Curriculum

Shubham Kumar

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B. Tech. (H) – Electrical Engineering, Indian Institute of Technology, Bhubaneswar

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AREAS OF INTEREST

- Analog-Digital/Mixed Signal Circuit Designing and Simulation especially for IoT based systems.
- Automatic control systems with special focus on robust and optimal control mechanism
- Signal processing and communication systems
  - Image processing: character & pattern recognition system.
  - IoT based secure communication and networking.
  - Wearable gadgets functioning: signal acquisition, processing, transmission and communication.

ACADEMIC QUALIFICATION

Year	Degree/ Certificate	School/ Institution enrolled	Percentage/ CGPA obtained	Specialization
2009-2011	AISSE-CBSE (Class X)	St. Francis D' Assisi Senior Secondary School, Guwahati	CGPA 10	English Communication, Hindi, Mathematics, Science and Social Science
2011-2013	AISSCE-CBSE (Class XII)	S. B. O. A. Public School, Guwahati	80.6%	English Core, Physics, Chemistry, Mathematics, Computer Science and Physical Education
2014-2018	Bachelor of Technology (Honors) (4-years)	Indian Institute of Technology (IIT), Bhubaneswar	CGPA 7	Electrical Engineering

SCHOLASTIC AND NON-SCHOLASTIC ACHIEVEMENTS AND AWARDS

- Selected in **top 0.1% students** in the **JEE-Mains 2014** out of total **1.356 million candidates appeared** and in **top 1% students** in the **JEE-Advanced 2014** out of a total **0.119 million candidates appeared** in India.
- Among the **top-25 candidates** out of **0.2 million candidates appeared** in the State-level Engineering Entrance Exam: **Assam CEE 2014**.
- Selected for **INSPIRE Winter Science Camp 2010** in **Class IX** hosted by **IIT Guwahati for class IX, X toppers**.
- Secured **first rank** consistently for **2003-2011** (before dropping out in 2011) in the **Annual Art Examinations** conducted by **Art Training Centre**, Guwahati, Assam affiliated under **Bangiya Sangeet Parishad**, Kolkata, West Bengal.
- Awarded the prestigious **Ankan Bivakar (Master Artist)** by the **Bangiya Sangeet Parishad in 2009-10.**
- **Awarded First Prize** in the Creative Craft: **International Art & Craft Contest 2008- School Level** in **Class VIII.**

INTERNSHIPS/PROJECTS UNDERTAKEN IN IIT BHUBANESWAR

PROJECT: SCI-CALC **APRIL, 2013- JULY, 2017**

A CLI based general purpose complete scientific calculator programmed in C++ with lots of innovative and detailed features having over 4000+ lines of code. Status: Completed. Full details on demand. (Self-undertaken project)

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PROJECT: SR-DOMOTICA **MAY-JULY, 2016**

A Voice Controlled Home Automation system having connectivity using Bluetooth (less-distant communication) and GSM (much-distant communication) with an innovatively designed Android Application interface. Status: Completed. Full details on demand. (Project done under the guidance of **Assistant professor Dr. S. Manikandan, SES, IIT Bhubaneswar**, in group of 2 students, including me)

COURSE PROJECT: SOULEVA **JULY-SEPTEMBER, 2016**

A simple Sound Level Monitoring System, to detect any audio activity, gives information about frequency (Hz), Voltage amplitude (V), Loudness (in dB-A) in the LCD panel, and display the waveform shape in real-time on a GLCD panel using Arduino MEGA 2560. Status: Completed. Full details on demand. (Project done under the guidance of **Assistant Professor Dr. Barathram Ramkumar, SES, IIT Bhubaneswar**, in group of 3 students, including me)

COURSE PROJECT: IOT-BASED SENSORY DATA ANALYSIS **SEPTEMBER-NOVEMBER, 2016**

Made a simple IoT based Vibration and Temperature detection module; send the generated data to the computer using MCU ATMega328 PU via serial to USB connector, for sending the data on the Internet for displaying real-time signal variation and its data analysis. Status: Completed. Full details on demand. (Project done under the guidance of **Assistant Professor Dr. Barathram Ramkumar, SES, IIT Bhubaneswar**, in group of 6 students, including me)

