

# **DTC Miniproject**

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**“Detection of skin lesions and skin cancers using near infrared imaging”.**

## **Introduction.**

Interesting work has been undertaken in using near infrared wavelengths to examine chemicals and materials hidden under layers of other materials. Previously this work has concentrated on the applications in the food and security industry, say, to detect foreign bodies or explosives respectively, as examples. However, work on the food industry aspects has shown that meat (tissue) can be successfully penetrated using near infrared wavelengths from cheap, easily-available sources, and imaged with webcams or similar video systems.

## **Project (12 weeks).**

It is proposed that a simple test bed be set up in which a controlled infrared source, such as a desk lamp, is used to examine skin using basically a standard CCD TV camera. However, the camera will be screened to remove visible wavelengths and then the images obtained will be examined in the near infrared. The ranges of wavelength for this purpose will be investigated, and analysed using whatever mathematical techniques seem appropriate. Any imaging tools, including Photoshop or similar, will allow easy enhancement and examination of the images. For the purpose of testing, benign sources (as mentioned above) will be used, and skin examined for damage, say, due to sun exposure in the UV and so on. If time permits, access to a skin clinic may be arranged but in any case the principles can be demonstrated and characterised in the laboratory. The work will take place in the School of Engineering, and volunteers for the imaging process may be drawn from students and staff.

The student who undertakes this project will gain experience not only of video systems, imaging, but also medical applications thereof, and image data analysis. Whatever tools are appropriate and easily available will be used, and the project has the backing of two, strongly research-led professors in Engineering who have collaborated in the near infrared security project alluded to above. Any suitable data and methodologies arising from the project may be published, subject to its academic value.