NINAD H. WATWE

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Born and brought up in Pune, Maharashtra and a passionate mechanical engineer with a master's degree in design engineering, has an enthusiastic persona, assimilates easily and flexibly in teams, an avid reader and a quizzer since school, a good public speaker and conversant in English, Marathi and Hindi with elementary training in German. Wish to work in product design and development, machine & system design, research and development

WORK EXPERIENCE

JULY 2016 – CURRENT

ASSISTANT MANAGER, SPECIAL PROJECTS MAHINDRA SUSTEN

Joined Mahindra Susten through campus placement as a Post-Graduate Engineering Trainee and worked on various assignments in developing solutions and products for the solar energy sector

- **Single Axis Solar Tracker:** Worked on development of Mahindra Single Axis Tracker in ideating and designing of various subassemblies and components for functionality, strength, cost, ease and error-free assembly on solar sites
- Modeled vibration response of tracker structure for forced excitation due to wind for sizing and selection of oil dampers along with IIT Bombay, to reduce vibration (ref annex)
- Developed experimental procedures for troubleshooting problems with tracker structure and conducted experiments using strain gauges on site for proposing rectification
- **Module Cleaning Robot:** Led the efforts in developing unique, integrated automatic cleaning apparatus for cleaning solar PV modules on MW scale installations
- Work involved following a 'design thinking' framework including individual stakeholder analysis, pain-point analysis and taking voice of customer

JULY 2013 – 2015

RESEARCH ASSISTANT, ENGINEERING DRAWING HALL, IIT BOMBAY

Joined IIT Bombay as a graduate student in fall semester of 2013 and began duties as Research Assistant (RA) of the drawing hall. The duties as RA were primarily administrative:

- Planning and resource allocation of a **team of 40 teaching assistants** for supervisory and academic details depending on individual schedules
- Managed **academic activities for over 500 students** every semester including test paper evaluation, 'office hours' for doubt clarification and supervision during lab sessions
- Handled lab expenses and oversaw massive upgradation in lab infrastructure including setting up of ~120 computers, 6 3D printers and their periodic maintenance
- Helped in introducing, for probably the first time in India, an advanced curriculum of 2D CAD, 3D CAD and introduction to 3D printing along with traditional paper based drawing

GRADUATE EDUCATION

JULY 2016

MASTER OF TECHNOLOGY, IIT BOMBAY

Graduated with a **CPI of 9.65 out of 10** from the Department of Mechanical Engineering, with a degree in Design Engineering with M.Tech dissertation titled "Design of Cable-Driven Robotic Device for Surgical Simulator Interface". Key courses studied include:

- Kinematics and dynamics of machines
- Computer aided simulation of machines
- Stress Analysis and Fracture Mechanics
- Finite element method
- Vibration engineering
- Wheeled and mobile robotics

JULY 2013

BACHELOR OF ENGINEERING, PVG'S COLLEGE OF ENGINEERING (UNI. OF PUNE)

Graduated with distinction scoring an aggregate of 70% marks and a graduated project titled "Design of Fixtures for Heller HMC for Pump Casing". Courses of interest:

- Computer oriented numerical methods
- Industrial automation
- Industrial fluid power
- Machine design and drawing

OTHER ACTIVITIES

JULY 2014-15

PUBLIC RELATIONS CORE TEAM, SARC, IIT BOMBAY

In charge of the Public Relations Portfolio of the 17-member core team of 100+ member Student Alumni Relations Cell at IIT Bombay, instituted for promoting alumni relations

- Responsible for writing and editing the Dean ACR's monthly alumni newsletter "The Knowledge Tree" sent to over 40,000 alumni updating them about their alma mater
- Represented the institute in the annual IIT Bombay Alumni Association Chapters Conclave held in Goa, successfully pitching for student involvement in the Global Business Forum

JULY 2009-13

TECHNICAL ACTIVITIES CELL HEAD, MESA, PVG'S COLLEGE OF ENGINEERING

An active member of the Mechanical Engineering Student's Association since the first year of engineering and rose through the ranks to become technical cell secretary by fourth year

- Led the technical cell of the 3-tier team of 25 students working towards organizing technical and non-technical events in inter and intra college events
- Oversaw all the technicalities including budgeting, monitoring and reviewing of running events and organizing new events, some of which had a footfall of more than 500 people

SKILLS

- Programming: Python, MATLAB, C
- CAD/CAE: Solidworks, Ansys, Adams, AutoCAD
- Prototyping: 3D printing, Arduino
- Engineering, design and development

NOTABLE

- Ranked in top 5 in the M.Tech batch in the Mechanical Engineering Department at IIT Bombay
- Trained in Poka-Yoke at Mahindra Institute of Quality, Nashik (MIQ)