PRODUCT DEVELOPMENT PROJECT: AIDE- A SMART GOGGLE **OCTOBER, 2016-JULY, 2017**

It is a wearable Smart Goggle System, it is an assistant (or helper), to perform simple tasks just by doing eye movements. It is aimed for those who are suffering from locomotor and/or speech disabilities, to provide them with an electronic assistant to ease off their day-to-day tasks. Status: Completed. Full details on demand. (Project undertaken for **TI, IIM Bangalore and DST collaborative India Innovation Challenge Design Contest 2016,** in group of 4 students, including me)

INTERNSHIP: ELECTRONIC & RADAR DEVELOPMENT ESTABLISHMENT (DRDO), BENGALURU **MAY-JULY, 2017**

We made an FMCW based RADAR model for Object's position and velocity detection in 2D along with building the Graphical User Interface (GUI) of the MATLAB App (My RADAR) & tested the corresponding algorithms in Simulink Environment. We tested the workability and authenticity in result's display and incorporate various parameters needed to successfully run the model.

MATLAB Toolboxes used in implementation of the system:

- Phased Array System Toolbox
- DSP System Toolbox
- Control System Toolbox
- RF Toolbox

Status: Completed. Full details on demand. (Project done under the guidance of **Scientist (Cat.: F) Paramananda Jena, Electronic & RADAR Development Establishment (DRDO)**, in a group of 2 students, including me)

B. TECH. (H) PROJECT: IOT-BASED AUTO-TRANSLATION OF GESTURE ANIMATION SYNTHESIS SYSTEM FOR BODY AREA NETWORK (BAN) **JULY, 2017-MAY, 2018**

The aim of the project is to make a Gesture Animation Synthesis System that utilizes hand gestures as input to control or interact with connected devices without physically touching them to enable a human to communicate with the machine which forms the basis for Human Machine Interaction (HMI) and interact naturally without taking aid of any mechanical devices. This device uses five Flex-Sensors that we use to quantify how much each finger is bent, a MPU-6050 (a three-axis accelerometer and gyroscope) is able to detect the orientation, translational and rotational movement of the hand, an Ultrasonic proximity sensor to detect distance from an object, a Pressure sensor to detect force applied while holding an object, a temperature sensor to monitor the temperature of human body and finally a pulse rate sensor to monitor the heartbeat of human body for each hand. Status: Completed.

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Full details on demand. (Project done under the guidance of **Prof. RV Raja Kumar, Director, IIT Bhubaneswar**.)

PROJECTS UNDERTAKEN IN KPIT TECHNOLOGIES LTD.

TELEMATICS K-VTS PROJECT: CUSTOMER- DICV **OCTOBER, 2018-SEPTEMBER, 2019**

- The KLOG Parser utility was coded in Python for testing, result logging and debugging of various KLOGs received on the serial terminal through RS232.
- I did modular design of CryptoManager API for AES 256 bit in CBC mode for encrypting & decrypting of data, HashManager API for hashing using SHA 256, and ProtectionManager API for protecting IP data in the KPIT under Middleware layer for K-VTS Next Gen Firmware in embedded C language for STM32L4 platform.
- I did an end-to-end PoC: code-flow design, coding, verification, testing, and firmware installation on the Quectel M66 GSM-GPRS Module mounted on the K-VTS Telematics Control Unit hardware for its Firmware upgrade as per the requirement.

DIAGNOSTICS & COMMUNICATION SYSTEM PROJECT: CUSTOMER- ZOOMCAR **OCTOBER, 2019-MARCH, 2020**

- I've extracted and identified CAN & ECU ID Data for Body Control Module related actuation from 8-9 passenger vehicles through reverse engineering methods and did a Local & Remote control of the module in IGN ON & OFF state as a part of PoC.
- I've understood at beginner's level about various vehicles application-layer protocols such as UDS ISO 14229 & OBD ISO 15031; vehicles data description protocols such as ODX ISO 22901-1 & OTX ISO 13209.

