


# UMAR MASUD

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## Education

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### Jamia Millia Islamia

*Bachelor of Technology in Electronics and Communications (9.44/10 till 4<sup>th</sup> Sem)*

**August 2019 – Present**

*New Delhi*

### The Frank Anthony Public School

*Science Stream (98%, ICSE 12<sup>th</sup>)*

**April 2004 – March 2019**

*New Delhi*

## Relevant Coursework

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- Data Structures
- Database Management
- Computer Architecture
- Digital Signal Processing

## MOOC

- Machine Learning: From Basics to Advanced
- Python and Flask Framework

## Experience

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## RESEARCH

### Indian Institute of Science (IISc)

*Research Intern*

**January 2021 – Present**

- Associated with [VCL Lab](#), where I am working on Domain Adaption for Person Re-identification task.

### École normale supérieure - PSL

*Research collaborator*

**December 2021 – Present**

- Collaborating with Ethan Cohen (PhD student) for a project on Self/Semi Supervised learning for out-of-focus/noised images in phenotypic screening.

### IIIT-Allahabad

*Summer Research Intern*

**May 2021 – July 2021**

- Worked on the topic of "Automatic Detection of Image Splicing", under Prof. [Anupam Agarwal](#), in *Interactive Technologies and Multimedia Research (ITMR) Lab*.
- Did literature review and comparative analysis, implemented five baseline papers from scratch and ran various experiments/simulations, cross-evaluated the SOTA papers with different datasets and out-of-distribution training/testing environments. Concluded a study that the latest methods have an overestimated performance and are unsuitable for real-world applications. ([arXiv](#))

### Jamia Millia Islamia

*Undergraduate Researcher*

**April 2021 – Present**

- Working on a problem pertaining to "Facial Mask Detection and Positioning", under Prof. Sarfaraz Masood.
- Designing a research participation form and collecting a dataset from scratch for our purpose. Exploring various benchmark Facial Recognition datasets, literature review and analysis, applying latest Object Detection techniques on a novel synthetic dataset we developed by image stitching using homography matrix for our purpose.

## ENGINEERING

### Omdena Global

*Junior ML Engineer*

**September 2021 – November 2021**

- Collaborating in a team of 50+ ML engineers to develop a production-ready deep vision system that uses geospatial data to provide accurate rooftop solar PV analysis, including factors such as total roof-area, roof obstacles, shadows/solar potential, rooftop material, etc. This project is in association with Rebase Energy.

## OPEN SOURCE PARTICIPATION

- Successfully completed the Hacktoberfest'20.
- Contributed in Winter of Code, IIT Kharagpur (kWoC).

# Projects

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## MACHINE LEARNING

### Classical ML

- Reproduced 5 papers on the topic Image Forgery Detection that uses hand-crafted features for classification of pristine and tampered images.
- Diabetic Retinopathy Detection using Texture Features and Ensemble Learning (paper implementation). Achieved F1-score = 0.97 and accuracy = 97.2%
- Fog detection in images using GLCM based features and SVM (paper implementation). Got F1-score = 0.83 and test accuracy = 82.3%
- Phishing URL detection system based on URL features using SVM (paper implementation). Achieved F1-score = 0.99 and test accuracy = 99.2%

### OpenCV Projects

- *Air-Piano*, an air-based piano enabling the person to play through hand(fingertip) movements.
- *Air-Drum* System, an air-based drum beat generator.
- *Background Color Detection*, uses 2 techniques to detect a suitable background for the input image.

### Deep Learning

- Image Inpainting using a U-Net model with a fused ConvMixer encoder. ([Report](#))
- Different Descriptors for Squeeze and Excitation Attention Block - experimented with standard deviation, trace, largest singular value, and DC coefficient of DCT instead of usual GlobalAvgPool2d. ([Report](#))
- *Background Remover* tool for portrait images of humans, made using a U-Net model trained for semantic segmentation of the image. The model achieved 0.981 IOU-score on test data. Also deployed on a web-app.
- Implemented the paper - Medical image denoising using Convolutional Denoising Autoencoders(CAE). Achieved a loss = 0.106 or Structural Similarity Index(SSIM) = 0.894 .
- Image similarity measure through Siamese network on fashion apparels. Got an evaluation accuracy of 94.2%
- Plant Pathology Challenge, a FGVC8 workshop challenge at CVPR-2021 for multi-label classification of plant leaf diseases. Got 87.34% accuracy with a pre-trained model as feature extractor.

## WEB DEVELOPMENT

- *Banking System*, contains a simple banking system that enables to transact between the customers. It uses HTML, CSS, bootstrap, PHP, and MySQL, with the local server provided by the XAMPP.
- As a part of the InnerveSOC competition, designed a complete website template for Innerve Tech-Fest 2020, IGDTUW. **I was the adjudged winner.**

## Miscellaneous

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### SKILLS

**Languages:** Python, Java, HTML/CSS, JavaScript, PHP

**Libraries:** NumPy, Pandas, Matplotlib, Sklearn, OpenCV, Keras, TensorFlow, PyTorch, Flask

**Database:** MySQL, PostgreSQL

**Interpersonal:** Communication, Public Speaking, Critical Thinking, Team Leadership, Team Management.

### POSITIONS OF RESPONSIBILITY

**ML/AI Dev** - Google Developer Student Club, JMI

**Youth Ambassador** - HundrED Global Organisation

### AWARDS AND HONORS

**Workshop on AI for Computational Social Systems(ACSS) 2021:** 3rd place in Student Paper Competition.

**5th Summer School of AI 2021 - IIIT Hyderabad:** One amongst 500 participants worldwide.

**INSPIRE Science Award For Top 1%:** Scholarship for Higher Studies by Govt. of India.

**Mr. Harbinder Singh Dugal Rolling Trophy:** Awarded for Proficiency in Science ISC-XII.

**Mr. G W Mayer's Merit Scholarship:** Awarded for excellence in Mathematics and Science.

**Shanker Sumeda Rolling Trophy:** Awarded for Excellence in Academics.