Imaging Spectrometer for Early Detection of Skin Cancer

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Technology description

Skin cancer detection is typically identified via standard visual inspection. Skin patches with asymmetrical outlines, irregular borders, mottled color or a diameter greater than six millimeters are all early indicators of possible cancerous areas.

However, some skin cancers cannot be detected by visual inspection because they appear in light frequency bands other than the three bands visible to the human eye. For this reason, spectral information can be collected and analyzed to improve the early detection of skin cancer.

Currently, two techniques are used for spectrally imaging tissue. One method uses different frequencies of light, while the other uses a moveable scanning slit. In both cases, the imaging process is delayed, either by the need to switch between colors of light or by the need to scan a slit over the area of interest. This delay can cause the image reference points and light spectrum to become skewed, a problem that can be further exacerbated if movement occurs during the acquisition process. Additionally, the moving parts of current scanning devices make them cumbersome and unreliable, particularly for portable applications. New techniques for spectrally imaging tissue are needed. A UW-Madison researcher has developed a portable imaging spectrometer for the early detection of skin cancer. A handheld scanner uses light emitting diodes to illuminate a region of skin and the reflected light is collected by an objective lens. A micro-lens array then divides the region into smaller images that are processed to reveal their spectral content.

Because spectral and image data are acquired in one step, this new device provides two effective indicators to detect skin cancer. Physicians can evaluate the image data while the spectral data is compared to spectra of known cancerous or healthy regions.
The Wisconsin Alumni Research Foundation (WARF) is seeking commercial partners interested in developing a portable cancer detection system with improved imaging characteristics.

Additional Information

Click here for a news release describing this technology.

http://www.news.wisc.edu/19323

Application area

Skin cancer detection

Advantages

Acquires high resolution spectral and image data in one step
Acquires a single image with as many as 256 colors
Avoids image distortion
Does not require moving components
Device is rugged and handheld.
Samples all tissue within mapped region, so that small areas of cancer are not missed
Accentuates regions with cancerous features
Image is easily reviewed and evaluated by a physician.
Image processing may take place within device or in a remote computer connected by a cable or wireless system.

Institution

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