

# KUNLE SUNDAY OGUNTOYE

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## EDUCATION

### Iowa State University (ISU), Ames, IA

- Doctor of Philosophy (minor in Computer Science 3.92/4.0) May 2024–2026
- Masters of Science (Intelligent Infrastructure Engineering) Jan. 2022–May 2024  
(awarded Dec 21, 2025)

### University of Ibadan, Nigeria

- Bachelor of Science, Civil Engineering – 6.5/7.0 Jun. 2014–Jul. 2019

## INTERESTS

Quantitative Research | Data Science | Machine Learning | Computer Vision | Infrastructure Monitoring | Engineering

## CERTIFICATIONS

- AWS Certified Machine Learning- Specialty September 2023
- Coursera – Machine Learning by Stanford online March 2023
- Coursera – Generative AI with Large Language Model (LLM) August 2023
- Udacity nano degree – Computer Vision March 2023
- FAA remote pilot license January 2023

## WORK EXPERIENCE

### Iowa State University (ISU), Ames, IA

#### Graduate Research Assistant

January 2022–present

- **Machine Learning and Deep Learning:**
  1. Finetuned DistilBERT model for domain adaptation in pavement engineering
  2. Trained LSTM models for predicting future pavement performance conditions
  3. Performed explorative data and statistical analysis on extracted pavement big data
  4. Trained computer vision models (Yolo, Segformer models) for the detection of pavement cracks and other distresses – object detection and segmentation
  5. Trained computer vision algorithms, including Yolov5, Faster R-CNN, and SSD, for localizing aboveground utility assets in drone images
- **Geographical Information System (GIS) and UAV:**
  6. Utilized ArcGIS Pro software for the development of airfield pavement ground common points maps [\[tutorial video\]](#)
  7. Developed Python codes for customized ArcGIS Tool Box capable of automatic detection and approximation of distresses such as corrugation and rutting from the input depth map. [\[codes\]](#)
  8. Collaborative contribution and championing of remote pilot-related tasks during drone field data collection
  9. Completed a two-day federal emergency management agency course on the use of drones and big data analytics for emergency response
- **Software Engineering:**
  10. Developed a web application for utility mapping using NextJS/ReactJS and Django Rest Framework. [\(Youtube demo\)](#)
- **Others**
  11. Completed a two-day training on the distress monitoring and inspection rating of pavement by Aptech
  12. Presented and won awards at the annual departmental poster presentations
  13. Assisted in a senior-level class on the use of MATLAB for data and signal processing as an unofficial TA

### Musco Sport Lighting, Urbandale, IA

#### Machine Learning Engineer Intern (Computer Vision)

May 2023–Aug 2023

- Built an end-to-end Machine Learning Operations pipeline, improving overall deep learning tracking and GPU usage by 15%.
- Developed a smarter and cost-effective data labeling workflow on AWS SageMaker Ground Truth, boosting data labeling efficiency by 10%.
- Developed a Python script for video stitching operations, enabling faster stitching operations by 20 % overall.
- Built an automated ETL pipeline for data images, ensuring seamless data transformation and timely filtering of image label data.
- Developed end-to-end machine learning model development on AWS using S3 and SageMaker built-in algorithm.
- Labeled and trained image data using the Yolo algorithm for object detection tasks.

#### Graduate Project Manager

Feb. 2021 – Dec. 2021

Seflam SGI, Lagos – an EPC company that offers construction and project management services to Oil and Gas companies.

- Championed the modeling of all mechanical and safety equipment in Nigeria Liquefied and Natural Gas facility using point cloud data and Cyclone.

- Worked actively in project management team by contributing immensely to tracking, monitoring, organizing, and proffering workable solutions to project-related problems.
- Represented and exhibited for the company at the 2021 National Oil and Gas conference.
- Trained new employees and interns on the use of in-house software.
- Modeled and structurally designed offshore structures using SACS software.

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#### SKILLS: [Github: <https://github.com/Kunle-xy>]

- Continuous Integration and Continuous Deployment (CI/CD): Git/Github Actions
- Programming language: Python, JavaScript, and C++
- Extraction, Transformation, and Loading (ETL) for big data: AWS (Glue, Athena, Kinesis, Data Pipeline, Aurora, Elastic Map Reduce), Apache Spark, SQL
- Machine Learning Models (NLP and Computer Vision): PCA, Naive Bayes, time series, XGBoost, causal inference, transformers, YoloV5, OpenCV, PyTorch, TensorFlow, AWS (Deep AR, SageMaker, Lex, Polly, etc.).
- Data Science and Business Intelligence: pandas, Plotly, Tableau, Power bi, Monte Carlo simulation, statistical testing.
- MLOps and software stacks: WandB, Mlflow, cometML, docker, PostgreSQL, AWS Dynamo DB, Lambda, Agile development, Azure, Linux, Flask, Django, CSS, HTML, Kubernetes, NextJS, Express and React.

