

Balakrishna Narra, M.E (Aerospace), FMAeSI

Passport Number: **Z7333015**

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Work Experience

Professional Summary & Achievements |

- Over 10 years of experience as a Software Developer specializing in Fortran programming
- Proficient in programming languages FORTRAN, C++, C#, MATLAB script
- Proficient in Windows, Linux, MS Office, and .NET framework, also working experience in CATIA & other CAE tools
- Strong ability to develop functional and non-functional use cases also developing test cases for the same
- Working in Agile environment, engaging with key stakeholders with effective communication/presentations
- Received prestigious “Extra miler” award from ABB in 2021
- Received prestigious “Team Excellence Award -2021” for UGM project in ABB
- Received “Trailblazers Spot Award” four times in a row
- Received “Infra-star” award in 2022 for optimum usage of Servers in Process Automation Energy Industries Lab
- Nominated for “Best Employee of the year” in 2016 at AETOS Design & Engineering Pvt. LTD

Technical Software Engineer | Licensing Technology for Manufacturing Urea |Stamicarbon |Sittard, Netherlands

Stamicarbon Work Summary |

April 2024 - Present

- Analyzed and understood an extensive distributed codebase comprising Fortran, VB.NET, VBA, and C++
- Lead the migration of the code repository from TFS to Git for improved version control and collaboration.
- Refactored and upgraded the application platform from 32-bit to 64-bit for enhanced performance and compatibility.
- Responsible to refactor legacy code to align with modern Fortran standards.
- Identify opportunities to enhance and modernize features to reduce engineering effort.
- Provide ongoing technical support to process control teams to ensure effective application usage.

Project | Tisflo | Fortran, C++,VBA

TISFLO is an advanced software application designed as a flowsheet solver, enabling process engineers to perform precise heat and mass balance calculations. TISFLO plays a pivotal role in streamlining process design and optimization of plant.

- Originally developed in the 1960s in Fortran as a console application, it was later enhanced to display output files through a GUI (Launchpad application).
- The application utilizes dynamic link libraries (DLLs) accessed by Excel VBA programs for additional functionality.
- Responsible for gaining a comprehensive understanding of the entire application to provide a holistic overview.
- Tasked with troubleshooting and resolving bugs, while migrating the application to a 64-bit platform for better performance.
- Responsible to refactor the legacy code in modern Fortran standards to eliminate outdated components

Project | Launchpad Application | VB.Net

Stamicarbon Launchpad is a GUI application designed to support TISFLO, assisting process engineers with post-processing data, modifying input files, and optimizing plant designs for specific mass balances.

- Developed in VB.NET on a 32-bit platform, it supports TISFLO and integrates with Excel files for seamless functionality.
- Responsible for understanding, maintaining, and enhancing the application based on evolving user requirements.
- Tasked with designing and building the GUI for preprocessing data, reducing the time process engineers spend preparing input text files

Project | Instrument Index and DHS | VBA

Instrument Index and DHS is an Excel-based application developed to assist process control engineers in reducing repetitive tasks

- The application is written in VBA, enhancing automation and efficiency.
- Responsible for maintaining and ensuring the smooth operation of the application.

Senior R&D Engineer | Process Automation, Energy Industries | ABB GISPL | Bengaluru, India

ABB Work Summary |

October 2017 – March 2024

With more than 6 years of my journey in the dynamic realm of research & development has been defined by a resolute focus on process automation in various sectors such as oil & gas, mining, and control systems. This journey has been marked by the exploration of innovative approaches to process automation. By conducting thorough feasibility studies, I've harnessed my analytical skills to conceptualize the detailed requirement and migrate existing legacy tools and infusing them with new features, I've played a pivotal role in modernizing tools that have found applications in critical sectors, enhancing efficiency and productivity. Even after migration I've worked with stake holders to streamline processes, reduce waste, and contributed to resource conservation. This approach reflects my commitment to efficiency in all endeavors

