

**THE IMPLEMENTATION OF K-MEANS CLUSTERING ALGORITHM
FOR DETERMINING THE RIPENESS LEVEL
OF INDRAMAYU MANGO VARIETY**

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ABSTRACT

Indramayu mango is a regional mango variety known for its distinct skin color transformation—from dark green when unripe to yellowish-green when ripe. However, the subtle color changes make it difficult to visually determine the fruit's ripeness level. Traditional methods such as pressing or smelling the fruit are still widely used, despite being inefficient and potentially damaging to the fruit's quality. This study aims to classify the ripeness levels of Indramayu mangoes using the K-Means Clustering algorithm. This algorithm groups data based on similarity, allowing mangoes with similar ripeness levels to be clustered together while distinguishing between ripe and unripe fruits. The research employs Python programming with the HSV (Hue, Saturation, Value) color model to extract color features from mango images, enabling more accurate classification. Image data were collected from various fruit vendors, representing different ripeness stages. The system utilizes the Elbow Method to determine the optimal number of clusters, which is set to $K = 2$ (ripe and unripe). Evaluation using the Silhouette Score yielded a value of 0.7727, indicating that the method is effective in clustering the ripeness levels of Indramayu mangoes.

Keywords: *Clustering, K-Means, Mango*