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, Microprocessor – Programming and Interfacing, Control Systems

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