

# AMNA AHMED ELMUSTAFA

## Interested in ML Research for Social Good

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📍 CA, USA

in /amna-elmustafa-20ab8b11a/

🔗 <https://github.com/AMNAALMGLY>

## EDUCATION

### Predoc Research Fellowship

#### Stanford King Center

📅 CA, USA

📍 2022 - Present

- **Supervisors:** Stefano Ermon, David Lobell, Soledad Prillaman
- working on research projects at the intersection of Machine Learning and Global Development

### African Master of Machine Intelligence (AMMI)

#### AIMS Senegal, Facebook, and Google

📅 2021 - 2022

📍 Mbour, Senegal

- **Graduated** with Distinction
- **Relevant Modules:** Foundations of ML/DL, Computer Vision, NLP, Optimization, Geometric DL, RL.

### B.Sc Electrical and Electronics Engineering

#### Khartoum University

📅 09/2013- 10/2018

📍 Khartoum, Sudan

- **Graduated** with Distinction
- **Relevant Modules:** Linear Algebra, Statistics and Probability, Data Structures.

## PUBLICATIONS

### Understanding Economic Development in Rural Africa Using Satellite Imagery

#### ACM digital library

📅 2022

📍 ACM SIGSPATIAL 2022

- **Authors:** Amna Elmustafa, Erik Rozi, Yutong He, Genghen Mai, Stefano Ermon, David Lobell, Marshal Burke
- improve the performance and debias deep models used to measure sustainability measures in rural areas using attention mechanism and buildings info.

### A study in human locomotor activity recognition in rehabilitation devices

#### IEEE Xplore library

📅 2019

📍 ICCCEEE19 Conference

- **Authors:** Amna Abdallah, Rawan Saifeldin
- **Investigates** possible ML tools that maximize off-line accuracy and prediction time of locomotor activity recognition in rehabilitation devices.

## SELECTED PROJECTS

### Detecting Harvest Piles in Ethiopia

Predoc research project

- using satellite images to segment harvest piles as a more accurate estimate for crop lands in Ethiopia

### Diffusion models with Masked AutoEncoders

Predoc research project

- developing a general framework for discriminative and generative models using MAE as backbones for Diffusion models

### Monitoring biodiversity using Remote Sensing

MILA Internship project

- using satellite images to detect species(birds) inhabiting different geographic places around the world, taking into consideration the distribution shift in different species in different places.

### PhantoMedicus: A data simulator to benchmark Clinical Decision Support Networks

EPFL Internship project

- uses Bayesian networks and Decision Trees to simulate and generate patient-level consultation data

### Hyper Parameters Optimization with RL

Master's coursework

- Built an Environment for learning best NN hyperparameters for regression/classification tasks using policy gradient.

### Improving transparency and democratizing access to public sector contracts using NLP

Omdena Internship

- Using council meeting minutes, agendas, and data from RFP posting sites to train a model to recognize upcoming business opportunities before the RFP is posted.

### Cassava images dataset classification

Master's coursework

- Achieved 91% in classifying cassava plants as belonging to one of 4 various disease classes or healthy using Resnet50 architecture.

### Object tracking in video frames

Master's coursework

- Instance segmentation and object tracking performed on video frames using the detectron2 library and Mask RCNN model.

### Tabular data prediction using SAINT model architecture

Paper re-implementation

- SAINT model performs attention over both rows and columns. It also uses contrastive self-supervised pre-training.
- In a team, I implemented the model architecture and conducted experiments on different datasets.

## Work and Teaching Experience

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### Research Intern

#### Mila-Quebec AI Institute

📅 2022 📍 Remote

Advisor: Prof.David Rolnick

### Teacher Assistant

#### AMMI

📅 2022 📍 Senegal

Foundations of ML and DL tutor

### Research Intern

#### EPFL-ML and Optimization Lab

📅 2022 📍 Remote

Advisor: Annie Mary Hartly

### Junior ML Engineer

#### Omdena

📅 2021 📍 Remote

Used NLP tools to predict business opportunities

### Software Engineer

#### Techno-Tec for IT solutions and services

📅 2020 📍 Sudan

Leader of back-end systems team

### Application Engineer

#### MT for Industrial Supplies and Services

📅 2019 📍 Sudan

designed automation solutions for oil industry

### Teacher Assistant

#### Khartoum University

📅 2019 📍 Sudan

Co-Instructor of Java Lab.

## SKILLS

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- **ML and DeepLearning Frameworks:** Numpy, Pandas, Scikit-Learn, Pytorch, Detectron, Pytorch3d, Spacy, Nltk.
- **Programming:** Python, Matlab, Java.
- **Version Control:** GIT.
- **Research:** Technical writing,  $\LaTeX$ , critical thinking.

## ACHIEVEMENTS AND ACTIVITIES

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- One out of two current Sudanese grad students came straight from Sudan to grad school at Stanford with a full scholarship.
- Acceptance at Google AI residency program 2022.
- DAAD full scholarship award.
- AMMI Master Scholarship (6% acceptance rate), sponsored by Facebook and Google.
- Top 5% performing students in undergrad in terms of GPA.
- Women In Machine Learning (**WiMLDS**), **IEEE** and **Black in AI** Volunteer.
- Sudanese Statistical Society (**SSS**) member.