

UNIVERSITI TEKNOLOGI MARA

**FACIAL FEATURES POINT
LOCALIZATION USING MODIFIED
SIFT SCALE SPACE**

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of the requirements for the degree of
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AUTHOR'S DECLARATION

I declare that the work in this thesis was carried out in accordance with the regulations of Universiti Teknologi MARA. It is original and is the results of my own work, unless otherwise indicated or acknowledged as referenced work. This thesis has not been submitted to any other academic institution or non-academic institution for any degree or qualification.

I, hereby, acknowledge that I have been supplied with the Academic Rules and Regulations for Post Graduate, Universiti Teknologi MARA, regulating the conduct of my study and research.

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ABSTRACT

Face recognition has been recognized as one of the most promising biometric systems. One challenge in facial recognition is recognition of facial expressions. The problem of facial expression arises due to the activity of changing the shape of the face. Surface change creates high-dimensional data during feature extraction work. There are many algorithms proposed for recognition of facial expressions, including SIFT algorithms that are considered superior in performing feature extraction. However, SIFT has also been reported to be capable of generating high dimensional data, this affects the performance of the SIFT algorithm especially when the presence of False-Positive feature points is present with such high-dimensional data. The issue mentioned requires a new action to resolve it. This study aimed to develop a new algorithm in the form of hybrids when the scaling technique in SIFT was integrated with another technique. This hybridization forms a new technique called modified SIFT scale space. In this study, the original SIFT scaling technique, the Gaussian filter, was integrated with the proposed Savitzky Golay filter. The purpose of this integration is because it is hoped that the Savitzky Golay filter can act as a high-preservation data generated by SIFT. Two databases have been used for examine the image recognition. The databases are CASIA 3D Face V1 and the Bosphorus database. Four different facial expressions were selected from each database; neutral, smile, sad, and surprise. Three tests were used on the original SIFT algorithm and modified SIFT. The first test is to evaluate the accuracy of the built-in vector feature. The results showed that modified SIFT yielded more consistent results than the original SIFT. The second test assesses the feasibility of repeatability based on the value of feature vectors. The existence of consistency towards results by modified SIFT indicates that the use of Savitzky Golay as a Gaussian coupling technique in scale space can have an impact by preserving the quality data. The third test on facial expression recognition process showed that the modified SIFT give more stable result than the results of the SIFT algorithm when the tests are performed on two different databases.

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