implementation" by Dr. Hardik J. Pandya

Research Intern

June 2016–July 2016 | Product Lifecycle Management Lab, Centre for Product Design and Manufacturing, Indian Institute of Science, Bangalore
Project Investigator: Dr. B. Gurumoorthy, Professor

- Worked on Data collection and Ontology building in Stanford's PROTÉGÉ software for the manufacturing domain (Aircraft manufacturing).

PROFESSIONAL EXPERIENCE

Accelerated Life Test Systems Developer (Freelancing)

Dec 2020 – Present | DEKRA India, Pune

- DEKRA India is one of the Testing, Inspection & Certification (TIC) bodies in India.
- Provided multiple end-to-end solutions to their product testing lab.
- Catered systems compliant with ISO, BIS, EN, NEN, and Internal Standards.

IT Support & PFP Volunteer

Nov 2020 – Present | Partners For Patients, Switzerland

Product Development Engineer & Team Lead (Freelancing)

Feb 2021–Feb 2022 | ADAGRAD AI, Pune

- ADAGRAD works on AI solutions and edge computing devices.
- Developed an end-to-end solution constructing a custom carrier board compatible with NVIDIA Jetson modules.

Product Development Engineer & Team Lead

Jan 2020–June 2020 | Virtualis Services Private Limited, Mumbai

EDUCATION

Manipal Institute of Technology

India | Aug 2015 - June 2018

B. Tech in Mechatronics Engineering

Minor specialization in Robotics & Automation

GPA: 2.65/4.0

Acharya Polytechnic

India | Aug 2012 - June 2015

Diploma in Mechatronics Engineering

Percentage: 81%

RELEVANT SKILLS

GD&T as per ASME Y-14.5-2009 Design for Plastic & metal parts, DfAM, DFM/DFA, DFX, Material selection, Design based on (ISO, IEC, UL, EN, NEN) Standards, FEA simulations, Topology Optimization, Product Lifecycle Management, Mould design, PCB Design and Manufacturing, Biomedical Lab equipment handling, CNC (Milling and turning), Laser Cutting, 3D Printing, electronic components selection and soldering skills (including SMT components assembly and rework).

Certification

ISO 13485:2016

Medical devices - Quality Management Systems - Requirements for Regulatory Purposes

SOFTWARE

Mechanical

Solidworks, Catia, Autodesk Fusion, COMSOL Multi-Physics, CADEM seeNC

Electronics

Autodesk Eagle, Altium, EasyEDA, Multisim, Keil MDK

Rendering & Editing

Keyshot, Blender, Photoshop, Premiere Pro, Coral Draw

- Industrial collaboration between BEES Lab and Virtualis Services Private Limited resulted in filing two patents.
- Designed and developed Personal Auscultation Device for Medical Analysis (PADMA) and Point of Care Diagnostic Systems.

Industrial Trainee (New Product Development)

May 2017–Aug 2017 | Fracktal Works Private Limited, Bangalore

- Worked on RFID integrations with the Octoprint OS, worked on swappable nozzle head tool.
- Worked on the mechanical and electronic components assembly lines for deployments (Julia V2 and Julia Pro) series 3D printers. Designing and rendering 3D printer (Snowflake 3D printer).

