SUMIT BINNANI

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AREAS OF INTERESTS

Computer Vision and Image Processing, Machine Learning, Artificial Intelligence, Hardware-Software Co-design

EDUCATION

Jun '15 **Bachelor of Engineering (honors)**, *Electrical and Electronics Engineering* — **CGPA: 9.23 / 10**
Birla Institute of Technology and Science, Pilani (BITS Pilani), Pilani Campus

Feb '11 **Class XII: Higher Secondary School Certificate Examination** — **Aggregate: 92.67 %**
Maharashtra State Board of Secondary and Higher Secondary Education, Pune

Mar '09 **Class X: Secondary School Certificate Examination** — **Aggregate: 94.00 %**
Maharashtra State Board of Secondary and Higher Secondary Education, Pune

RELEVANT COURSEWORK: Image Processing, Pattern Recognition, Digital Signal Processing, Computer Architecture, Operating Systems, Digital Design, Control Systems, Matrices and Linear Algebra, Optimization, Differential Equations

SCHOLASTIC ACHIEVEMENTS

- Awarded **MITACS Globalink Research Scholarship** in 2014 to pursue 12-weeks of Research Internship in Canada
- Awarded **Merit/Merit-Cum-Need Scholarship**, by BITS Pilani, for being among top 2% across all the disciplines in BITS Pilani
- Selected for **INSPIRE Scholarship** offered by **Department of Science and Technology, Govt. of India** for being in top 1% among 130 thousand students who appeared for Class XII examination
- Secured **3rd Merit** in **Regional Math Olympiad**, Maharashtra Region, India in 2011
- Recipient of various awards and scholarships in examinations like **Maharashtra Talent Search Examination**, **All India Talent Search Examination**, etc.

INDUSTRIAL EXPERIENCE

Jun '15 – Present **Application Developer,** Oracle India Pvt. Ltd., Bangalore, India
Oracle is a global software company that primarily specializes in developing and marketing computer hardware systems and enterprise software product
- Working on identifying similar and duplicate records in database, and taking appropriate cleansing action
- Developing ***MVVC framework*** to reduce server load and display business reports dynamically

Jan '15 – Jun '15 **Intern,** Globallogic, Nagpur, India
Globalogic provides full-lifecycle development in areas like wireless products, medical devices, cloud computing, etc.
- Worked for one of the world's top companies providing premier medical technologies and services
- Developed ***image processing libraries*** for enhancement of ***biomedical imaging*** for ***Android Framework***
- Developed ***Chart API*** to create animated views for bar/area/line charts for ***Android Platform***

RESEARCH AND ACADEMIC EXPERIENCE

May '14 – Aug '14 **Mitacs Globalink Research Intern,** University of Manitoba, Winnipeg, Canada
Guide: *Prof. Zahra Moussavi, Head, Bio-medical Engineering Group, University of Manitoba*
- Worked on a ***head mounted tracking system*** for spatial capability assessment of *Alzheimer's* patients
- Developed a ***module*** to reconstruct ***3D World*** from output of *Simultaneous Localization and Mapping* (SLAM)
- Proposed, designed, and implemented a ***Collision Detection Module*** for the aforementioned ***3D World***
- Worked on verification of eye tracking hardware based on Electrooculography

May '13 – Jul '13 **Project Trainee,** Bhabha Atomic Research Centre, Mumbai, India
Guide: *Dr. A. P. Tiwari, Senior Scientist (SO-H+), B.A.R.C., Mumbai*
- Designed ***Real-time Reactor Control Simulator*** based on ***Point Kinetic Model*** of Nuclear Reactor
- Implemented vectorized 4th Order Runge-Kuttaa (RK-4) algorithm to solve 7th ordered differential equation
- Developed and designed logic circuit for ***Data Acquisition System*** to be used in the designed simulator

TEACHING EXPERIENCE

Aug '14 – Dec '14 **Professional Assistant,** Analog and Digital VLSI Design, BITS Pilani
Instructor-in-Charge: *Dr. Anu Gupta, HoD, Dept. of Electrical and Electronics Engineering, BITS Pilani*

Jan '14 – May '14 **Teaching Assistant,** Microprocessor – Interfacing and Programming, BITS Pilani
Instructor-in-Charge: *Mr. Pawan Sharma, Dept. of Electrical and Electronics Engineering, BITS Pilani*

CONFERENCES

[Under review: Submitted in Nov '15] S Binnani, "Using Biased Convolutional Neural Network for Pre-processing Image to Enhance Accuracy for Given OCR System", Springer International Conference on Computer Vision and Image Processing (CVIP-2016), Feb 27-31, 2014, Roorkee

