**Introduction**

Infrared thermography (IRT), thermal imaging, and thermal video are examples of infrared imaging science. Thermographic cameras usually detect radiation in the long-infrared range of the electromagnetic spectrum (roughly 9,000–14,000 nanometers or 9–14 µm) and produce images of that radiation, called thermograms. Since infrared radiation is emitted by all objects with a temperature above absolute zero according to the black body radiation law, thermography makes it possible to see one's environment with or without visible illumination. The amount of radiation emitted by an object increases with temperature; therefore, thermography allows one to see variations in temperature. When viewed through a thermal imaging camera, warm objects stand out well against cooler backgrounds; humans and other warm-blooded animals become easily visible against the environment, day or night. As a result, thermography is particularly useful to the military and other users of surveillance cameras.

The appearance and operation of a modern thermographic camera is often similar to a camcorder. Often the live thermogram reveals temperature variations so clearly that a photograph is not necessary for analysis. A recording module is therefore not always built-in.

Thermography has a long history, although its use has increased dramatically with the commercial and industrial applications of the past fifty years. Fire-fighters use thermography to see through smoke, to find persons, and to localize the base of a fire. Maintenance technicians use thermography to locate overheating joints and sections of power lines, which are a sign of impending failure. Building construction technicians can see thermal signatures that indicate heat leaks in faulty thermal insulation and can use the results to improve the efficiency of heating and air-conditioning units.

Some physiological changes in human beings and other warm-blooded animals can also be monitored with thermal imaging during clinical diagnostics. Thermography is used in allergy detection and veterinary medicine. It is also used for breast screening, though primarily by alternative practitioners as it is considerably less accurate and specific than competing techniques. Government and airport personnel used thermography to detect suspected swine flu cases during the 2009 pandemic.

**Objective**

The main objective is to develop virtual instrumentation software to capture and interpret infra-red images for medical use. Following are the stages for implementing the above objective for a specific diseases, say Cancer.

1. Detection of malignant and non malignant cells in male and female subjects.

2. Detection of cancer at an early stage from malignant and non malignant subjects.

**Methods**

The system that we are building takes a set of .img image of a patient as input and analyses it to tell us whether the person is affected by oral cancer. For training the system we have made use of some templates from the same set of patients and used it for analyses. The following block diagram shows the basic working of our system from the front end.

To achieve better results, we analyse the subject from various angles of 0, 45 and 90 of the left and right side. This helps us in comparing the temperatures to make sure our result is more accurate. The block diagram for the algorithms used for 0,45 and 90 degree angles are as follows:

Essentially, we are to develop three modules to analyse the three angular faces of the subject. The modules had to be analysed separately. For the front face of the subject we need to partition the left and right side of the subject to find out the mean of the temperatures on both the sides.

**Results**

Our system can successfully detect whether a person has oral cancer or not based on above comparison between the temperature profiles of ROI. It is an 79% accurate system done on 43 patients ( 24 male and 19 Female) using the Machine Learning Tools LABVIEW and MATLAB (for statistical analysis of Data) along with SPSS V21 software.

**Conclusion**

Our currently implemented system follows the method of first learning and then testing. Our next step would be to completely train the system such that any arbitrary data can be tested on the system. The current system is manually implemented. We are determined to make the system as automated as possible such that the system can resolve an opinion on any set of data.