- Understand the existing legacy application/tool, fix the bugs and add features to enhance productivity also responsible to draw detailed requirement documentation of the application for easy migration
- Responsible to understand the core intentions of product development including business logics, debugging, identifying solution, validations & verification and risks & mitigations of architecture
- SPOC for documenting functional and nonfunctional technical requirement in detail, including requirements gathering from key stakeholders along with data flows, interfaces, integrations and security controls
- Post roll out of application, track the information of users, usage and keep the communication open to know what's going well and what's the challenges faced by the users and incorporate the feedback/updates accordingly

Project | Integrated Proposal Tool | Fortran, VB, C#, .net framework

At ABB we have different BU's working in mining industry. One such team based out of Sweden was using an outdated Fortran based legacy application to arrive at the equipment's required for the given project. This application was written in 90's with not much update or any maintenance as such. Sales engineers were preparing SOW manually, lacking standard procedures and also there wasn't any existing unified library where all the proposals can be placed. As an efficiency improvement team our responsibility was to migrate the existing calculation tool and add additional features like generating standard proposal document and store all the data centrally and not compromising the flexibility of the sales engineers

- Understand the existing legacy tool for Under Ground Mining Equipment sizing and Duty cycle calculation written in Fortran and fix the existing bugs and also add additional features to enhance the productivity
- Documentation of the friction hoist, duty cycle calculation program and mechanical dimensioning program of underground mining which is in Fortran and arrive at the physics, business logics involved in calculation
- Documentation of the proposal generation tool which is in Excel VB and arrive at the requirement and support the migration of tool to latest tech stack
- Develop flow charts, variable mappings and create functional test cases and use the same for validations
- Migrate the legacy calculation tool to C# libraries
- Also responsible for Integration testing, bug fixing, and enhancements issues as part of migration

Project | Brake temperature calculation tool | MATLAB

Brake temperature calculation tool is used to calculate the temperature in the hoist braking and help sales engineers to decide on the number of brake pads and friction coefficient to meet the operation eligibility. The improvements during the migration of the tool reduced the lead time.

- Understand and maintain existing legacy tool for brake temperature calculation written in MATLAB and fix the existing bugs and also add additional features to enhance the productivity.
- Develop flow charts, variable mappings, Integration testing, bug fixing, and improvements as part of new development along with creating a function test/use cases for the validation and testing

Project | PCDevice Library | ATL COM, VC++, VB

Process control device library is part of broad family of 800xA standard libraries, this reduces overall project engineering and testing time by providing pre-built configurable control modules, faceplates, graphic display elements, alarms lists and other special aspects for the standard device objects like valves, motors, and PID controllers, etc. found in most process industries.

- Originally this application was written in VB and as VB is absolute our first responsibility was to document the business logic, code flow, variable mapping
- Responsible to migrate the application to the C# .net platform
- Responsible to enhance application based on the customers' requirements

Project | SCADAventure | C#, VC++, CL, SQL, Polyhedra

SCADAventure is an application that provides a standard control methodology across the enterprise to automate workflows and optimize day to day operation, helping companies maximize uptime, safety, minimize capital and life cycle costs

- Understood the SCADA application standalone and its usage in the oil and gas industry
 - Maintain SCADAventure application by fixing the existing bugs and also add additional features in C#, .net and C++
 - Responsible for fixing backend bugs related to database in control language (CL)
 - Responsible to perform OSS scan of the complete code base and report the findings to the team
 - Responsible for new release quality assurance and testing activities
 - Work closely with product managers, site engineers, engineering projects teams to deploy & embed technology.
 - Responsible for documenting application functional and technical knowledge & sharing knowledge across the team
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Senior Application Engineer | AETOS Design & Engineering Pvt. Ltd | Bengaluru, India

Aetos provides Design & Engineering solutions in the field of Thermo-Fluid system simulation, CFD analysis, Design and Optimization of transmission systems and Turbo machinery |