DIAGNOSTICS DEMONSTRATION: CUSTOMER- MAN TRUCKS **JANUARY-MARCH, 2020**

- Bug fixed on K-VTS Firmware that was specially designed for Perodua, reused and added new UDS ISO 14229 services and thoroughly tested the modified Firmware and released it as FOTA update for the K-VTS Telematics Control Unit installed in MAN Trucks in Indonesia. The demonstration was a success.

RELEVANT OTHER COURSES UNDERTAKEN TILL DATE

MATHWORKS MATLAB + RASPBERRY PI WORKSHOP (2016)

- Hosted by Mathworks (India-HQ Bangalore) Senior Hardware Engineering Division employee at IIT Bhubaneswar on Photo and Video Processing after Data acquisition (through Microsoft Kinect and RaspiCam for Raspberry Pi)
- Followed by a hands-on training on Simulink environment to develop models for the same.

NETWORK BULLS EDUCATING NETWORK with E-CELL, IIT BOMBAY (2015)

- Understanding fundamentals of Computer Networking (routing switching technologies along with IP addressing schemes, routing basics, switching, WAN technologies, Network Security fundamentals, Network Automation and Network Programmability basics) & creating networking models on Cisco Packet Tracer Software.

INDWELL AUTOMATION with DESIGN & INNOVATION CENTRE, IIT BHUBANESWAR (2017)

- PLC Training (Introduction, types, hardware and software, micro and modular PLCs, logic development tricks, Important instructions, Industrial programs and industrial automation devices)
- HMI Training (Introduction, hardware and software, operator panel and touch panel, HMI screen development, PLC interface, security level and P/W protection)
- SCADA Training (Introduction, different tag creation, drive configuration, tags configuration, screens development, device tagging and PLC communication)
- DRIVES Training (Introduction, parameter setting, multi speed, wiring, PLC interface)

KPIT ECODE-GENESIS TRAINING (2018)

- Intensive training on standard C, embedded C (ATmega series - AVR), C++, Java SE, Javascript + NodeJS, Python, Azure Cloud Computing.

TECHNICAL SKILLS

Programming Languages used in academics/corporate industry (in Windows OS 8.1 & 10):

Standard C •••••••••• C++ Language •••••••••• Java SE ••••••••••

Python 3 •••••••••• Embedded C (ARM)•••••••••• MATLAB ••••••••••

Application Software mostly used in academics/corporate industry (in Windows OS 8.1 & 10):

- **Academics** : MathWorks MATLAB + Simulink 2014, Cadence OrCAD + Allegro SPB 16.6, Dassault SolidWorks 2014, Atmel AVR Studio 7, Google Android Studio 2.1, Microsoft Visual Studio 2013, Microsoft SQL Server 2014, Eclipse IDE (for JAVA) 4.1, Microsoft Office + Visio + Project 2010 and COMSOL Multiphysics 4.3.
- **Corporate industry (KPIT):** STM32 System Workbench, STM32 ST Link Utility, STM32 CubeProgrammer, STM32 CubeMX, ST Visual Programmer, ST Visual Develop, Teraterm & MobaXTerm.

OTHER ACTIVITIES AND ACHIEVEMENTS

- ✓ **Former Associate Team Member** of our Institute annual Techno-Management fest: Wissenaire under the Web & Design Team as the Graphics Designer
- ✓ Key member of the Badminton Team and played badminton tournaments for the Institute.
- ✓ **Core Head** of Events Management Team of Institute's Alumni Cell.
- ✓ A **former core member** of the RISC (Robotics and Intelligent Systems Club) took part in many events organized in the Institute.
- ✓ Participates actively in online tutoring platform: EdX, Coursera and Udemy for courses on Electrical Engineering, standard C and C++ Programming etc.
- ✓ Maintains my own blog at Wordpress.com: www.meetshubhamkumarhere.wordpress.com
- ✓ Passionate **Graphics Designer** (especially interested at DTP) using software tools such as Adobe Photoshop, Adobe Illustrator, Adobe Fireworks, Adobe InDesign, Adobe InCopy and Adobe Acrobat Pro.