

## **ABSTRACT**

*A building definitely requires a lot of electrical energy, especially if the area has many buildings, such as the Telkom University area which has many buildings in it. The electricity used in one building must be large, therefore, the use of electricity must always be monitored to know the details of electricity usage.*

*The monitoring system will help determine the electricity usage of each building and determine the electricity usage used in one building. Grouping of electricity usage is also needed to be able to find out which is excessive use in a building and display information from the use of each building. By using unsupervised learning with the K-Means++ algorithm which will help classify electricity usage data. Making a monitoring system displays information about electricity usage in each Telkom University building and also displays the results of grouping electricity usage using K-Means++. This monitoring system will carry out 3 grouping processes: daily grouping, monthly grouping, and grouping between buildings.*

*The Silhouette value for real data grouping in May has a value of 0.996, virtual device data grouping in July has a value of 0.85, real data grouping on May 5 has a value of 1, virtual device data grouping on July 19 has a value of 1, and building grouping has a value of 0.857. All Silhouette results have a very good structure, in other words, real data and virtual devices are of high quality. For the best Silhouette value, there is real data taken in May 2021 with a Silhouette value of 1, or it can be strongly structured.*

*Keywords: Electricity Usage Grouping, Clustering, Machine learning, Unsupervised learning, Monitoring System, K-Means++, Monitoring System.*