July 2015 - September 2017

- Responsible for structural analysis with client specified tools
 - Additionally, responsible for technical positioning of software like CAMRADII, MASTA and Universal Mechanism
 - Case set up and Execute analysis for different configurations based on customer requirements.
 - Work closely with sales team and assist in product demonstration and quick turnaround with benchmark problems
 - Provide design and specification development support to clients
 - Resolve customer issues in a manner that is consistent with the company mission, values & financial objectives
 - Provide status of ongoing and future projects
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Project | CAMRADII, Techplot | Hindustan Aeronautics Limited & Aeronautical Development Establishment(ADE)

- Generate performance curves, loads, vibration, response, and stability derivatives of rotorcraft
 - Perform trim analysis of helicopter for various flight conditions like hover, forward, backward and sideward flight and matching the same with the test results
 - Perform flutter analysis to generate the stability derivative model, natural frequency and mode shapes of the rotorcraft for control inputs like step, ramp and impulse
 - Perform transient analysis to generate time history of the rotorcraft for the prescribed pilot inputs
 - Perform structural dynamic analysis and generate the frequencies and eigenvectors of the rotorcraft.
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Project | ANSYS WB, Hypermesh | Gas Turbine Research Establishment (GTRE)

- Generated the finite element mesh for the centrifugal pump components like impeller, casing and shaft
 - The assembly was imported to the ANSYS workbench and pressure loads from CFD analysis was mapped into the model and von-mises stresses were calculated for both burst pressure and proof pressure
 - Dynamic analysis was carried out on the complete assembly to identify modal characteristics
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Project | MASTA, CATIA V5, ANSYS WB | Gas Turbine Research Establishment(GTRE)

- Modeled complete bevel gear assembly of the auxiliary gear box of the aircraft engine
 - Performed static analysis to generate maximum deflection and maximum von-mises stress values
 - Performed failure analysis to check the durability and reliability of the complete assembly
 - Performed dynamic analysis to generate the contact stress, bending stress, contact pattern, modal characteristics, transmission errors and efficiency
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Project | MASTA | Leading component manufacturer

- Modelled hypoid gear set of the truck axle for the static and dynamic analysis.
 - Generated the contact pattern and stress distribution profiles on the gear set.
 - Performed NVH, durability and micro geometry analysis over the gear and identified critical areas.
 - Optimized the micro geometry of the gear set for strength and NVH
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Project | Universal Mechanism | Defence Research and Development Organization (DRDO)

- Dynamic analysis of independent suspension system and its effect on steering characteristics

- Multi body dynamics model of complete vehicle is assembled in Universal Mechanism and carried out analysis for ride comfort, vehicle handling and fatigue life of the components
- Calculated stress levels in the components and suggested the necessary changes

Project Assistant | Indian Institute of Science | Bengaluru, India

Development of Multi Physics, Dimension, Domain Solver | M3SOL |

September 2013 - June 2015

- Key member for development of new FE software applicable for Multiphysics and Multi-Domain Solutions
- Understood the core intentions of product development including debugging, identifying solution and further test it
- Determine the unique methodologies used in software development
- Timely updating of development progress to higher ups
- Organize detailed documentation for further product enhancement and productivity

Project | FORTRAN, MATLAB, ANSYS, NASTRAN, CATIA V5 | Pratt & Whitney (P&W)

- Developed 2D finite element code from scratch for linear static and dynamic analysis and validated the same with commercially available tools
- Developed 3D finite element for linear static & dynamic analysis & validated same with commercially available tools
- Also Developed 2D extended finite element methods for handling strong displacement discontinuity
- Detailed Monthly document preparation for technical review with client
- Involved in design, fabrication of Drop Weight Impact Testing Machine for low velocity tests on metals & composites
- Maintains professional and technical knowledge by attending educational workshops; reviewing professional publications; establishing personal networks; participating in professional societies

