DISHANK BANSAL

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EDUCATION

Indian Institute of Technology (IIT) Kharagpur, India **Current CGPA: 8.26/10**
Bachelor of Technology in Manufacturing Science and Engineering 2015 - 2019
Third Year Undergraduate Student, Mechanical Department

Ram Krishna Vidya Mandir Gwalior, India **Aggregate 92.8%**
12th Grade, Central Board of Secondary Education 2013 - 2015

RESEARCH INTERESTS

Autonomous Robotics | Deep Learning | Computer Vision | Reinforcement Learning

RESEARCH AND PROJECT EXPERIENCE

Autonomous Ground Vehicle (AGV) Research Group *March 2016 - Present*
Computer Vision & Control Systems Researcher

Guide:- Prof. Debashish Chakravarty, IIT Kharagpur

- Devised solutions for Autonomous Vehicle Navigation challenges such as obstacle avoidance, road segmentation and traffic light detection using deep learning based models such as SegNet, YOLO, RCNN
- Developed the ROS based Autonomous Navigation module which included Perception, Localization and Control Systems, for an Autonomous Mobile Robot Eklavya 5.0 which participated in Intelligent Ground Vehicle Competition 2016 held at Oakland University, Michigan, USA
- Building a self-driving car for Mahindra Rise Driverless Car Challenge, our team was selected among top 13 teams out of the 600+ participants and subsequently awarded a Mahindra E2O: An Electric Car
- Working on implementation of Visual SLAM using monocular images, Sensor Integration and designing Control System for Mahindra E2O. Also integrated CAN bus interface of Mahindra E2O with control unit and sensors

Deep Visual Odometry *May 2017 - July 2017*
Guide:- Prof. Debdoot Sheet, IIT Kharagpur

- Carried out research to evolve a deep learning based Visual Odometry pipeline to find Ego-Motion of a robot using successive images from a monocular camera
- Established Model comprised of two parallel convolutional network in series with a recurrent network. Worked with specific models such as AlexNet, VGG-16 and LSTM

Handwritten to Digital Text Conversion *August 2016 - November 2016*

- Term Project for Machine Learning course (CS60050), scored 46 out of 50
- Developed an application which converts handwritten text to a digital document using deep learning and image processing and python based GUI
- Adaptive thresholding, Denoising and Histogram Analysis were executed on the handwritten text image to segment paragraphs into letters. Each letter is passed into deep neural network which classifies them into alphabets

SKALA: A semi-autonomous stair climbing mobile robot *January 2017 - March 2017*

- Won Gold at Inter-Hall Hardware Modelling Competition at IIT Kharagpur 2017
- Successfully built a large-scale robot to carry physically-challenged people up and down the stairs, also being able to move on floors with capability to autonomously navigate through the mapped rooms while avoiding obstacles

- Developed vision based autonomous navigation package having real time object-tracking and obstacle avoidance
- Came up with Embedded Design of the bot which included control of actuators, EEG signal based control, voice control and touch interface

Competitive Strength of ATM Service providers in California   *February 2017*

- Gold Winning Model to study Competitive Advantage of ATM firms.
- Web scrapping was done to extract age, population and employment data of each zip code from the census website.
- Population Profiling was performed for each zip-code using the extracted data to estimate Total Transactions and in turn Total revenue in zip codes.
- Clustering was used to calculate Market Share Score which was used to calculate revenue of each firm from Total revenue. Competitor Score was calculated for the firms utilizing Market Share Score.

Small Scale Robotics   *December 2015 - January 2016*

- Built a robot which counts human steps and follows the human movement and moves in multiple of steps. Interfaced magnetometer (HMC5883l) and gyrometer(MPU6050) with Arduino and a Wi-Fi module for communication of step and direction data.
- Designed a gesture controlled bot capable of lifting small objects using rack & pinion. Accelerometer and Gyrometer were used for gesture recognition and Arduino was used for controlling sensors and motors.

TECHNICAL SKILLS

Programming Languages:-	Python | C++ | C | Javascript | HTML | CSS
Deep Learning Frameworks:-	TensorFlow | Keras
Environments and Libraries:-	ROS (Robot Operating System) | OpenCV | OpenMVG | MATLAB | Git | SolidWorks | Atmel Studios
Processing Units:-	AVR (Arduino & ATmega) | Raspberry Pi
Communication Protocols:-	SPI | I2C | USART | Wi-Fi
Sensors And Actuators:-	3D LIDAR | Stereo Camera | BLDC Motor & Motor Controller | IMU | Encoder

RELEVANT COURSEWORK

University Undertaken:-	Machine Learning | Algorithms-I | Programming And Data Structures | Probability and Statistics | Electric Vehicles | Basic Electronics | Dynamics | Introduction To Flight Vehicle Controls | Kinematics Of Machine
Online:-	CS231n (Stanford University) | Introduction To Computer Vision (Coursera) | Reinforcement Learning by David Silver | Control of Mobile Robots (Coursera)

ACHIEVEMENTS

- Selected for **KVPY Fellowship Award** by Department of Science and Technology, India.   *2015*
  Securing All India Rank of 927 out of 50,000+ aspirants across India

- Won **Gold** in Inter Hall Hardware Modelling Competition 2017, IIT Kharagpur. See SKALA   *March 2017*

- Won **Gold** in Inter Hall Data Analytics Competition 2017, our model Analyzed the   *February 2017*
  Competitive Strengths of three ATM Providers in California

- Won **Silver** with 20+ teams participating at Open IIT Product Design Competition, IIT   *August 2015*
  Kharagpur. Designed a product which converts hand gestures of voice disabled person to corresponding voice output