Task 2:

In this section, I used DeepFace to predict the age of individuals in the Fairface dataset and measured the accuracy of the predictions. The overall accuracy is 0.2875.

Additionally, with the age prediction result, I analyzed the potential bias of the DeepFace model with respect to gender and race and calculated the standard deviation across race and gender. The results are reported below.

|  |  |  |  |
| --- | --- | --- | --- |
| Gender | Female | Male | Standard Deviation |
| Accuracy | 0.2783 | 0.2957 | 0.01592 |

Table 1. Age Prediction Accuracy Across gender

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Race | White | Black | East Asian | Indian | Latino\_Hispanic | Middle Eastern | Southeast Asian | Standard Deviation |
| Accuracy | 0.3117 | 0.2718 | 0.28 | 0.2796 | 0.2877 | 0.3085 | 0.2678 | 0.008686 |

Table 2. Age Prediction Accuracy Across Race

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Race | White | | Black | | East Asian | | Indian | | Latino\_Hispanic | | Middle Eastern | | Southeast Asian | |
| Gender | M | F | M | F | M | F | M | F | M | F | M | F | M | F |
| Accuracy | 0.3110 | 0.3125 | 0.2665 | 0.2774 | 0.2934 | 0.2664 | 0.2868 | 0.2726 | 0.3051 | 0.2710 | 0.3234 | 0.2777 | 0.2748 | 0.2602 |

Table 3. Age Prediction Accuracy Across Gender and Race

The results show that the model performs better on male faces compared to female faces (Table 1). Additionally, when analyzing the prediction accuracy across different racial groups (Table 2), the white group has the highest accuracy.

When considering the combination of gender and race (Table 3), the white group had the best overall performance. Interestingly, white women slightly outperformed white men and achieved the highest accuracy among all gender-race groups.