Image Capture: AI-assisted Sexually Transmitted Infection Diagnosis Tool for Clinicians in a Clinical Setting

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Background:

The healthcare industry is experiencing a surge in the adoption of artificial intelligence (AI) technology due to its potential for assisting clinicians in diagnosis and healthcare management decision-making. However, there is currently no AI-assisted image recognition tool for sexually transmitted infections (STIs). This study aims to develop an AI-assisted diagnosis tool for the clinicians in the sexual health clinic.

Methods:

Melbourne Sexual Health Centre (MSHC) developed the Image Capture tool to collect lesion images, allowing clinician/client to upload the lesion images via a mobile phone. We used total of ~6,000 images (80% for model training and 20% for evaluation) to train the AI algorithm. We include 20 classes of common skin lesions including STIs (Genital Warts, Herpes, Syphilis, Molluscum Contagiosum, Monkeypox) and non-STIs (Healthy skin, Pearly White Penile Papules, Vaginal Intraepithelial Neoplasia (VIN), Balanitis, Lichen Sclerosis and other dermatosis). We employed deep learning approach and Convolutional Neural Networks (CNN) for training and evaluating the AI model.

Results:

Our AI model successfully identified and classified 20 different skin lesions with mean Average Precision (mAP) scores ranging from 50 to 83. Notably, the model achieved high levels of accuracy in detecting and differentiating common STI and non-STI lesions, with mAP scores of 0.70 for Herpes, 0.73 for Syphilis, 0.75 for Molluscum Contagiosum, 0.72 for Monkeypox, 0.83 for Penile Papules, and 0.75 for Genital Warts.

Significance:

The integration of trained AI model on the Image Capture tool allows the clinicians to

conveniently upload lesion images from their mobile phones and check the predicted diagnosis and corresponding probability. This can aid in making accurate diagnoses in a sexual health clinic. It also has the potential to improve the efficiency and accuracy of diagnosis and reduce the workload for clinicians.