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Grouping Mortgage Data By Job Using The Clustering Method

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ABSTRAK

Penelitian ini membahas tentang penerapan metode pengelompokan data berbasis klaster (clustering) untuk mengelompokkan data Kredit Pemilikan Rumah (KPR) berdasarkan jenis pekerjaan para peminjam. Tujuan dari penelitian ini adalah untuk mengidentifikasi pola-pola yang mungkin ada dalam data KPR dan mengelompokkannya menjadi kelompok-kelompok yang memiliki karakteristik pekerjaan yang serupa. Dalam penelitian ini, metode klaster digunakan untuk mengelompokkan data KPR berdasarkan atribut pekerjaan dari para peminjam. Data yang dikumpulkan meliputi informasi pekerjaan dan beberapa atribut terkait lainnya. Proses klasterisasi dilakukan dengan menerapkan algoritma tertentu untuk mengelompokkan data menjadi kelompok-kelompok yang berbeda. Hasil dari penelitian ini diharapkan dapat memberikan wawasan tentang hubungan antara jenis pekerjaan dan karakteristik peminjam KPR. Dengan pemahaman yang lebih baik tentang pola ini, lembaga keuangan dan instansi terkait dapat mengambil keputusan yang lebih terinformasi dalam pengelolaan produk KPR, risiko kredit, serta pengembangan strategi pemasaran yang lebih efektif. Metode pengelompokan data ini dapat memberikan kontribusi dalam meningkatkan efisiensi analisis data dan pengambilan keputusan dalam sektor finansial.

ABSTRACT

This research discusses the application of a cluster-based data grouping method (clustering) to group Home Ownership Credit (KPR) data based on the type of work of the borrowers. The aim of this research is to identify possible patterns in mortgage data and group them into groups that have similar job characteristics. In this study, the cluster method is used to classify mortgage data based on the job attributes of the borrowers. The data collected includes job information and several other related attributes. The clustering process is carried out by applying certain algorithms to group data into different groups. The results of this study are expected to provide insight into the relationship between the type of work and the characteristics of mortgage borrowers. With a better understanding of these patterns, financial institutions and related agencies can make more informed decisions in managing mortgage products, credit risk, and developing more effective marketing strategies. This data grouping method can contribute to improving the efficiency of data analysis and decision making in the financial sector.

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1. INTRODUCTION

Grouping and classifying data is an important aspect in data analysis, especially when the existing data is very large and complex. One area where data grouping has a significant role is in the analysis of home financing, especially Home Ownership Credit (KPR). KPR is one of the main financial instruments that allows people to buy property on credit with certain terms and conditions. In the world of banking and financial institutions, an in-depth understanding of the profile of prospective mortgage borrowers is very important. Based on employment, place of residence and age, banks can identify patterns, risks and potential opportunities related to prospective mortgage borrowers. For example, prospective borrowers with certain occupations and residences may show a tendency to have lower credit risk, whereas the opposite may help PT. Batam Cahaya is successful in terms of clustering housing sales that are most popular, quite popular and less popular

Another research is about consumer segmentation analysis using the k-means clustering algorithm. With the conclusion: To determine consumer segmentation, clustering is done, namely by grouping data based on consumer characteristics. So in this research, the clustering process was carried out by grouping consumer data based on three attributes, namely, type of motorbike, type of purchase and occupation. The data used is motorbike sales data at Honda dealers. The consumer grouping process is carried out using the K-Means algorithm. This algorithm works by dividing data into k clusters. Each cluster is determined based on the closeness of the distance between each data and its center point (mean point). From the results of the comparison of applications using SPSS software, the difference between each cluster was obtained with an average of 7%. This is because the initial centroid was chosen randomly.

The application of the K-Means Clustering method has been carried out by many previous researchers, including the Application of Data Mining in Clustering Sales Target Achievement Using the K-Means Algorithm. Conclusions obtained Using this method, the data that has been obtained can be grouped into several clusters based on the similarity of the data, so that data that has the same characteristics is grouped in one cluster and those that have different characteristics are grouped in different clusters. others that have the same characteristics. Results of this research

2. METHOD

In using the clustering method, the initial process carried out to form clusters is to transform the data into numerical form with predetermined codes, then determine the number of groups (K), calculate the centroid, calculate the use of objects to the centroid and then group them based on work and place. Just respond to the complaints you feel, if there are no objects or groups moved then the iteration is complete. The system process or workflow for grouping KPR data based on occupation, place of residence and age using the clustering method can be seen in the form of a flowchart as in the image below

