



## 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](http://www.jiw.co.jp)

» Research and Development of AI models for structural defect detection from drone video utilizing SOTA **R-CNN based Object Detection** algorithms for some of the top companies in Japan.

» Development and maintenance of **Machine Learning Pipeline** for production environment.

### Artificial Intelligence Engineer

**Hiperdyne Corporation, Japan** ( July, 2019- August 2021)  
[www.hiperdyne.com](http://www.hiperdyne.com)

» Development of **AI based automation of an industrial process control system**. An autonomous system for **Optimal Control Parameter (set point)** estimation from sensor values (process value) in **Oil Refinery**. [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](http://www.hiperdyne.com)

### Jr. Research Engineer (Product development and Research Dept.)

**Pi Labs Bangladesh Ltd.** ( August, 2017- September, 2018)  
[www.pilabsbd.com](http://www.pilabsbd.com)

» Security and Monitoring System Development **based on IOT** . Standalone sensors 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 Arm 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

2020

Machine Learning Algorithms implementation from Scratch (**ANN, SVM , Descision Tree, Logistic Regression, Naive Bias, k-NN**) using Python and Numpy. [GitHub link](#)

2020

I have implemented SOTA Algorithms of **Computer Vision & Deep Learning** - YOLO( object detection), U-Net(semantic segmentation), 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 coordinates 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](#) (ILQR Paper : Synthesis and Stabilization of Complex Behaviors through Online Trajectory Optimization.- by Tassa Et al.).

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 in 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

2021

Recent research work as **main author**, regarding **A Novel Auxiliary Task Guidance Method for Visual Odometry** has been accepted for being published in the journal **IAES International Journal of Artificial Intelligence**.

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