M KRISHNAKANT ACHARY

Agricultural and Food Engineering | IIT Kharagpur

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EDUCATION

Year	Degree/Exam	Institute	CGPA/Marks
2021	Bachelor & Master of Technology (Dual Degree)	Indian Institute of Technology, Kharagpur	8.48/10
2015	Central Board of Secondary Education (CBSE)	Jawahar Navodaya Vidyalaya-1, Malkangiri	91%
2013	Central Board of Secondary Education (CBSE)	Jawahar Navodaya Vidyalaya-1, Malkangiri	10/10

INTERNSHIP

Nippon Koei Co., Ltd., JAPAN — **Data Science Intern** — **May'19 – July'19**

- Analyzed the effect of **climatic change** on rice production in Punjab and Odisha and proposed unique adaptive solutions for both areas.
- Created five different **weather parameters** from raw weather data and **calibrated threshold** levels for loss in rice production.
- Learned various **Bias-correction** methods and corrected the Near-surface Specific Humidity bias for six GCM's weather data.
- Analyzed **humans' survivability** in New-Delhi, due to increasing wet-bulb temperature during summer by the end of the 21st century.

IIT Kharagpur — **Machine Learning Intern** — **May'20 – July'20**

- Applied **Tchebichef moments** for quantitative analysis of soil components, i.e., Nitrogen, carbon, and LOI, based on raw NIR spectra.
- Applied **Tchebichef Moment-Partial Least Squared regression** (TM-PLS) and compared the results with i-PLS and PLS regression results.
- Preprocessing steps included removing the outliers, converting the raw spectral data into **Grayscale images**, extraction of the orthogonal moments using **tchebichef polynomial**, scaling the moment values, and feature selection for TM-PLS regression.
- The obtained R2 scores for test data of size 60 were **83.1%, 82.1%, and 76.6%**, from the TM-PLS method, in estimating N, C, and LOI.

PROJECTS

B-tech Thesis: Risky Years for Rice Production Analysis and Predictive Irrigation Scheduling — **July'19 – April'20**

- Estimated the **risky years** for Rice production from 2020 - 2069 of West Bengal, by calibrating weather parameters on historical data.
- Identified the **cause of loss** in those Risky years and proposed methods for minimizing the loss, adaptation, and mitigation.
- Simulated the **Rice crop yield** for the Kharagpur region with different planting dates for years from 2040 - 2069 in DSSAT software.
- Designed a **predictive irrigation scheduling system** based on the iterative approach of finding Available soil water using the weather data.

Topic: A strategy to apply machine learning to small datasets — **June'20 – Oct'20**

- Designed a **two-step sequential machine learning** model to improve the accuracy for a small dataset and compared it with an ANN model.
- Worked primarily on eye-tracking data from Tobiie pro eye sensor to estimate the **Reaction Time**, while playing Virtual Reality games.
- Each layer of the neural network was pre-trained using **autoencoders**, and the pre-trained weights are used for final training.
- The obtained R2 scores for the ensemble sequential model was **91.34%,** whereas the R2 score for the trained ANN model was **84.65%.**

Topic: Developing Cognitive Load Evaluation Model — **Jan'20 – May'20**

- Built an algorithm that uses the **Probabilistic Neural Network** to estimate the Cognitive load while playing Virtual Reality games.
- The data was preprocessed by dividing into four clusters using **K-means clustering** and mapping each feature values in the range of 0-1.
- Effectiveness tested on the collected user review data showed an absolute error and relative mean squared error of **10.7%** and **23.3%.**

Topic: Bengali digit recognition model using CNN — **Feb'20 – Mar'20**

- Developed a Convolutional Neural Network for recognition of Bengali Digits by modifying, training, and optimizing **LeNet architecture**.
- The samples used for training were rotated uniformly between -45 to 45 degrees to account for better generalization and accuracy.
- Stochastic gradient descent optimizer and cross-entropy loss were used, which obtained **92.3%** accuracy on the test dataset.

COMPETITIONS

Topic: Prediction of Customer Response for a Personal Loan Scheme — **Nov'19 – Jan'20**

- Developed predictive model using TVS credit two-wheeler loan dataset to identify responders for a newly released personal loan scheme.
- Various Machine Learning models such as Random Forest, XGBoost, KNN, Cart 4.5, and Neural Networks were used for classification.
- The dataset was balanced by under-sampling, followed by an ensemble bagging technique to get a generalized model for all data points.
- The responders predicted using a bagged XGBoost classifier with Tenfold Cross-Validation showed an F1-Score of 84%.

Topic: Detection of COVID-19 using Chest X-ray — **May'20 – June'20**

- Implemented a **CNN model** for the classification of COVID-19, viral pneumonia, and bacterial pneumonia from images of chest X-rays.
- Achieved top 5% result in the class of 250 by using data augmentation, transfer learning and ensemble model with **96% F-1** score.

POSITION OF RESPONSIBILITY

- **Vice-captain** of the table tennis team of LLR hall: Individually trained the juniors by conducting regular practice session for GC 2019-2020.
- **Network manager of ShARE-Global think tank** ,IIT Kharagpur, leading a team of 10 members working in Sustainable Energy section.

SKILLS AND EXPERTISE

Programming Languages: Python, C++, C, R **Tools:** SQL, Git, Tensorflow, PyTorch, Keras, Scikit-learn, Ensemble Learn, C++ STL

Softwares: Visual Studio Code, MS Office, Linux (Ubuntu), AutoCAD, Solid Works, Adobe Photoshop, DSSAT, EES, ArcGIS

COURSEWORK INFORMATION

Computer Science Courses: Programming and Data Structure | Data Analytics | Deep Learning Foundations and applications | Regression and Time Series Modelling | Applied Machine Learning in Python | Deep Learning with Python and PyTorch | Algorithmic Toolbox

Other Courses: Probability and Statistics | Partial Differential Equations | Financial Management | Economics | Marketing and Market Research | CAD and Simulation of Agricultural Machinery | Modelling of Extreme Events | Agricultural System Modelling

AWARDS AND ACHIEVEMENTS

- Achieved **Six-stars** under problem solving skill and **Five-stars** under C++ by solving 150+ coding problems in Hackerank.
- Secured a percentile of **97.22** among a total of 1.5 million candidates that appeared for Joint Entrance Examination (JEE) Main 2016.

EXTRA-CURRICULAR ACTIVITIES

- Designed and patented various improvisation for **Amber charkha** for **doubling productivity**, reducing breakage during operation.
- Member of the National Service Scheme, IIT Kharagpur, which conducted various medical camps and classes for children of Porapara.
- A vital player of the inter hall **Bronze winning** table tennis team in the general championship, IIT Kharagpur, for the session 2017-2018.