Project Trainee | Aeronautical Development Establishment | Bengaluru, India

Project curator/cataloger/Trainee Engineer | MS Office

February 2013 - June 2013

- Maintain an accurate and true daily log of project activities, experiences and evaluations
- Complete all project duties in a professional manner
- Maintain regular, substantive contact with project investigator
- Identify the goals and objectives of the project appropriate to the agency

Project | NASTRAN PATRAN AND MATLAB | Aeronautical Development Establishment (ADE)

- Fabricated the composite plate of the glass-fiber reinforced plastic by hand layup method and vacuum bagging process
- During fabrication foreign object was placed at the specified locations, later this laminate plate was cut into beams
- Studied of effect of presence of foreign object on static and dynamic properties of Glass-fiber reinforced plastic (GFRP) cantilever beams in NASTRAN and PATRAN
- Experiments was carried out to get the static and dynamic properties of the beams, the natural frequencies of the composite beams were identified by Impulse Response Technique.
- Personal computer sound card is used for data acquisition & analyzed data using Fast Fourier Transform in MATLAB
- Compared both experimental and analysis results

AMAE SI (B. Tech) Project | The Aeronautical Society of India

Design and optimization of the spar beam for a transport aircraft wing structure | AMAE SI

April 2014 - July 2014

- A typical aluminum material 2024-T3 is chosen for the design
- A finite element approach is used to calculate the stresses developed at each station for a given bending moment.
- Linear static analysis is carried out in NASTRAN to calculate stress distribution in the beam.
- In the no stress region, the beam is cut out and the material is taken out and optimized design
- The results from the conventional design approach and the optimized design are compared.
- Weight saving through the design optimization is calculated

Education

Examination	University	Institute	Year	CPI/%
Post-Graduation	Anna University	P M College of Engineering (PMCTech Group)	2023	8.43
Graduation	The Aeronautical Society of India	The Aeronautical Society of India	2013	60
Intermediate/+2	Indian School Certificate	Phoenix Public School, Belagavi	2005	80
Matriculation	Karnataka Secondary Education Examination Board	Maharshi High School, Mysuru	2003	73.28

Specialized Trainings

Stamicarbon | Professional Training | Netherlands

- Fortran for scientific computing
- Chemical Engineering for Scientist and other Engineers

ABB GISPL | Professional Training | Bengaluru, India

- Completed ABB Lean Six-Sigma Yellow belt
- Completed Cyber Security in software development lifecycle

Aetos Design & Engineering Pvt. Ltd | Professional Training | Bengaluru, India

- CAMRADII: - Aeromechanical analysis tool for Rotorcraft -By Dr. Wayne Johnson
- DYNAMICS R4: - Software for analysis and design of rotor systems of high complexity
- MASTA: - Gearbox and Driveline design, analysis and simulation tool
- UNIVERSAL MECHANISM: software to simulate kinematics and dynamics of mechanical systems

Extra-Curricular Activities

ABB GISPL | Digital Twin/PA Global Hack Summit 2018 | Simulation to Optimise the underground mining cycle

Hacksummit is an annual innovation program that encourages global R&D teams to submit their creative ideas. In one such instance, a groundbreaking concept revolving around digital twins was proposed during a department meeting for the Hack Summit event. The department enthusiastically embraced the idea and subsequently approved the initial budget for a pilot project. Over the course of nearly a month, dedicated efforts were invested in developing a Proof of Concept (POC) model. This POC model was then presented to stakeholders, garnering substantial interest and support. Unfortunately, progress towards full-scale productization had to be paused due to budgetary constraints.

Languages Known

English, Kannada, Telugu, Tamil, Hindi and Limited proficiency in Malayalam.

References

Raghuram, Phani – Phani-raghuram.atchutuni@siemens.com/phani.atchutuni.ext@siemens-energy.com
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