Automating ringworm diagnosis

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Ringworm, known more correctly as dermatophytosis, is a skin infection caused by any of forty or so different types of microbial fungus. It causes inflammation and itchiness, making the skin scaly and forming a circular rash, and sometimes causing hair loss and blistering. Typical infection is by Trichophyton, Microsporum, and Epidermophyton

species and is associated with skin contact with other people. Excessive sweating, obesity, and poor immune function are important risk factors.

Dermatophytosis is usually diagnosed based on symptoms and the appearance of the ring rash followed by biopsy of a scraping of skin cells from the infected area. However, it can manifest itself in different ways and so a definitive and perhaps even automated approach would be a boon for medical professionals particularly in areas where the infection is common. Treatment commonly requires the use of oral antifungal drugs, such as terbinafine, fluconazole, or itraconazole. It can also be treated with a "dip therapy" approach.

Now, writing in the *International Journal of Computational Vision and Robotics*, a team from India has turned to a computer vision diagnostic for dermatophytosis. The team "trains" an algorithm in the computer software Matlab to recognize the characteristics of known photographs taken of an area of a patient's skin suffering dermatophytosis. The software can then recognize the presence of the infection in images from as yet undiagnosed cases with up to 87 percent accuracy, the team says.

Such an automated system with this level of accuracy would allow screening of suspect cases ahead of presentation to a clinician and so reduce the workload in rural areas, for instance, where contact with animals and the fungal spores is common, but a suspected infection may be presented by patients where another skin condition is present. The economic benefits of an approach based on photographing the skin and requiring no specialist hardware that also precludes to some degree the need for detailed personal examination in the first instance and costly biopsy will be of significant benefit to such communities.

More information: Manas Saha et al, Human skin ringworm detection using wavelet and curvelet transforms: a comparative study, *International Journal of Computational Vision and Robotics* (2021). DOI:

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