**Other non-technical skills:** team player, PowerPoint presentation, problem-solving, leadership, teaching.

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#### PUBLICATIONS: [Google Scholar page](#)

##### Journals:

- Kimara, E., **K. S. Oguntoye**, and J. Sun. 2025. "PersonaAI: Leveraging Retrieval-Augmented Generation and Personalized Context for AI-Driven Digital Avatars." arXiv.
- Oguntoye, K. S.**, Halil, C., Sunghwan, K., All Sourav Md A., Gulmezoglu B., Mo, Y. "Maintenance Record-Enriched Machine Learning Model for Pavement International Roughness Index Prediction." (**under review**- International Journal of Pavement Engineering)
- Oguntoye, K. S.**, S. Laflamme, R. Sturgill, and D. J. Eisenmann. 2023. "Review of Artificial Intelligence Applications for Virtual Sensing of Underground Utilities." *Sensors*, 23 (9): 4367. Multidisciplinary Digital Publishing Institute. <https://doi.org/10.3390/s23094367>.
- Oguntoye, K. S.**, S. Laflamme, R. Sturgill, D. A. Salazar Martinez, D. J. Eisenmann, and A. Kimber. 2024. "Probabilistic Method to Fuse Artificial Intelligence-Generated Underground Utility Mapping." *Sensors*, 24 (11): 3559. MDPI.

##### Conferences:

- Oguntoye, K.S.** Ceylan H., Kim S., Sourav M.D., Gulmezoglu B., and Yunjeong M. "Automatic pavement maintenance predictions using language and machine learning models." ASCE International Conference of Transportation and Development (ICTD) 2025 proceedings
- Oguntoye, K.S.** Sourav M.D., Mitra R., Jenkins A., Ceylan H., Kim S., Gulmezoglu B., and Yunjeong M. Brooks C.N. " Low-Altitude sUAS Flights for Remote Sensing of Submillimeter Hairline Cracks: A Case Study." ASCE International Conference of Transportation and Development (ICTD) 2025 proceedings

##### Technical report:

- Oguntoye, K.S.** Sourav M.D., Mitra R., Jenkins A., Ceylan H., Kim S., Gulmezoglu B., and Yunjeong M. Brooks C.N. "Demonstrating the Use of Small Uncrewed Aircraft Systems (Drones) Capabilities and Data for Iowa Transportation and Infrastructure Work: Pilot Project No. 1 - Use of small Uncrewed Aircraft Systems for Hairline Crack Detection on Bridge Deck"

##### Master's degree Thesis:

- Oguntoye, K. S.** 2024. "A practical framework for automatic underground utility mapping." Master's Thesis. Iowa State University.

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#### PROJECTS (Freelance and class project)

- Investigated the benefits of Deep Kernel Gaussian Processes - [Paper](#)
- Leveraged Retrieval-Augmented Generation and large language model through Replicate to develop a web application that logs daily user data and creatively makes generations based on users writing style and logged preferences - [Paper](#) | [Code](#)
- Developed a Monte Carlo Tree Search algorithm for a draughts game to varying levels of difficulty in Java - [Code](#)
- Developed admissible heuristics and implemented A\* algorithm to arrive at a goal state for 8 puzzle problems - [Code](#)
- Led a team of four to victory in a hackathon competition with AI-driven solutions (YOLOv5 for detecting maize diseases) for sustainable agriculture. Built the full-stack web application using React for the front-end and Django/PostgreSQL for the back-end. - [Code](#)
- Image and sound processing class projects using Matlab, OpenCV, Fourier Transform, and Python - [Code](#)
- Probabilistic model of events using Hidden Markov Model (class project) - [Code](#)
- Developed a Retrieval-Augment Generation (RAG) application that seamlessly queries PDF documents for knowledge extractions using Langchain, Weaviate, and Streamlit - [Code](#) | [Presentation](#)
- HumanlyAI: Developed a web application that addresses ChatGPT's lack of references to initial generations on similar prompts (still under construction) using React and Vite. - [Code](#)
- # add BIM paper
- Trained Long Short-Term Memory (LSTM) model in predicting future highway pavement performance index using historical data
- Product Recommender System: Developed using AWS Personalize, boosting customer retention by 25%.

**LEADERSHIP AND SERVICE EXPERIENCE**

<b>ISU Graduate and Professional Student Senator</b>	<b>2024-2025</b>
<ul style="list-style-type: none"><li>• Collaborated with fellow senators in institutionalizing new laws and resolutions for the good of the graduate students' community</li><li>• Served as an award review committee member</li></ul>	
<b>Academic Paper Reviewer</b>	
• Transportation Research Board	<b>2024</b>
• ASCE International Conference of Transportation and Development (ICTD)	<b>2025</b>
• Journal of Transportation Engineering: Part B, Pavements	<b>2025</b>
<b>Data Science Club, Vice President</b>	<b>September 2022–August 2023</b>
<ul style="list-style-type: none"><li>• Organized training events for club members on different data science modules.</li></ul>	
<b>Hult prize competition (Global), The University of Ibadan, Head of Logistics</b>	<b>2018</b>
<ul style="list-style-type: none"><li>• At the time, I organized the university's largest entrepreneurial competition.</li><li>• I acquired the necessary funds from sponsors by presenting the club's visions and goals.</li></ul>	

**REFERENCES**

Available upon request	
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