Projects

- Advanced Morphology Unit for Realtime Analysis (AMURA)
  - Designed, developed, and validated a smart bright field microscope that can automatically scan, segment, and delineate between benign and malignant cells within 10mins.
  - Implemented a backlash compensation algorithm to achieve 550nm resolution movement for the automatic scanning stage.
  - The system achieved overall 90% accuracy with a substantial increase in the sensitivity for low stages of cancer (from 25% to 73%) when compared to manual cytology methods.
- Personal Auscultation Device for Medical Analysis (PADMA)
  - Designed, developed, and validated a smartphone-attached system that can sense auscultated signals, process the signal to digital form, and uploads the signals to the cloud.
  - Designed and simulated the acoustics horn that can house 4 acoustic sensors. Using beamforming we were able to differentiate between heart and lung sounds.
  - Worked on the PCB layout design, and SMT (assembly and rework).
- Multimodal Sensor Integrated Diagnostic Tool for Chronic Airway Management
  - Designed and developed a multimodal sensing catheter that can trace the velocity profiles and stiffness of trachea tissue during stenosis
  - Performed a feasibility study on flexible PCBs and trained Shape Memory Alloys (SMA) -Nitinol for the application and developed a prototype that houses temperature sensors, pressure sensors, and SMAs
- Minimally invasive Bioresorbable Devices for Anti-epileptic Drug Screening by Recording Electrocorticography (ECoG) Signals
  - Designed an ECoG signal acquisition system that can sense and transmit 32-channel signals from the rat's sensory cortex using a proprietary bioresorbable microelectrode array.
  - Worked with clinical collaborators to curate experimental protocols and designed electronic components which can communicate with the neuralynx data acquisition system
- MEMS-based force sensor characterization attachment for micromanipulator
  - Designed and developed attachments for Shutter Instruments Micromanipulator, by changing attachments we were able to perform characterization for inhouse developed force sensors

Programming Skills

C/C++, Embedded C, Python, Matlab

Robotics and Automation

ABB Robot Studio, Siemens SIMATIC PLC Control, FESTO FLUID SIM, Sherlock 7

Microsoft Office Suite

Hardware Expertise

Arduino, Raspberry Pi, NVIDIA Jetson, ATMEL controller, ARM Controllers, STM controllers, ESP Controllers, MSP Controllers

Awards

MIT Hacking Medicine- Grand Hack 2020: Winner under Customized Cancer Care track OncoTwin – A platform for screening and mapping the region of glioblastoma (a type of brain tumor) that has a high probability of recurrence, and relating the tumor with omics data, and EHR data to analyze the patient condition.

Extracurricular Roles

RoboManipal: Mechanical Subsystem member, designed various end-to-end robotic systems and competed in ABU Robocon 2016 & ABU Robocon 2017 problem statements

IISc Open Day 2019: Represented BEES Lab and exhibited project AMURA

Mentored and Organised:

Technical Mentor for Reimaginehealth Hackathon 2019, Arduino day 2016, Autocrades 2014 (Intra Department Technical event)

Sports:

Represented Karnataka in State and National Badminton Tournaments

Ranked: 1 (Doubles) in 3-star Men's National Badminton Tournament, Hyderabad 2014

Winner in College and Zonal Level Chess Tournaments

Publications & Conference Proceedings

- Electrical Field Stimulated Osteogenesis Modulation on PVDF/BT/MWCNT Based Electroactive Biomaterials. Bhaskar Nitu, Kachapilly Midhun C, **V Bhushan**, Hardik J. Pandya Bikramjit Basu, SSRN Elsevier Publishing
- An Intubation Catheter Integrated with Flow Sensors and Smart Actuators for Characterizing Airflow Patterns in Stenosed Trachea: An Objective Guide for CAO Management. B Alekya; V V S N Sitaramgupta; B S Arjun; **V Bhushan**; Abishek Kevin; Rao Sanjay; Kim Yeongjin; Hardik Pandya. Journal of Micromechanics and Microengineering, IOP Publishing, Reference Number - JMM-105222.R2
- Design and Fabrication of Bioresorbable Chips for Recording Electrocorticography Signals. Suman Chatterjee, Bhagaban Behera, **Bhushan V**, Mahesh Jayachandra, Hardik J. Pandya. 2nd World Congress on Biosensors and Bioelectronics, Singapore City, Singapore, November 27-28, 2019. (International Conference Presentation)

Patents

- **A Handheld Diagnostic Tool for Grading Stenosis in Paediatric Upper Airway (Granted)**
  Patent Number: WO2021260461
- **Personal Auscultation Device for Medical Analysis (PADMA)**
  Application Number: 202021016743
- **Point of Care Diagnostic Systems**
  Application Number: 202021020250