

Evaluation of the facial makeup impact on femininity appearance based on automatic prediction

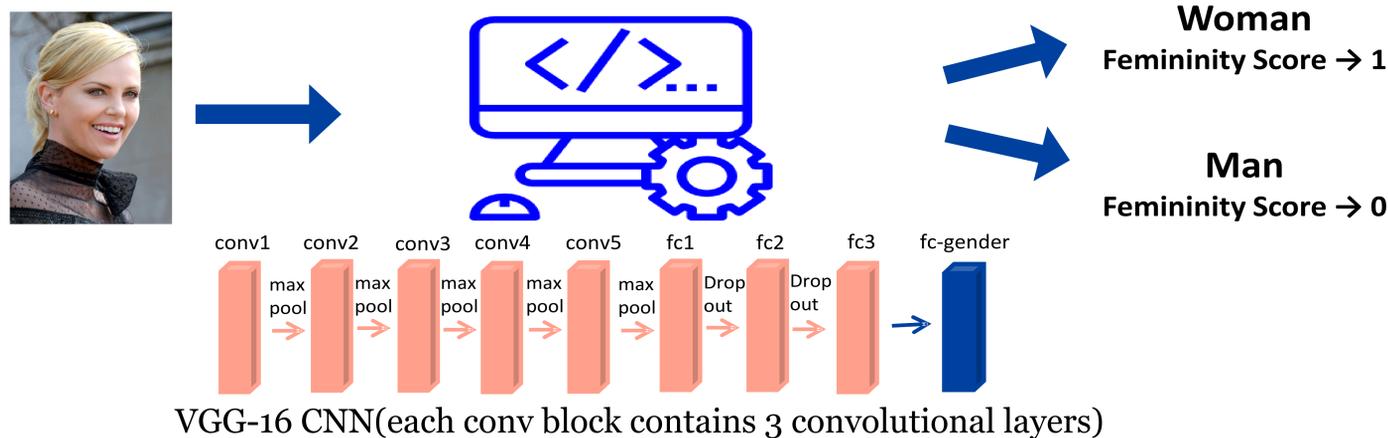
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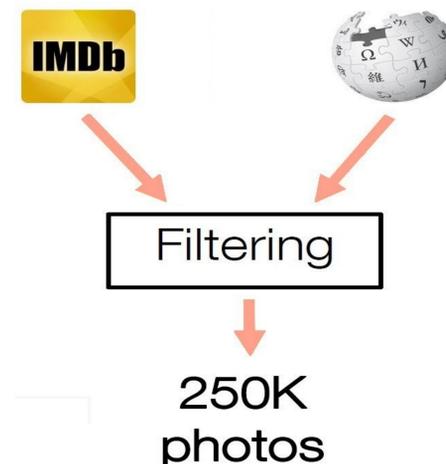
Introduction

Beauty has always been highly regarded in our society and it has been proven that physically attractive people are given privileges that others are not. Thereby, women are making a huge beauty work in order to endeavor attractive appearances. Most commonly, women wear makeup on daily basis, trying to highlight their feminine line and bring out their beauty traits. Numerous subjective studies have been conducted to gauge the facial makeup impact on the perceived femininity outcome. The aim of this work is to evaluate the makeup effect on the gender prediction score from the machines point of view, now that they are able to outperform humans thanks to deep learning algorithms.

Gender estimation algorithm

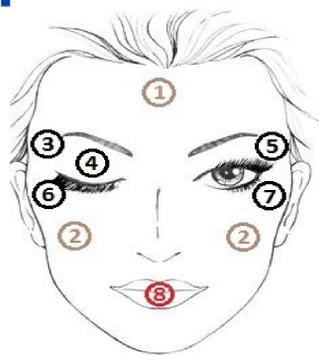
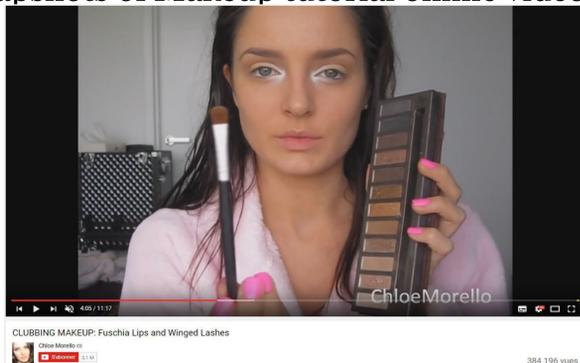


