Irfan Mohammad Al Hasib

Machine Learning Engineer

19 November 1993

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About me

I am a passionate engineer, always seeking to learn something new.

Skills

Deep Learning

Deep Neural Network
Convolutional Neural Network
Reinforcement Learning
Proficient in **TensorFlow & KERAS**
Familiar with **Basic PyTorch**
Proficient in **Python, Numpy, Pandas, Sklearn**

Machine Learning

Regression, SVM,Naive Bias, k-NN, Decision Tree, CART, Random Forest, AdaBoost, GBoosting, XGboost, Bagging, Boosting, Stacking, Ensemble, K Means Clustering etc.

Computer Vision

CNN : YOLO, SSD, U-Net, ResNet, Inception, R-CNN. CV : HOG, Haar, SURF, SIFT, ORB, Opt. Flow, Segmentation, Detection, Tracking etc.

Reinforcement Learning

Value Iteration, Policy Gradient, MDP, TD/MC Learning, DQN, DDPG, PPO, A2C, A3C etc.

Experience

Artificial Intelligence Engineer
Japan Infrastructure Waymark, Tokyo, Japan (August, 2021- Till Present)
www.jiw.co.jp

» Research and Development of **structural component and defect detection** system from drone video for severel top companies in Japan using SOTA AI models.
» Worked on **anomaly detection, visual change detection** on infrastructure from image data.
» Develop and maintain the **Machine Learning Pipeline** for production environment. Frequently work with **Python, AWS, CI/CD , Linux systems, Docker** etc.

Artificial Intelligence Engineer
Hiperdyne Corporation, Japan (July, 2019- August 2021)
www.hiperdyne.com

» Development of **AI based automation of an industrial process control system** with optimal control parameter estimation. *detail link*
» Product shipment optimization utilizing **AI based optimization techniques**. An AI driven tool for shipment planning for oil supplier company. *detail link*
» Development of **Deep Learning based system for Production KPI estimation**, from real time **sensor data** in a industry. *detail link*
» A system for **Production dynamics visualization using Machine Learning.** The system generated 2D/3D dimensional visual output from high dimensional data stream to assists a human operator at industry. *detail link*

Artificial Intelligence and Japanese Language Training
Hiperdyne Corporation, Japan (November, 2018- April, 2019)
www.hiperdyne.com

Jr. Research Engineer (Product development and Research Dept.)
Pi Labs Bangladesh Ltd. (August, 2017- September, 2018)
www.pilabsbd.com

» Security and Monitoring System Development **based on IOT** . Standalone sensor units were developed on **ESP8266 platform** for minimal power consumption. The system was monitored centrally with a **Raspberry Pi** based server. *detail link*
» Programmable Syringe Infusion Pump Development. It can be programmed by setting amount of fluid to be pushed in a certain time period. Platforms : **AVR micro controller**; **FreeRTOS** based sytem.*detail link*
» Box **tracking system** based on utilization of **GPRS signal** transmitted from the box at regular interval with location information. *detail link*
» Online weight measuring machine in supply shop.*detail link*

Achievements

2023 My work as main author - **"Boosting auxiliary task guidance: a probabilistic approach"** has been published in IAES International Journal of Artificial Intelligence, *Volume 12PDF*

2016 Participated along with my team, Interplaneter in University Rover challenge , 2016 at Utah, USA. Our team attained 5th position in Phobos final. I was in charge of **Robotic Manipulator Design and deployment**. The Competition is organized by Mars Society, USA annually for college students world wide. URC 2016 Result, video link YouTube

Machine Learning Project

2022 My Deep Learning and **Computer Vision Blogs** on FasterRCNN, YOLO, CNN Networks etc. https://irfanhasib0.github.io/blogs/

2020 Machine Learning Algorithms implementation from scratch **(ANN, SVM, Descision Tree, Logistic Regression, Naive Bias, kNN)** GitHub

2020 Implementation of **Deep Learning based Computer Vision Algorithms - YOLO-V1-3, UNet, Flow-Net(optical flow), Disparity estimator**. GitHub link

2020 Reinforcement Learning Algorithms from Scratch **(DQN, DDPG, A2C, PPO)** using Python and Tensorflow. GitHub link

Skills

Programming

Python : Advanced Level (3 year +)
C++ : Intermediate Level (1.5 year)
HTML, CSS, Java Script : Basic (Few Months)

Data Analysis:

Standard Data Preprocessing Pipeline, SMOTE, Correlation & Feature Importance Analysis, Confusion Matrix, AUC & ROC, Data Visualization Tools, VAE, PCA, t-SNE, SVD, FFT, Wavelet Transform etc.

