AI, are dermatologists' days numbered? - Synopsis

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Introduction

Artificial intelligence (AI) is a branch of computer science dedicated to the development of machines capable of simulating human intelligence processes. The predictive analytical powers of AI can aid drug discovery, disease diagnosis, and treatment plan design. AI possesses superior pattern recognition and learning ability that places it in direct competition with medical specialities involved in detecting and interpreting patterns in data, such as dermatology. The diagnostic power of AI-driven smartphone applications are set to become directly accessible to the patient, and may bypass the doctor altogether. This essay aims to explore the current and future uses of AI in dermatology, and to address whether fears it will render dermatologists obsolete are warranted.

What is AI?

In 1955 Professor John McCarthy defined artificial intelligence as "the science and engineering of making intelligent machines, especially intelligent computer programs." In medicine the ability of AI to classify and categorise visual data is of particular interest. AI's data-processing power already outstrips human capabilities, and by 2045 it is predicted to surpass the combined brainpower of all human beings alive.[1]

Current applications of AI in dermatology

AI has demonstrated superior performance in specificity and sensitivity of melanoma diagnosis[2] and concordance in keratinocyte cancer diagnoses with human dermatologists.[3] Technology utilising AI's ability to diagnose melanoma is already in use by both physicians and patients. Apps exist in which users take an image of their lesion and an AI suggests a diagnosis. Other AI systems can facilitate six-monthly melanoma follow-ups, recommend treatment plans for a given dermatological diagnosis, and suggest personalised skincare products.

Strengths and challenges of AI

AI has the potential to take over administrative and managerial tasks, act as a superior screening and triage tool,[4] deliver more accurate and quicker diagnoses, and facilitate the personalisation of medicine. AI diagnostic algorithms could easily be adapted for medical training, and health promotion. AI incorporated into smartphone technology could reduce outpatient referrals and transform health care in rural or marginalised communities with poor access to services.

However successful implementation of AI in our healthcare system is not without its challenges; of particular concern is inherent bias in AI algorithms[5] and the lack of governance frameworks to protect against breaches of privacy laws. [6] We must also dispute the wisdom of outsourcing clinical responsibility to the patient, particularly when diagnostic power is diminished when a dermatoscope is not used for image capture.[7] Furthermore purely visual information cannot be replied upon to make an accurate diagnosis, and there is a lack of published evidence proving safety and efficacy of AI systems.

Will AI take over the role of a dermatologist?

The ideal imaging system should increase diagnostic accuracy, be time and cost efficient, reduce benign biopsies, and be accessible to all demographic and socioeconomic groups.[8] It is apparent that AI will soon be superior to humans in executing these aims. AI is set to revolutionise diagnosis and treatment in all medical fields, functioning as a clinical decision support tool that boosts physician confidence, accelerates care, and reduces workload.

However AI is not a substitute for a thorough history, clinical examination, and consultation. A physician is responsible for delivering news compassionately, interpreting and responding to patient needs, and creating a personalised management plan. Even accounting for future AI capabilities, a doctor will retain the uniquely human abilities essential to the doctor-patient relationship and delivery of care. Human doctors will not perish, they will simply adapt as their skill-set expands in areas that will never be supplanted by machines.

References
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