

Early Detection of Osteoarthritis Stage by Applying Classification

Technique to Human Joint imagery

Sophal Chan

**A Thesis Submitted in Fulfillment of the Requirements for the**

**Degree of Master of** Science in Information Technology

**Prince of Songkla University**

2018

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#### ABSTRACT

Knee Osteoarthritis (OA) is a degenerative joint disease or degenerative arthritis which is the most common chronic condition of joint inflammation coursing various paints such as joint paint, stiffness, swelling, creaking or creating sound, decrease ability to move and bone spur. It is a major cause of disability in older people. The risk of knee OA increases from age 45 and older. Early diagnosis is typically made using X-ray imagery. The work presented in this thesis has proposed the three different mechanisms for knee OA Classification includes: (i) texture based approach, (ii) graph-based approach, and (c) Convolutional Neural Network deep learning approach. The fundamental idea is to segment X-ray image so as to obtain the X-ray pixels describing the region of interest (ROI) which were done manually and representing these segmentations using an appropriate representation mechanism to translate an X-ray image into a form that serves to captures key information while remaining compatible with the classification process. By pairing each representation with its OA stage, a classifier can be generated to predict the OA stage according to the nature of a selected representation. The generated classifier can be then used to provide a quick and easy mechanism for labelling the X-ray imagery.

**Keywords:** Image classification, Image Analysis, Image Processing, Osteoarthritis, X-ray image Analysis, Data Mining, Osteoarthritis Analysis, Osteoarthritis Stage Analysis, Medical Image Processing,

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