WORK EXPERIENCE AND SURVEY

Edelweiss Securities Limited | Trading Technology Team

SUMMER INTERNSHIP : Design interface for TCA Report *(May '18 - Jul '18)*

- Designed **UX** and **UI** for easy access to Transaction Cost Analysis (TCA) report to help traders get actionable insights to enhance **trading** related **execution quality**, compliance and management reporting capabilities
- Implemented **login authorization** and **dynamic forms** to query single day and multiple day TCA reports based on date, account ID, portfolio and instrument with **download** link to summary file on **Django framework**
- Created infrastructure for **logging errors**, warnings and regular django server info for future **debugging**

WINTER INTERNSHIP : Transaction Execution plot enhancements *(Dec '17)*

- Reviewed and reengineered the code base for plotting transaction execution **time series graphs** using Python
- Introduced features like embedding the **volume traded**, hover for more details and multiple colour schemes for different **trading algorithms** to help traders in comparing their performance with the market more efficiently

PV Module Field Survey in Leh *(Jun '19)*

The National Centre for Photovoltaic Research and Education, IIT Bombay

- Inspected solar plant installations and carried out survey on their performance degradation in Leh
- Surveyed **88 modules at 3 sites in Ladakh** and carried out module and string level **I-V characterization**, IR thermography for **hotspot** detection and visual imaging to capture **cracks** and physical damages of the cells
- Calculated average performance degradation rate of the modules per year to be **1.42%, 3.32% and 3.97%**

Teaching Assistant | Reliability and Failure Analysis *(Jun '19 - Nov'19)*

Instructor : Prof. Narendra Shiradkar, EE Dept. IIT Bombay

- Developing an online portal using interactive Python library **Bokeh & Jupyter notebooks** that would provide the students **personalized random failure data** of various distributions for their course project **(Virtual Lab)**
- Generated **artificial random data** of normal, weibull and lognormal **distributions** for modeling & simulation

RESEARCH AND COURSE PROJECTS

Data Driven Techniques to Predict Performance Loss in PV Plants | M.Tech Thesis

Guide : Prof. Narendra Shiradkar, EE Dept. IIT Bombay *(Jun'19 - Present)*

- Developing **data driven techniques** for predicting the degradation rates & future revenues of solar PV plants
- Building **predictive analytics** tools capable of handling **big data** for extracting the **performance degradation** rate (with confidence bounds) of solar PV plants from time series data of current-voltage(I-V) measurements.
- Implemented a **five parameter single diode model** for PV modules in Python that can predict the PV module power at **any irradiance and temperature** by extracting the parameters from the module datasheet
- Utilized Bokeh server to plot the I-V curve(with interactive sliders) by **numerically solving the diode equation**

Solar module Mounting Orientation and Axis Tracking effect *(Mar '19 - May '19)*

Course : Design and evaluation of PV power plants

- Determined the best possible orientation of solar panel for **maximum power output** in different regions.
- Performed parametric analysis on System Advisor Model software by varying **tilt and azimuthal angle** in northern, southern and equatorial **regions** as well as for summers and winter **season**.
- Concluded that **optimal tilt** angle is **latitude** angle and **optimal azimuth** is **180°** in north and **0°** in south
- Observed for equatorial regions optimal azimuth angle changed seasonally and **axis tracking** was effective

Image Compression using Wavelet Transform Algorithm *(Mar '19 - May '19)*
Course : VLSI Design Lab

- Implemented image compression using 4-taps, **2-D Daubechies** wavelet transform and **Huffman encoding**
- Synthesized the code on Quartus for Cyclone Altera FPGA using Nios II processor and SDRAM module
- Applied low pass and high pass filters (implemented using LUTs), followed by downsampling on 512 x 512 grayscale image to obtain LL, LH, HL and HH image components

Power Amplifier Design *(Mar '19 - May '19)*
Course : Solid State Microwave devices

- Simulated a 2 stage power amplifier with **matching & bias-T** circuits with unilateral design approach in ADS
- Designed, fabricated & tested the PCB using Vector Network Analyzer for **gain and bandwidth** specifications

Modelling Gesture Control *(Oct '18 - Nov '19)*
Course : Sensors in Instrumentation

- Modelled **3-D** Gesture Control using ADXL345 **Digital Accelerometer** interfaced with **Arduino** board
- Estimated inclination angle of board w.r.t. three axes with an **error of less than 5%** and plotted it in real time

IITB-RISC Microprocessor Design *(Oct '17 - Nov '17)*
Course : Microprocessors

- Designed **16-bit** microprocessor with 8 registers having **multi-cycle** point to point communication infrastructure
- Synthesized VHDL code by integrating the controller-FSM and data path on FPGA

Portable Solar cum Vibration Energy Harvesting Mobile Charger *(Oct '18 - Nov '18)*
Course : Electronic Design Lab

- Prototyped and tested working model of solar cum vibration charger with optimized size and efficiency
- Designed a suitable **AC-DC** converter and a **DC-DC Boost** converter for vibration and solar circuit output

Maze Solver *(May '16 - Jul '16)*
Summer School of Code, WnCC IIT Bombay

- Implemented command line **Image Processing** Project on Python platform assisted by OpenCV library
- Used thresholding, filters, **contour extraction**, and **thinning** to get a path from start to end.

POSITIONS OF RESPONSIBILITY

Campaigning Coordinator *('16)*
Abhuyday, Social Body IIT Bombay

- Led volunteer weekends at various schools for the underprivileged with a unified motive of **circulating general awareness**, **computer basics** and **career counselling**, with a team of 20-22 members
- Headed a **23 member** volunteer team to "Humara Bachpan" (National level initiative for child empowerment) in Bhajiwali slums, with a purpose of **realizing the harsh situations** of kids by spending some time with them
- Co-ordinated and volunteered ANTARCHAKSHU, St. Xaviers XRCVCs initiative with a motive to demand from the government and people **equal accessibility** to science education for **visually challenged people**

TECHNICAL SKILLS

Programming Languages	Python, C++, VHDL, Assembly
Tools & Libraries	MATLAB, R, Cadence Virtuoso, Quartus, Bokeh, Django, PVLib, Pandas, Numpy

RELEVANT COURSES UNDERTAKEN

- **Solar and Reliability**: Design and evaluation of PV Plants, Reliability and Failure Analysis of Electronic Devices
- **Analog VLSI** : CMOS Analog VLSI Design, Mixed Signal VLSI Design, RF Microelectronics Chip Design
- **Others**: Data Structure and Algorithms, Probability and Random Processes, Introduction to Quantum Mechanics

EXTRA CURRICULAR ACTIVITIES

- Bestowed with a **Black belt (1st Dan)** at an age of 12 in Shotokan Karate after regular training of **4 years** *('09)*
- Recieved **Gold medal in Badminton** inter hostel General Championship (among 11 teams) in IIT Bombay *('18)*
- Awarded **Silver medal for Street Play** "Mann ki Bhadas" in Freshmen cultural competitions, IIT Bombay *('15)*
- Pursuing 50 hours official **German language course** provided by International Relation Cell, IIT Bombay *('19)*