DEPARTMENT OF APEX INSTITUTE OF TECHNOLOGY

# PROJECTPROPOSAL

## 1. Project Title: - Gender and Age Detection with Data Science

## 2. Project Scope: - (Max 500 words)

The "Gender and Age Detection Using Data Science" project aims to develop an innovative facial recognition system that accurately classifies an individual’s gender and age using advanced machine learning techniques. By leveraging convolutional neural networks (CNNs), this project seeks to create a model that is both efficient and accessible, requiring only basic computing resources and a webcam for operation. The technology will serve as a robust tool across various applications such as recruitment, government ID verification, and targeted marketing, where accurate age and gender classification are essential.

**Objectives:**

The key objectives of this project are:

1. **Develop an Accurate Gender and Age Classification Model**: Implement CNNs to accurately classify gender into 'Male' or 'Female' categories and age into specific ranges,), and more, based on facial images.
2. **Ensure Accessibility and Ease of Use**: Create a user-friendly system that requires minimal equipment, making it accessible to a broad audience, including non-professionals.
3. **Enhance Application in Multiple Domains**: Adapt the model to work effectively in diverse fields such as recruitment, where it can help verify candidates' age and gender, and in marketing, where it can assist in customer segmentation.

**Key Components:**

The following critical components will be part of the project:

1. **Data Collection and Preparation**: Utilize the Adience dataset, which contains over 26,000 images across different age groups and genders, to train the model.
2. **Model Design and Architecture**: Implement CNNs specifically designed for facial analysis to ensure high accuracy in classification.
3. **Model Training and Validation**: Train the model on the Adience dataset and validate its performance against unseen data to ensure reliability and accuracy.
4. **Efficiency Enhancement**: Continuously improve the algorithm's speed and efficiency while maintaining accuracy, making it suitable for real-time applications.

In conclusion, the "Gender and Age Detection Using Data Science" project is set to create a versatile, accurate, and user-friendly tool that can be deployed across various industries. By integrating cutting-edge machine learning techniques with accessible technology, this project will provide essential tools for gender and age classification, driving advancements in fields such as recruitment, security, and marketing.

## 3. Requirements: -

* Hardware Requirements

1. A computer with enough processing power to perform machine learning algorithms and develop models.
2. Sufficient storage capacity for model results, software, and datasets.
3. Additional hardware based on specific algorithm requirements, such as GPUs for deep learning models.
4. Software Requirements
5. **Operating System**: Windows 10/11, macOS, or Linux (Ubuntu preferred)
6. **Programming Language**: Python 3.7 or higher
7. **Integrated Development Environment (IDE)**: PyCharm, Visual Studio Code, or Jupyter Notebook
8. **Libraries and Frameworks**:
   * **TensorFlow** or **PyTorch**: For building and training the Convolutional Neural Network (CNN).
   * **Keras**: High-level neural networks API, running on top of TensorFlow.
   * **OpenCV**: For image processing and handling webcam input.
   * **NumPy**: For numerical operations and matrix computations.
   * **Pandas**: For data manipulation and analysis.
   * **Matplotlib/Seaborn**: For data visualization.
   * **Scikit-learn**: For preprocessing, metrics, and possibly some model evaluation tasks.
9. **Database**: Any lightweight database for managing datasets and results.

**STUDENTS DETAILS**

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| **Name** | **UID** | **Signature** |
| Aryan Negi | 21BCS11602 |  |
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**APPROVAL AND AUTHORITY TO PROCEED**

We approve the project as described above, and authorize the team to proceed.

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| **Name** | **Title** | **Signature**  **(With Date)** |
| Ms. Anudeep Kaur | Supervisor |  |