**ABSTRACT** 

Color blindness is a condition that limits an individual's ability to distinguish

between certain colors. In general, people with color blindness will have difficulty

identifying specific colors. Therefore, a system capable of automatically detecting

and classifying color patterns on color blindness test tools is necessary.

In this study, a color pattern detection system was developed using the K-

Means method based on OpenCV. The K-Means method is used to perform color

Clustering on images from the color blindness test by dividing the image pixel into

several main color clusters based on a predefined number. The process begins with

image acquisition using a camera, followed by preprocessing stage to enchance

image quality before performing color clustering.

The results show that the K-Means method is capable of clustering colors

with high accuracy, allowing the color patterns on the color blindness testing tools

to be clearly detected. The OpenCV based implementation makes the system

efficient and easy to integrate with other applications. System evaluation indicate

that the digit recognition accuracy reaches 93.33% from a total 15 test data, with an

average error rate of 6.67%. This system is expected to assist individuals with color

blindness in automatically interpreting the results of color blindness tests and

minimizing potential errors during the examination.

**Kata Kunci:** Color Blindness, K-Means, OpenCV, Clustering

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