



# Artificial Intelligence in Facial Plastic Surgery

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## Abstract

Using Artificial Intelligence Facial Plastic surgery is a new important tool that has been implemented recently into helping surgeons, we focused in two aspect of AI uses in facial plastics which is in the use of early detection of skin lesions and the use of it in the aspect of cosmetic facial plastic surgery by developing an algorithm that determines attractive facial features most closely related to post-operative target variables.

**Keywords:** Facial Plastics; Otolaryngology; Dermatology; Artificial Intelligence; Skin Cancer

"AI is not a doctor, AI is not a cure, AI is a tool – a means to an end – increasingly embedded in everything for the benefit of the patient"—Keith Bigelow, General Manager, GE Healthcare.

"The computer scientist Donald Knuth was struck that 'AI has by now succeeded in doing essentially everything that requires 'thinking' but has failed to do most of what people and animals do 'without thinking'—that, somehow, is much harder!"— Nick Bostrom, Superintelligence: Paths, Dangers, Strategies.

## Introduction

Understanding the combination of technology and Facial Plastic Surgery is curranty and will be very important to position Otolaryngologist and Facial Plastic surgeons at the forefront of surgical innovation, which is a hot topic to talk about nowadays. This account of the future applications of Artificial intelligence in facial plastic surgery introduce us to a subset of issues amenable to support this technology. It equips facial plastic surgeons with the knowledge to navigate technical conversations with peers, trainees, patients, and technical partners for collaboration and to usher in a new era of technology in facial plastic surgery. From the mathematical basis of Artificial Intelligence to its commercially viable applications, topics introduced herein constitute a framework for design and execution of quantitative studies that will better outcomes and benefit patients. Finally, adherence to the principles of quality data collection will leverage and amplify plastic surgeons' creativity and undoubtedly drive the field forward [1].

As the technology community romanticizes Artificial Intelligence and packages it into commercial products for resale to the healthcare industry, we on the front lines cannot help but wonder how to stay ahead of the curve. How might a research team grappling with study design and difficult data collection best position itself to leverage open-source AI resources in the name of efficiency and better patient outcomes? How might the individual surgeon use AI tools to assist in optimizing surgical plans or improving the patient experience? This account should provide facial plastic surgeons with a practical approach to understanding the uses, limitations, and potential of artificial intelligence in research and clinical practice. Data collection in facial plastics remains a challenge as they are innately visual specialty thus are uniquely suited to embrace artificial intelligence. Before and after photos are widely publicized and

are a testament to the success or failure of a plastic surgery procedure, intimately linking visual features to outcomes. Progress made in computer vision and facial recognition outside of healthcare is being leveraged to segment facial anatomy, quantify visual appeal, model procedure outcomes, and predict aging [2].

Although there is largely increasing appetite in the facial plastic surgery community for expert peer-reviewed literature on the applications of artificial intelligence in surgery, it is important to note that the democratization of access to AI resources currently makes it possible for facial plastic surgery innovation to come from within our community. Surgical skills and clinical intuition are necessary but insufficient conditions to implementing such powerful technological advances as AI in the field of plastic surgery. I believe that facial plastic surgeons will be able to navigate technical conversations with peers, trainees, patients, and technical partners for collaboration and to usher in a new era of technology in plastic surgery.

## Skin Cancer

Dermatologists and facial plastic surgeons works in combination in managing treat skin lesions and cancers medically or surgically. When dermatologists detect a skin lesion or cancer on the face, they will either proceed with Mohs surgery or consult a facial plastic surgeon to perform resection the lesion or to reconstruct the defect that has been left behind after performing Mohs' surgery. Early detection of skin cancer is a very, if not the most, important aspect to successful treatment and cure. Therefore using Artificial Intelligence to improve automatic detection of skin cancers from photos or videos is incredibly useful.

Recently, a team of researchers in Stanford University in California, USA were able to train an Artificial Intelligence software to detect and classify skin cancer with greater accuracy than dermatologists that use dermoscopes. There is another study done at Department of Dermatology at McGill University in Montreal Canada that shows the promise of Artificial Intelligence in screening for melanoma. A melanoscoan, which is Sophisticated whole-body photographic scanners have been developed that could use Artificial Intelligence to help quantify and detect dangerous skin cancers [3]. It's this kind of Artificial intelligence that holds the bright future for skin cancer early detection and prompt treatment.

## Facial Plastics

In a recent study, researchers created an automated classifier for facial beauty — trained using extracted facial features from 165 images of "attractive" female faces that were also independently graded by human referees. In this model, a decision tree algorithm assessed a set of

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descriptive attributes — which in this particular investigation included different facial ratios — and attempted to determine attractive facial features most closely related to post-operative target variables. When subjected to the testing set of images, the automated classifier was just as good as humans at assessing beauty. A quantitative measurement of aesthetic improvements could not only set expectations but also discourage patients from undergoing procedures that offer marginal improvement [4].

## Conclusion

The Implementation of Artificial Intelligence in the field of Facial Plastic Surgery is still in its early phases and a lot of research must be invested in this field as it will help both surgeons and patients into having the optimal care and outcome, especially in early detection of skin cancer and determining attractive facial features most closely related to post-operative target variables in an objective way.

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