A Comparative Analysis: Dual-Task CNN vs. Single-Task CNNs for Gender and Age Prediction in Facial Images

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***Abstract*—Lorem ipsum dolor sit amet, consectetur adipiscing elit. Suspendisse non eleifend elit. Lorem ipsum dolor sit amet, consectetur adipiscing elit. Ut ligula nulla, placerat ut porta vitae, efficitur ut ipsum. Aenean sodales lacus et mauris faucibus, at congue turpis consectetur. Mauris volutpat a velit ac commodo. In dui urna, pulvinar interdum varius at, volutpat non ipsum. Integer hendrerit convallis laoreet. Nunc in mattis diam. Donec at hendrerit risus, vel pellentesque tortor. In hendrerit malesuada elementum. Suspendisse nibh dolor, condimentum non nisi id, laoreet tincidunt mi.**

I. Introduction

In the realm of computer vision and image processing, the ability to accurately predict gender and age from facial images holds significant importance across various applications that benefit from the demographic data of their users.

Biometric information can, in fact, be used in a plethora of ways, ranging from targeted commercial use [1] to intelligent non-profit campaigns [2] and even extending to Orwellian credit scoring systems [3].

A heated debate continues to unfold regarding the application and potential abuse of Machine Learning and Computer Vision technologies in the daily lives of citizens, particularly heightened since the advent of Convolutional Neural Networks (CNN). The transformative capabilities of CNNs lie in their ability to process vast amounts of data and generate remarkably accurate predictions. Notably, these networks eliminate the necessity for manual feature engineering tasks, such as feature extraction, thereby rendering the implementation and utilization of these technologies more convenient than ever before [4].

This evolution raises significant questions about privacy, ethics, and the broader societal impact of seamlessly integrating advanced algorithms into various aspects of our lives [5]. Notably, entities such as the European Union Commission and Parliament have actively addressed these concerns by formulating the AI Act [6]. This legislative initiative seeks to classify the risks associated with ML and CV technologies, especially concerning the citizens of the confederation. The primary objective is to safeguard individuals from the inappropriate use of their biometric data, acknowledging the critical need to establish regulatory frameworks that balance the advancement of technology with the protection of individual rights and privacy [7].

Given the circumstances, it is crucial to understand the design techniques and architectures upon which these models are based to utilize and implement them with increased awareness and consideration for the effects and consequences on end-users. In particular, we will undertake a comparison between a multi-task CNN and two single-task CNNs for age and perceived gender detection to assess their results and differences in task execution.

II. Related Work

Citation example [**?**]

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III. Proposed Approach

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IV. Experiments

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V. Conclusion

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