Algorithm For Automated Detection of Melanoma

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Technology description

Technology Overview

Comprehensive diagnosis of melanoma typically requires both reliable histopathology and the trained eye of a clinician for assessment. With optical (as opposed to physical) sectioning of tissue and OHSU created software to process confocal images, it is possible to distinguish the diagnostic traits of malignancy,such as the presence of pagetoid melanocytes in the epidermis and the breakdown of the dermal-epidermal (DEJ), without biopsy.There is a pressing need for better diagnostic tools for the diagnosis of skin lesions suspected to be cancerous.

The standard tool for helping to diagnosis melanoma is clinical polarized dermoscopy. It slightly improves spatial resolution to about 100 micrometers by optically separating superficial and deeply penetrating light. While this scale is sufficient for gross morphology, it is insufficient to detect important cellular features such as the presence of pagetoid melanocytes and subcellular features associated with melanoma.

As melanomas are thought to originate in the DEJ and progress in lateral and vertical growth phases leading to metastasis, possesing the ability to image microscopic structural details would be highly valuable. A confocal microscope produces "stacks" of images where the superficial image captures the stratum corneum, and successive images (deeper in the skin) penetrate well into the papillary and superficial reticular dermis. Near real-time collaboration between dermatologists and pathologists for the rapid detection and point-of-care diagnosis of cancerous lesions can ensure patient comfort and peace of mind.

Market Summary

Half of all cases of new cancers diagnosed are skin cancer.

Malignant melanoma (MM) is the most fatal form of skin cancer, (estimate that it causes 80% of all skin cancer deaths) and a mortality rate of 14%.

MM incidence in the United States is increasing, with an estimated 60,000 new cases each year.

Typically, 40-50 biopsies are performed for every single melanoma that is detected. The average time from an initial visit to see a primary-care physician about a potential melanoma and for the patient to receive results in 30-60 days. Because of the tendency for MMs to metastasize, early detection and excision are critical. The five-year survival rate for melanoma is 90.5%, but percentages range from 100% (stage 0 removal) to 16.2% (stage 4 removal).

Advantages

Automated detection of melanoma bridges the gap between dermoscopy and typical biopsies. Non-invasive method of screening lesions may help prevent unnecessary biopsies and enable the survey of more lesions than feasible biopsied, while also providing greater diagnostic accuracy than currently provided by dermoscopy.
Automated identification of possible tumors also allows for the detection of melanoma in non-sterile environments or remote areas without easy access to doctors.

Institution

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