S Binnani and H O Bansal, "Electronic Aid for Elder and Sick People: IR-Remote Controlled Switch Board for Changing State of Electrical Appliances", IEEE International Conference on Recent Advances and Innovations in Engineering (ICRAIE-2014), May 9-11, 2014, Jaipur

PROJECTS

Oct 15 – Present **Pupil Detection for Gaze Tracking** *(self-motivated)*
Developing module to ***track user's gaze*** using webcam. Implemented ***pupil capturing*** using eye centre localisation as proposed by Timm, F. and Barth, E. Developing ***SVM model*** to track user's gaze.

Oct 15 – Nov 15 **Image Denoising using Deep Learning and Artificial Neural Networks** *(self-motivated)*
For a given dataset of images of scanned text, that has seen better days, removed noise using ***Artificial Neural Networks***. Achieved ***decrease in error rate for OCR by about 60%*** as compared to unprocessed image.

Aug 15 – Oct 15 **Electronics Aid for Sick and Elder** *(add-on to previous project)*
Build an add-on to wireless switches module by developing ***Voice Control System*** to operate electrical appliances using Wit.ai (Natural Language Processing Platform developed by Facebook Research Group).

Aug 14 – Dec 15 **Histogram Equalization for Facial Features Extraction** *(Guide: Mr. Sanjay Singh, Sr. Scientist, CEERI)*
Implemented ***Contrast Limited Adaptive Histogram Equalization*** (CLAHE) as a pre-processing technique to enhance facial feature extraction. Implemented ***Bidirectional Weighted Median Filter*** to get rid of noises.

Aug 14 – Dec 14 **Finger Print Recognition using BLPOC Algorithm** *(Guide: Mr. Pramod Tanwar, Scientist, CEERI)*
Implemented a ***Band Limited Phase Only Correlation*** (BLPOC) Fingerprint Matching Algorithm for Fingerprint Recognition.

Nov 13 – Apr 14 **Finger Point Detection for Human Computer Interaction** *(Guide: Mr. Sanjay Singh, Sr. Scientist, CEERI)*
Developed a ***low-cost module for finger point detection*** using OpenCV library for Human Computer Interaction. The module could be used to perform click and point operations on Projector's Screen.

Dec 12 – Mar 13 **Electronics Aid for Sick and Elder** *(Guide: Dr. Hari Om Bansal, Associate Professor, BITS Pilani)*
Designed wireless switches ***costing less than a USD*** for operating electrical appliances using ***Infra-Red Remote Controller***.

EXTRACURRICULAR ACTIVITIES

- Held various position of responsibilities, like **Technical Team Lead** of **Society of Student Mess Services**, **Treasurer** and **Joint Secretary** of **Embryo Initiative**, **President** of **Maharashtra Mandal**, **On-Campus Publicity Co-ordinator** for **BITS Connect 2.0**, and **Co-ordinator** for **Founder's Day Committee**, during undergraduate studies at BITS Pilani
- Participated and contributed in various technical activities and events of **Electrical and Electronics Association**, **Computer Science Association** and **Remote Control Club**
- Contributed to a few Open Source projects like ***numpy***, ***scipy***, ***scikit-learn***, ***sckit-image***, ***pandas***, etc.
- Secured **1st Position** for traversing arena in shortest time, and overall **2nd Position** in **Track-o-mania**, a theme based line-following-robot making competition, in **APOGEE 2013**
- **Top 10 Finalist** for **Solar Water Heater from Waste** in **DHITI**, a social innovation competition, **APOGEE 2012**
- Recipient of various awards in **Elocution, Music, Arts,** and **Sports** competition

A FEW ONLINE COURSES AND CERTIFICATIONS

- **Machine Learning** by Prof. Andrew Ng, Stanford University, Coursera
- **Data Manipulation at Scale: Systems and Algorithms** by Bill Howe, University of Washington, Coursera
- **Practical Predictive Analytics: Models and Methods** by Bill Howe, University of Washington, Coursera
- **Algorithms: Design and Analysis, Part 1** by Tim Roughgarden, Stanford University, Coursera

SOFTWARE SKILLS

Languages: C, C++, Python, R, JAVA, Visual Basic, MATLAB, x86 Assembly Language, Verilog HDL
Simulation Tools: LTSpice, Cadence, ModelSim, LABVIEW, Simulink
Databases: MySQL, Oracle SQL
Others: PHP, Django, HTML, CSS, Javascript, Android SDK