Training data



EURECOM's Facial Cosmetics Database

Snapshots of Makeup tutorial online videos [3]



Snapshots annotation and classification according to amount and location of the makeup

Skin			Eyes			Mouth	
Foundation	Cheek	Brow	Shadow	Upper line	Mascara	Lower line	Lips
1	2	3	4	5	6	7	8
2	2		2		2	2	2
		2		2			1
1	1	1	1	1	1	1	
0	0	0	0	0	0	0	0

Level 3: heavy makeup
Level 2: average makeup
Level 1: light makeup
Level 0: without makeup

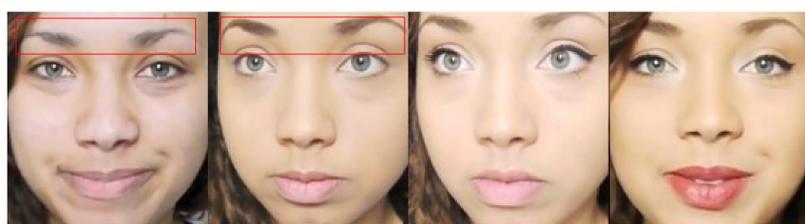
Results

Estimated Femininity Score for different makeup levels



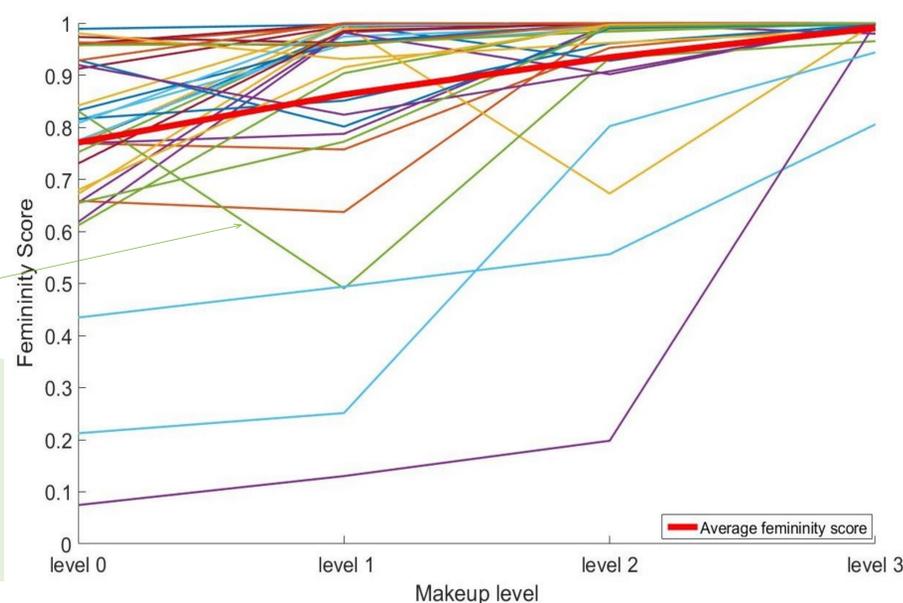
0.752026364207 0.98401699774 0.999972151467 0.9999903183

The femininity score increases as women apply more makeup.



0.831091299653 0.490447103977 0.932797603309 0.965225774795

Lowering of the femininity score occurs in some cases: This is due to the fact that generally thick eyebrows are referred to men whereas thin eyebrows are related to women.



Conclusion

- The evaluation of the facial makeup impact through **gender prediction** has proved that **deep learning algorithms** are now able to **simulate the human perception** of physical attractiveness.
- The assumption that wearing facial makeup enhances the physical attractiveness and boosts the beauty traits has been confirmed through an objective evaluation.
- Wearing makeup is not only used for beauty reasons, it is evenly applied to conceal signs of aging, such as wrinkles and under eye bags, in order to make middle-aged women look younger. As a future work, we aim to evaluate the impact of facial makeup on apparent age estimation.

Acknowledgments

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References

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- [2] Yi, D., Lei, Z., Liao, S., Li, S.Z., Learning face representation from scratch. Computer Vision and Pattern Recognition, 2014.
- [3] Eckert, M.L., Kose, N., Dugelay, J.L., Facial cosmetics database and impact analysis on automatic face recognition, Multimedia Signal Processing (MMSP), 2013.