Engineering Mathematics:

Linear Algebra, Vector & Matrix, Transformations, Eigen-decomposition, Differential Calculus, Engineering Mathematics

Probability and Statistics :

Data Distributions, Bayes Theorem, Entropy, Cross Entropy, KL-divergence, Information Gain , Relevant theorems of Probability, Statistics and Information Theory.

Embedded System & IoT

AVR Micro-controller (C++), Basic ARM
ESP 8266, Raspberry Pi (Python, C++)

Robotics:

IoT & Embedded System Design
Path Planning Algorithms
Robot Vision Algorithms
Robot Operating System **(ROS)**
Visual Odometry and SLAM

Development Platform

Linux : Intermediate Level (2 year +)
GitHub : Intermediate Level (3 year +)
DBMS (SQL) : Developing (1 year)
Docker : Developing (1 Year)
AWS : Developing (1 Year)
Web Development : Basic (Approx. 6 months)
Spark & Hadoop : Basic (Roughly a month)
Kubernetes : (Learning)

Data Structure and Algorithms

Data Structures and Sorting Algorithms
Graph and Tree based Algorithms
Recursion & Dynamic Programming

Design Software

Proteus for Circuit Design
SolidWorks for CAD Design
draw.io for Flow Chart
MS Word, MS Excel, MS Power Point

2019 **Kaggle Competition** : House Price Prediction using state of the art data preprocessing methods and hyperparameter tuning. GitHub link

Robotics Project

2019 Implementing optimal steering angle estimator from road co-ordinates using **Model Predictive Controller (MPC)** and Iterative Linear Quadratic Regulator (ILQR) algorithms from scratch. Tested the on AirSim environment and OpenAI car racing environment.GitHub link

2018 Designed a simple two link Robot using URDF and written driver codes for **ROS in Python**. YouTube link

2017 Built a programmable (G- code) **Desktop CNC Machine** using AVR Platform, for G-code parsing I have used an open source called GRBL. YouTube link

2014 Visually instructed **Robotic arm on AVR Platform**. I have build a simple object tracker using IR sensor array YouTube link 1 I also built a software platform that enables it to be controlled by Joy-Stick controller and added some real time computer vision based object tracking and localization based algorithm support with On-Screen Display. link 2

Education

2017 **B.Sc. in Mechanical Engineering**
Bangladesh University of Engineering and Technology (BUET)
CGPA: 3.23 out of 4.00

2011 **HSC (Science)**
Rajuk Uttara Model College, Uttara, Dhaka 1207
GPA: 5.00 out of 5.00

2009 **SSC (Science)**
Rajuk Uttara Model College, Uttara, Dhaka 1207
GPA: 5.00 out of 5.00

Language
English : Business level proficiency in English
Japanese : Passed NAT-N5

Publications

2016 Development of a two wheeled self balancing robot with speech recognition and navigation algorithm, Journal : AIP

2019 Integrating data mining and microsimulation modelling to reduce traffic congestion. Journal : Urban Science

Academic Project

2015 A Remote control Surveillance robot.The robot was able to pick up small objects from hole. It could also send temperature, pressure and video feed from an remote place using Bluetooth signal for surveillance support.(link)

2016 For undergrad thesis we developed a precision velocity measurement system. We used Kalman filtering for **Sensor Fusion** and combined **GPS (Ublox-NEO 6) and IMU Sensor(MPU6050)** data. (link)

Co-Curricular activities

2016 ***Founding President at BUET ROBOTICS SOCIETY (BRS) (page)***

2016 Co-organized Annual Robotics Competition for BRS