THE NEXT DERMATOLOGICAL TOOL IS GETTING PURCHASED DIRECTLY BY THE PATIENT – THE DIAGNOSTIC APP

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Introduction

Thanks to those “cubes” on our smartphones, we now have the ability to book our summer holidays and have dinner delivered to our homes from the back seat of a vehicle summoned with an app. Apps are the driving tool behind our increasingly self-empowered lives. Where do the latest dermatology apps fit into this app craze?

Apps for diagnosis and surgery

The effectiveness of dermatology apps depends on their ability to successfully diagnose skin cancer. One such example is SkinVision\(^1\) an app allowing you to take a photo of your skin mole or lesion for classification as low, medium, or high risk. It does this by using fractal geometry to interpret photos taken by the user\(^2\). It was developed by finding patterns in already diagnosed skin cancer photos based on their appearance and then extrapolating from this data to the undiagnosed photos to predict the presence of skin cancer. This process is known as a ‘convolutional neural network’ (CNN)\(^3\)

To merit the title of a diagnostic tool, diagnostic dermatology apps would need to be accurate in detecting skin cancer at rate equal to, or greater than, a board-certified dermatologist. A study showed that SkinVision’s algorithm of detecting melanomas was 81% accurate.\(^4\) Despite a not insignificant detection rate, the conclusion was that this app was “insufficient to detect melanomas accurately.”\(^5\) A team at the University of Pittsburgh tested four different apps used to detect skin cancer. Three of these apps used photo recognition software, while the fourth would send photos directly to a dermatologist for review. They found that the most accurate of them missed the correct diagnosis of melanoma lesions 30% of the time\(^6\). The fourth method had the highest rate of success, however, sole reliance on that app was still “unwarranted”\(^7\). Recognizing such limitations, SkinVision has noted that the app is “not to be used or relied on for any diagnostic or treatment purposes and they do not replace a visit to the doctor”\(^8\).

This begs the following question: given the evidence to date regarding reliability, in what context should skin cancer detection apps be used? At present, perhaps their best use lies in improving awareness of the importance of skin cancer screening or understanding the effect of UV light as a risk factor. Increasing awareness of skin cancers could encourage people to have earlier and frequent testing (and therefore lead to an earlier diagnosis). Apps could act as a platform for monitoring the progression of a skin mole/lesion, and even encourage the wearing of sunscreen on high UV index days.

What exists that could compete with apps?

The United Kingdom’s National Institute for Health and Care Excellent (NICE) protocols for the diagnosis of Melanoma (Figure 1) indicate the segment at which a diagnostic app could be an addition to the current protocol (blue). ‘Molemate’, a competing technology to SkinVision that uses pulsating light of different wavelengths to map a lesion and analyze it for diagnosis, has recently been certified by NICE as cost-effective and is already being implemented in primary care settings. Figure 1 shows that Molemate and diagnostic apps essentially serve the same purpose. However, they are too similar to merit the implementation of both technologies in primary care, since they both have the interpretation of images as the common denominator.

Figure 1. Current NICE protocol for care of Melanoma in U.K.(blue) and additional potential diagnosis technologies (orange)\(^9\) Figure 1

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How can apps contribute to better diagnosis?

Already there has been progress towards improving the application of apps for diagnosis of skin cancer, although not necessarily by improving the app itself. For example, the company Dermlite now makes a ‘DL Connection Kit’ for smartphones that greatly enhances its ability of taking quality photos of moles/lesions. The dermoscope, commonly used in dermatological surgery, is an expensive tool, so having a smartphone-fitted version of it (at a much lower price) is cost-effective, especially when used in tandem with a diagnostic app. An increase in cost-effectiveness, combined with improved accessibility for diagnosis, would be enticing factors for NICE to change its guidelines in favor of using more such apps. It is conceivable that developers will use photo-enhancing techniques as a means of improving accuracy of apps by incorporating dermascope features in app packages. This could be seen as finding a middle ground between new diagnostic methods and traditional diagnostic tools, thereby increasing the app’s likelihood of being accepted as reliable by both doctors and patients.

Conclusion

The development of dermatology apps, mostly for screening skin cancer, has given rise to concerns since their debut in app stores. While it is conceivable that overtime they will become as accurate as a diagnosis by a dermatologist, this is not the case at present. Are they to be dismissed, given the chance of inaccuracy? The short answer is no. Apps can help increase awareness of skin cancers, risk factors, and inform patients about surgical procedures. At the current rate of technological development, I envisage a world where we will be consulting our smartphones before our dermatologist. Is this concerning? Not really - it is, in fact, empowering.

References