**Project Proposal**

**On**

**Deep Learning**

Title: Gender & Age Prediction (image classification and regression)

Course Code:CSE-460

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**Submitted to**

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**Introduction**:

Understanding age and gender from facial images is a fascinating challenge with applications in security, marketing, and social media analytics. This project will develop a deep learning model using Convolutional Neural Networks (CNNs) to predict a person’s age and gender from their face. We’ll be working with the UTKFace dataset, which contains thousands of labeled images, and implementing our model using TensorFlow and Keras in a Jupyter Notebook environment.

**Goals:**

* Build a deep learning model that can predict age and gender with high accuracy.
* Process and analyze the UTKFace dataset to ensure quality inputs for training.
* Train, test, and fine-tune a CNN model to improve its performance.
* Explore ways to optimize the model, such as data augmentation and hyperparameter tuning.

**Methodology:**

* **Preparing the Data:** We’ll organize and clean the UTKFace dataset, making sure the images and labels are easy to work with.
* **Designing the Model:** Using TensorFlow/Keras, we’ll build a CNN with layers that help the model recognize patterns in facial images.
* **Training & Testing:** We’ll teach the model by feeding it data, evaluate its performance, and adjust it to improve accuracy.
* **Improving Accuracy:** To make the model better, we’ll try techniques like modifying learning rates, adding more training images, and using dropout to prevent overfitting.

**Tools and Technologies:**

* Python (with libraries like Pandas, NumPy, Matplotlib, and Seaborn for data handling and visualization)
* TensorFlow/Keras for building and training the model
* Jupyter Notebook as our coding environment
* The UTKFace dataset for training and validation

**Expected Outcomes:**

* A trained CNN model that can predict Performance insights and visualizations to understand how well the model works.
* A framework that can be adapted for other facial classification tasks.

**Conclusion:**

This project will use deep learning to predict age and gender from facial images with CNNs. By working with the UTKFace dataset and improving the model’s accuracy, we aim to create a reliable classification system. The results can be useful for security, personalized experiences, and demographic studies. Through careful training and testing, this project will help improve our understanding of how CNNs recognize facial features and their real-world applications.