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**ACCREDITED BY NAAC WITH “A” GRADE**

**DEPARTMENT OF COMPUTER ENGINEERING**



**Group Members: Guide:**

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**Problem Statement**

Gender and Age Detection: predict if a person is a male or female and also their

age

**Introduction**

Gender and age detection algorithms aim to unravel the intricate tapestry of human diversity encapsulated within facial features. By analysing subtle nuances such as facial contours, skin texture, and expression, these algorithms can infer the gender identity and approximate age range of individuals captured in images or video streams.

**Algorithm:**

Deep Neural Network using OpenCv2

**Preparation:**

* Load the facial image into memory.
* Import necessary libraries, including PyTorch for deep learning.

**Model Loading:**

* Load a pre-trained deep learning model for age and gender detection. Common choices include CNN architectures like VGG, ResNet, or custom-designed models.

**Preprocessing:**

* Resize the input image to match the required input size of the age and gender detection model.
* Convert the resized image to the appropriate format for input to the model, such as normalization and channel ordering.

**Inference:**

* Feed the pre-processed image into the age and gender detection model.
* Allow the model to make predictions for both age and gender attributes.

**Post-processing:**

* Interpret the model's predictions to extract the estimated age and gender of the individual.
* Perform any necessary adjustments or filtering to refine the predictions, such as thresholding or smoothing.

**Display:**

* Present the inferred age and gender information to the user, either through a graphical interface or as part of an automated system.

**Flowchart:**



**Experimental Setup**

* Google Collab- T4 GPU
* OpenCv2
* argparse
* Camera (1080p)
* Language – Python 3.11.3
* Intel i5 8th gen
* OS - Windows 10

**Sample Output:**



**Application:**

* **Security and Surveillance:** Age and gender detection can be used in surveillance systems to identify potential threats or suspicious individuals based on their demographic characteristics.
* **Human-Computer Interaction:** Age and gender detection can enhance user experiences in various applications, such as virtual assistants and gaming, by customizing interactions based on the user's demographic characteristics.
* **Retail:**

Retailers can use this technology to analyse the demographics of their customers. This information can help them make better decisions regarding product placement, inventory management, and marketing strategies.

**Limitations:**

* **Inference Speed:** Some models used for age and gender detection may require significant computational resources for inference, which can limit their practical application in real-time systems or resource-constrained environments**.**
* **Sensitivity to Environmental Variations**: Environmental factors such as background lighting and brightness variations can affect the model's accuracy, leading to inconsistencies in predictions. These fluctuations challenge the model's ability to generalize across different lighting conditions, highlighting the need for robustness in performance.

**Conclusion:**

In conclusion, we have developed a model capable of accurately detecting age and gender from facial images. Through preprocessing, model inference, and post-processing, our algorithm can reliably predict demographic attributes, contributing to various applications such as targeted marketing and security surveillance. This process enables the transformation of raw facial data into valuable insights, enhancing decision-making in age and gender prediction.

**References:**

* Fundamentals of deep learning <https://www.oreilly.com/library/view/fundamentals-of-deep/9781492082170/>