ANNEXURE

MAJOR PROJECTS

LUMPED SPRING MASS DAMPER MODEL FOR SINGLE AXIS SOLAR TRACKER, SPECIAL PROJECTS, MAHINDRA SUSTEN

Devised an analysis method for sizing of oil dampers and its effects on prime-movers and the mounting structure along with IIT Bombay by mathematical modelling

- Initiated a damper sizing and suitability study analysis, based on field reports of galloping instability of single axis tracker due to wind
- Formulated a mathematical framework for sizing of oil dampers accounting for significant non-linearities, for reduction in tracker instability, along with IIT Bombay

DEVELOPMENT OF CABLE DRIVEN HAPTIC SURGICAL SIMULATOR,

ROBOTICS LAB, MECHANICAL ENGINEERING, IIT BOMBAY

Designed a machine to simulate a laparoscopic surgery that will give a haptic force feedback to a trainee surgeon

- Used cable driven parallel robotics based principles and manipulators for the mechanism
- Manufactured the designed setup and worked on the control strategy for controlling all the actuators in tandem, in a manner appropriate for training a surgeon for surgery
- Created and implemented a simplistic linear spring model for tissues for providing a haptic feedback to the user, so that the user feels like he is poking a tissue even though there is nothing actually present using a virtual environment that is displayed on screen

DEVELOPMENT OF MACHINING FIXTURES FOR PUMP MANUFACTURING,

PVG'S COLLEGE OF ENGG, UNIVERSITY OF PUNE

- Analyzed the requirements for fixturing of 63 pump models in a series, in various machining directions on Heller MCP-H 250 Horizontal Machining Centre for minimizing machining time, using AutoCAD
- Achieved complete fixturing with minimal fixtures (3 fixtures) using interchangeable clamping surfaces while taking care of the machine envelope, pallet changers and machining constraints

INVESTIGATION OF RESPONSE TO VIBROTACTILE STIMULI IN BRAIN COMPUTER INTERFACE, PSYCOPHYSIOLOGY LAB, IIT BOMBAY

- Designed experimental setup, protocol and conducted testing on human test subjects for investigating electroencephalographic response of the brain to vibro-tactile stimuli using EEGLAB in MATLAB
- Future work involves the possible use in BCI or integration in already available BCI for cognitive rehabilitation

MINOR PROJECTS

MATHEMATICAL MODELING OF GEAR BASED CYCLOID DRAWING MACHINE, HOBBY PROJECT INSPIRED BY YOUTUBE VIDEO

- Created a mathematical kinematic model for motion transmitting mechanisms comprising epicyclic gear trains, sliding and turning linkages to simulate machines
- Imported the generated mathematical model to generate beautiful patterns on graphs to simulate patterns generated in a cycloid drawing machine (viz. Joe Friedman's cycloid drawing machine)

IMPLEMENTATION OF SWARM ROBOTICS ALGORITHMS ON KILOBOTS, CONTROLS LAB, SYSTEMS & CONTROL DEPT, IIT BOMBAY

- Implemented communication and decision-making protocols in kilobot swarms leading to collective decision making in the swarm using AVR programming and simulations in V-Rep
- Experimented with swarms of 20 kilobots and algorithms can be extrapolated to swarms up to 255 kilobots for generating numerical consensus in the swarm

FINITE ELEMENT BASED MODAL ANALYSIS OF TAPERED BEAM WITH TEMPERATURE VARYING PROPERTIES, FEA COURSE, IIT BOMBAY

- Developed a MATLAB code for modal analysis of tapered beams with varying temperature along the beam, accounting for the varying material properties due to temperature difference
- Nonlinearities arising due to the interdependence of temperature field and thermal conductivity were solved by Newton-Raphson based iterative techniques and validated using ANSYS

VIBRATION CHARACTERIZATION AND MOTION SIMULATION OF LINEAR VIBRATORY TABLET FEEDER, ROBOTICS LAB, IIT BOMBAY

- Measured and characterized the vibration parameters of a vibratory linear tray used in pharmaceutical industry for filling tablets in bottles using accelerometers, working towards increasing the feed rate of the vibratory feeder
- Simulated the motion of a tablet on the feeder and analysed the motion for understanding the dynamics of the system, which would eventually help to increase the performance of the feeder

COMPUTER AIDED KINEMATIC AND DYNAMIC SIMULATION OF SEWING MACHINE, MACHINE SIMULATIONS COURSE, IIT BOMBAY

- Modelled and simulated the motion of feed dogs of a sewing machine in Adams MSC to understand critical relations of the geometry of the mechanism
- Analysed the kinematic and dynamic parameters of the important machine components

DESIGN OF EXPERIMENTAL SETUP FOR CRACK DETECTION IN PIPES,

MATERIALS LAB, IIT BOMBAY

- Designed a lateral deflection based experimental setup to detect the size and position of the crack in aluminium pipes based on theory proposed in a seminal paper by Prof. S K Maiti
- Performed experiments on the manufactured setup and validated the results using ANSYS