JIZTOM KAVALAKKATT FRANCIS

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PROFESSIONAL SUMMARY

Innovative digital agriculture researcher with over 3 years of experience in machine vision and machine learning, specializing in enhancing data handling and predictive modeling. Proficient in MATLAB, Python, and SQL, I've developed advanced image-based algorithms that improved crop residue analysis accuracy and streamlined data visualization tools for better decision-making. My recent work on a deep learning methodology for sensor data regression achieved an impressive R^2 of 0.861, showcasing my ability to deliver impactful results in agri-tech.

EDUCATION

Iowa State University **May 2025**
PhD, Computer Engineering *GPA: 3.82*

Iowa State University **August 2017 - December 2019**
Master's, Computer Engineering *GPA: 3.92*

Anna University **August 2013 - May 2017**
Bachelor's, Electrical Engineering *GPA: 7.6*

PROFESSIONAL EXPERIENCE

Iowa State University **Ames, IA, USA**
Digital Ag Graduate RA–Machine Vision/Machine Learning *January 2020 - Present*

- Enhanced open-world detection capabilities by utilizing advanced image processing techniques and machine learning algorithms, layering data on images for improved machine learning applications.
- Improved data handling efficiency by 30% by designing and implementing SQL Server data loaders and preprocessing pipelines.
- Increased accuracy of image-based predictions by 25% by refining and optimizing machine learning algorithms for agri-tech applications.
- Enhanced field accuracy in insect detection by pioneering novel sound-based detection techniques.
- Boosted user engagement and decision-making by 40% by streamlining and optimizing data visualization tools for agricultural data.

3M **Remote**
Data Science and Engineering Intern *May 2023 - August 2023*

- Enhanced airflow sensor testing efficiency by 15% in the Dewey Duct Project by designing and implementing advanced testing protocols.
- Increased accuracy of wound imagery modeling by contributing to the integration and refinement of U-Net based data pipeline techniques.
- Improved real-time data visualization capabilities by developing the Wanda Vision Platform, a sensor data visualization tool.
- Fostered innovation and effective project ideation by facilitating cross-functional team collaborations and brainstorming sessions.
- Delivered impactful results through innovative solutions by engaging in cross-functional team collaboration and idea generation.

Iowa State University **Ames, IA, USA**
Engineer Designer II/ Engineer I *January 2020 - December 2020*

- Improved crop loss predictions by applying MATLAB for in-depth satellite imagery analysis.
- Enhanced data analytics and backup efficiency by scripting automated SQL operations, leading to streamlined data analytics.
- Boosted file system flexibility in research by pioneering VM products compatible with ext4 file systems.
- Engineered GPS tagging and third-party integration for digital agriculture solutions.
- Increased efficiency in documentation and image capture by developing a custom Android app.

Iowa State University **Ames, IA, USA**
Graduate Research Assistant – Digital Ag *January 2019 - December 2019*

- Improved data accuracy by 30% in precision agriculture by engineering advanced vision systems and implementing them using MATLAB and LabVIEW.

- Enhanced data logger functionality by pioneering Linux-based development techniques, leading to more robust data collection systems.
- Refined object sensing capabilities across diverse terrains by spearheading tailored solutions for complex environments.
- Advanced machinery data logging systems by pioneering innovative designs, increasing operational efficiency in data collection.
- Implemented vision systems and mapping tools for precision agriculture, developed using MATLAB and LabVIEW to enhance operational accuracy.

GE Appliances **Lafayette, GA, USA**
Fall 2018 AME Co-Op *August 2018 - December 2018*
- Enhanced inventory management accuracy by 20% by creating and implementing a robust embedded inventory control label system.
- Increased product quality consistency by 15% by fine-tuning test sequences for optimal quality assurance.
- Improved quality control efficiency by 25% by ensuring quality in new product builds through meticulous testing.
- Reduced defect rates by 30% by analyzing and improving camera testing systems for critical quality control.

Heilbronn University **Heilbronn, BW, Germany**
Senior Design Project Intern *February 2017 - March 2017*
- Enhanced compliance and interoperability by pioneering a display driver compliant with ISO15118 for car charging stations using Python and C++.
- Improved team productivity and project outcomes by leading a team to develop backend drivers for a 4th Gen Car Charging Station project.
- Expanded cultural understanding and collaboration skills by engaging in a cultural and language exchange program across universities.
- Enhanced software development capabilities by applying Python, EBGuide, and C++ in the software development process.

RESEARCH

Deep Learning and Pattern-based Methodology for Multivariable Sensor Data Regression **Nassau, NW, The Bahamas**
IEEE - ICMLA 2023 *December 2023 - December 2023*
- We propose a deep learning methodology for multivariable regression based on pattern recognition that triggers fast learning over sensor data
- We used a conversion of sensors-to-image, which enables us to take advantage of Computer Vision architectures and training processes
- In addition to this data preparation methodology, we explore using state-of-the-art architectures to generate regression outputs to predict agricultural crop continuous yield information
- Finally, we compare with some top models reported in MLCAS2021
- We found that using a straightforward training process, we were able to accomplish an MAE of 4.394, RMSE of 5.945, and R2 of 0.861.

Multivariate Temporal Regression at Scale: A Three-Pillar Framework Combining ML, XAI and NLP **Paris, France**
IEEE - ICECET 2025 *July 2025 - July 2025*
- This paper introduces a novel framework that accelerates the discovery of actionable relationships in high-dimensional temporal data by integrating machine learning (ML), explainable AI (XAI), and natural language processing (NLP) to enhance data quality and streamline workflows
- Traditional methods often fail to recognize complex temporal relationships, leading to noisy, redundant, or biased datasets
- Our approach combines ML-driven pruning to identify and mitigate low-quality samples, XAI-based interpretability to validate critical feature interactions, and NLP for future contextual validation, reducing the time required to uncover actionable insights by 40–60%
- Evaluated on real-world agricultural and synthetic datasets, the framework significantly improves performance metrics (e.g., MSE, R^2, MAE) and computational efficiency, with hardware-agnostic scalability across diverse platforms
- While long-term real-world impacts (e.g., cost savings, sustainability gains) are pending, this methodology provides an immediate pathway to accelerate data-centric AI in dynamic domains like agriculture and energy, enabling faster iteration cycles for domain experts.

SKILLS

Skills: MATLAB, Adobe After Effects, Java, Android Development, AutoCAD, SolidWorks, Linux/Unix, Microsoft Azure, HTML/CSS, Git, Altium, Tensorflow, Pytorch, python, Computer Vision, RedHat, Data Analysis, C/C++, C#, Qt, Blender, Tableau, Minitab, AWS, Excel/Numbers/Sheets, Natural Language Processing (NLP), Python
Languages: French, German, Hindi, Tamil, Malayalam