

A Survey and Analysis on Inflammatory Pain Detection and Standard Protocol Selection Using Medical Infrared Thermography from Image Processing View Point

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Abstract : Human skin containing temperature value more than absolute zero, discharges infrared radiation related to the frequency of the body temperature. The difference in infrared radiation from the skin surface reflects the abnormality present in human body. Considering the difference, detection and forecasting the temperature variation of the skin surface is the main objective of using Medical Infrared Thermography(MIT) as a diagnostic tool for pain detection. Medical Infrared Thermography(MIT) is a non-invasive imaging technique that records and monitors the temperature flow in the body by receiving the infrared radiated from the skin and represent it through thermogram. The intensity of the thermogram measures the inflammation from the skin surface related to pain in human body. Analysis of thermograms provides automated anomaly detection associated with suspicious pain regions by following several image processing steps. The paper represents a rigorous study based survey related to the processing and analysis of thermograms based on the previous works published in the area of infrared thermal imaging for detecting inflammatory pain diseases like arthritis, spondylosis, shoulder impingement, etc. The study also explores the performance analysis of thermogram processing accompanied by thermogram acquisition protocols, thermography camera specification and the types of pain detected by thermography in summarized tabular format. The tabular format provides a clear structural vision of the past works. The major contribution of the paper introduces a new thermogram acquisition standard associated with inflammatory pain detection in human body to enhance the performance rate. The FLIR T650sc infrared camera with high sensitivity and resolution is adopted to increase the accuracy of thermogram acquisition and analysis. The survey of previous research work highlights that intensity distribution based comparison of comparable and symmetric region of interest and their statistical analysis assigns adequate result in case of identifying and detecting physiological disorder related to inflammatory diseases.

Keywords : acquisition protocol, inflammatory pain detection, medical infrared thermography (MIT), statistical analysis

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