

## Abstract

With such rapid technological development, smartphones become attractive option to support their our daily activities. Unlike ordinary mobile phone, smartphone offers features that are more diverse, so that users can perform a variety of activities such as reading email, chatting, document processing, video calls, download and upload data and other activities. Therefore, it takes a security feature as the user authentication process autentikasi for preventing unauthorized person to accessing the smartphone and the misuse of inside it.

Password to authenticate users who are in common use, but there are some shortcomings passwords, among others, the complexity of the combination of a secure password and users often forget passwords. Thus, face recognition system can be an alternative as user authentication for a face image of each individual is different and ease of operation

Principal Component Analysis (PCA) or also known as Karhunen-Loeve Transformation (KLT) is a statistical feature extraction methods and has been known for a long time in the world of pattern recognition [8]. In the face recognition system, the PCA has the advantage because it can extract all information related to the face (facial information), called the facial features (face features) such as eyes, nose and lips. Additionally, PCA effectively represented face image to reduce computational complexity and space (space complexity) by reducing the dimensions of a large facial image into smaller dimensions.

The results showed that face recognition system as a user authentication on a smartphone built with the method of PCA produce quite good accuracy. The accuracy is greatly influenced by variations in facial images of lighting conditions, pose, facial ornaments and facial expressions. Decrease resolution facial images providing significant differences in the time of authentication process but does not always make a difference in the accuracy of the authentication process. The decline to a certain resolution provides the same level of accuracy but when the resolution decreasing again, it will also reduce the level of accuracy.

**Keywords: User authentication, smartphones, face recognition system, Principal Component Analysis (PCA).**