# Harikesh Kushwaha

Location: New Delhi, Delhi

LinkedIn | Portfolio | GitHub | Kaggle  Email: harikeshkumar0926@gmail.com | Mobile: +919838422934

## Data Scientist

As a recent graduate with a strong foundation in **statistics** and machine learning algorithms, I have worked on several personal projects including **sentiment analysis**, **natural language processing**, and **computer vision**. In my recent projects, I have showcased my skills in **data cleaning**, **feature engineering**, and **model selection**. I have also demonstrated my proficiency in tools like **Python**, **TensorFlow**, **Keras**, **scikit-learn**, and **pandas**. With a passion for solving complex problems and a drive to constantly learn and improve, I am excited to take on new challenges in the field of Data Science.

## Technical Skills

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| **Languages** | : | Python, SQL, JavaScript, MATLAB, C++ |
| **Frameworks** | : | TensorFlow, Keras, Scikit-learn, Django, Streamlit |
| **Libraries** | : | matplotlib, pandas, NumPy, NLTK, Seaborn, BeautifulSoup, Selenium |
| **Databases** | : | MySQL, MongoDB |
| **Dev Tools** | : | VS Code, Git, GitHub, Jupyter Notebook, Anaconda, AWS, Kaggle |

## Projects

**House Prices Prediction** *Python, pandas, scikit-learn, kaggle, Matplotlib, Seaborn* Source Code

- Analyzed over **80** features to predict house prices using machine learning.
- Performed **data visualization** and **feature engineering** using Matplotlib and Seaborn, respectively.
- Trained **multiple models** using scikit-learn and selected the best one by applying **grid search** and **cross-validation**. Achieved a **top 12%** ranking on the Kaggle leaderboard.

**Digit Recognizer** *Python, TensorFlow, Keras, Kaggle* Source Code

- Developed a very deep **convolutional neural network** using TensorFlow and Keras with **dropout** and **batch normalization** to improve performance.
- Achieved an accuracy of **99.48%** on the test set, securing a place in the **top 15%** on the Kaggle leaderboard.

**Food Vision** *Python, TensorFlow, Colab* Source Code

- Developed a deep **neural network** using TensorFlow and Keras to classify **101 categories of food**.
- Used a pretrained **EfficientNet** model to extract features from the food images, and then **fine-tuned** the model to improve its accuracy.
- Achieved an accuracy of **80%** on the test set, demonstrating the effectiveness of the approach in addressing complex image recognition problems.

**NLP With Disaster Tweets** *Python, TensorFlow, NLP, Text Vectorization, LSTM, GRU, CNN* Source Code

- Developed NLP models to classify disaster and non-disaster tweets using **text vectorization**, various **word embeddings**, and deep learning models including **LSTM**, **GRU**, their **bidirectional** variants, and **1D CNNs**
- Utilized the **Universal Sentence Encoder** to create embeddings on both the character and word levels, and implemented a **multivariate** model using the **functional API** of **TensorFlow**.

**TensorFlow Speech Recognition Challenge** *Python, pandas, TensorFlow, kaggle* Source Code

- Trained a deep neural network to recognize **30** different commands by creating waveforms and transforming them into **2D spectrograms** using STFT.
- Used a convolutional neural network architecture and achieved an **accuracy of about 90%** on the test set.

**Titanic - Machine Learning from Disaster** *Python, pandas, sklearn, kaggle* Source Code

- Analyzed the Titanic dataset and performed **data cleaning**, **feature engineering**, and **data visualization**.
- Built several machine learning models including **Logistic Regression**, **Random Forest**, and **Gradient Boosting** and selected the best model using **cross-validation**.

- Achieved a test accuracy of **78.5%**, which was in the **top 12%** of the Kaggle leaderboard at the time.

**NNet** *Python, Numpy, Neural Network* Source Code

- Developed a module for arbitrary neural network architecture using **Python** and **NumPy**, implementing layers such as **Dense**, **Dropout**, **Conv2D**, **Flatten**, **Reshape** etc.
- Implemented both the forward and backward pass of the layers, demonstrating proficiency in **backpropagation** and **gradient descent**.
- Created an API similar to **Keras** for seamless integration and implemented various activation functions including **ReLU**, **tanh**, **sigmoid**, and **softmax**.
- Demonstrated strong skills in **machine learning**, **Python programming**, and **mathematics** while gaining a deeper understanding of the inner workings of neural networks.

**ReVision** *Python, Numpy, TensorFlow, Pytorch, CLI* Source Code

- Created a personal project called **ReVision** to learn the concepts and implementation details of groundbreaking **computer vision papers**.
- Utilized popular deep learning frameworks such as **Tensorflow** and **PyTorch** to implement the architectures of seminal papers like **LeNet**, **AlexNet**, **VGG**, **ResNet**, **Inception**, **EfficientNet**, etc.
- Developed a deep understanding of the underlying principles of deep learning and computer vision, while improving skills in **Python programming**, **machine learning**, and **deep learning**.
- Demonstrated proficiency in various computer vision tasks, such as **image classification**, **object detection**, and **semantic segmentation**.

## Education

**Indian Institute of Technology Delhi** New Delhi, India
*Master of Science in Physics, (8.6 GPA)* *July 2021 – May 2023 (Expected)*

**Banaras Hindu University** Varanasi, Uttar Pradesh India
*Bachelor of Science in Physics, (8.4 GPA)* *July 2018 – May 20231*

## Certifications

- Machine Learning Specialization (DeepLearning.AI) Certificate
- Simulation Models for Decision Making (University of Minnesota) Certificate
- IBM Data Analyst Capstone Project (IBM) Certificate
- Financial Markets (Yale University) Certificate
- Deep Learning Specialization (DeepLearning.AI) Certificate
- TensorFlow Developer Certificate in 2022: Zero to Mastery (Udemy) Certificate