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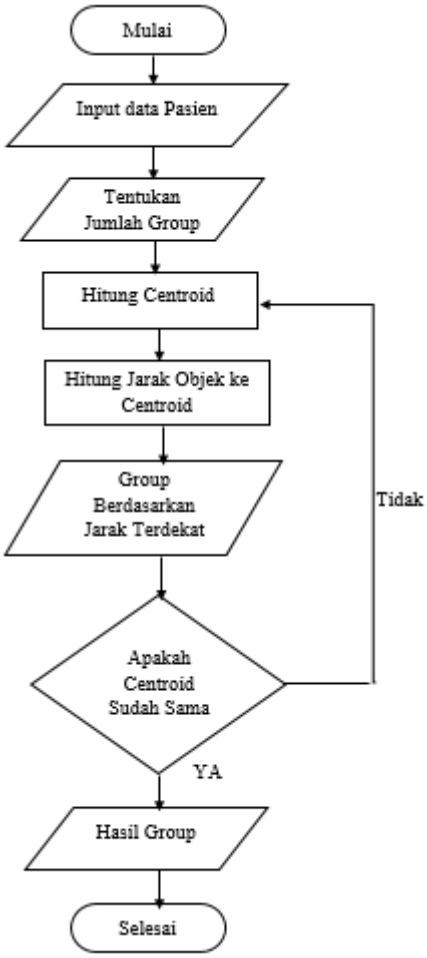

Figure 1. Clustering Method Flowchart

3. RESULTS AND DISCUSSION

In the discussion of the test results, the results of each system testing stage will be displayed and explained so that later the analysis results can be written in the conclusion. The following is a display and explanation of each stage:

3.1 First Test Results

The following displays the results of the first test of the cluster process, the cluster results table, and the cluster graph:

Figure 2. First Test Results

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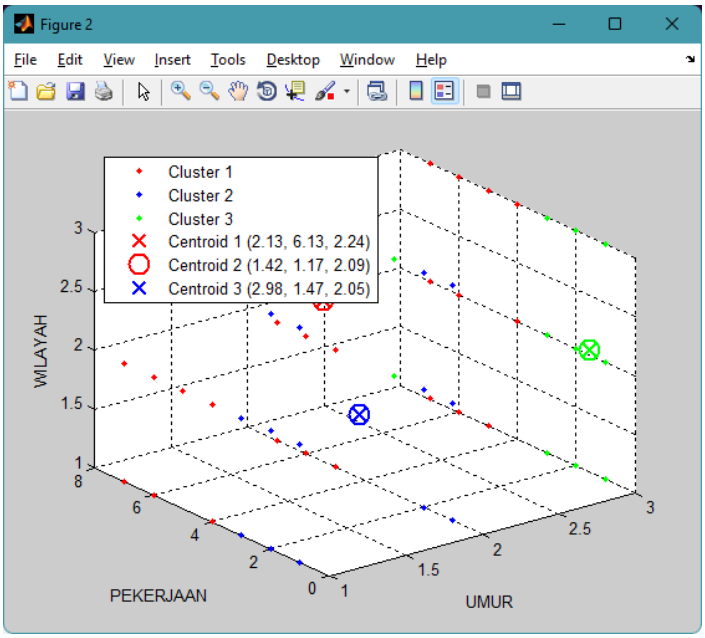

Figure 3. First Test Cluster Graph

From 1026 groupings of KPR data based on age, occupation and region, 3 groups were obtained, where the largest group in this first test was in cluster 2 with a total of 299 data in groups with centroids of 1.42, 1.17, 2.09, namely ages 22-25, private companies and West Binjai region.

3.2 Second Test Results

The following displays the test results of the two cluster processes, the cluster results table, and the cluster graph:

Figure 4. Second Test Results

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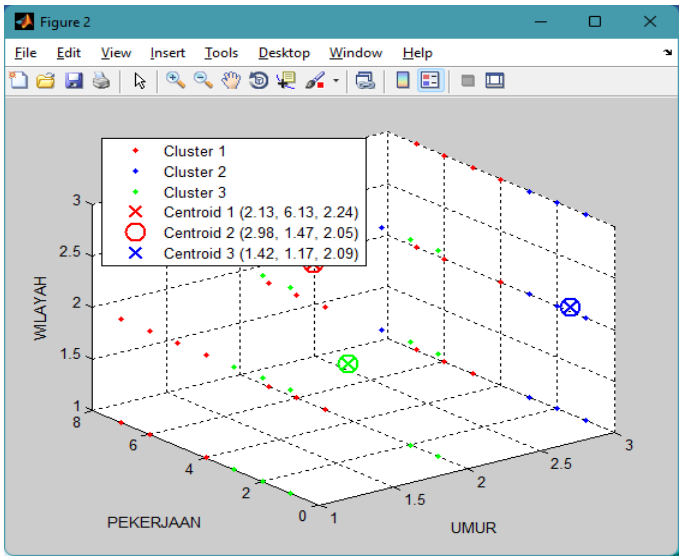

Figure 5. Second Test Cluster Graph

From 1026 groupings of patient data based on work and place of residence regarding perceived complaints, 3 groups were obtained, where the largest group in this second test was in cluster 3 with a total of 299 data in groups with centroid centers of 1.42, 1.17, 2.09, namely ages 22-25 Private company jobs and West Binjai area. It can be seen that in this second test there was a change or movement of clusters, where previously the largest group in the first test was in cluster 2, therefore the test will continue to the next stage.

3.3 Third Test Results

The following displays the test results of the three cluster processes, the cluster results table, and the cluster graph:

Figure 6. Third Test Results

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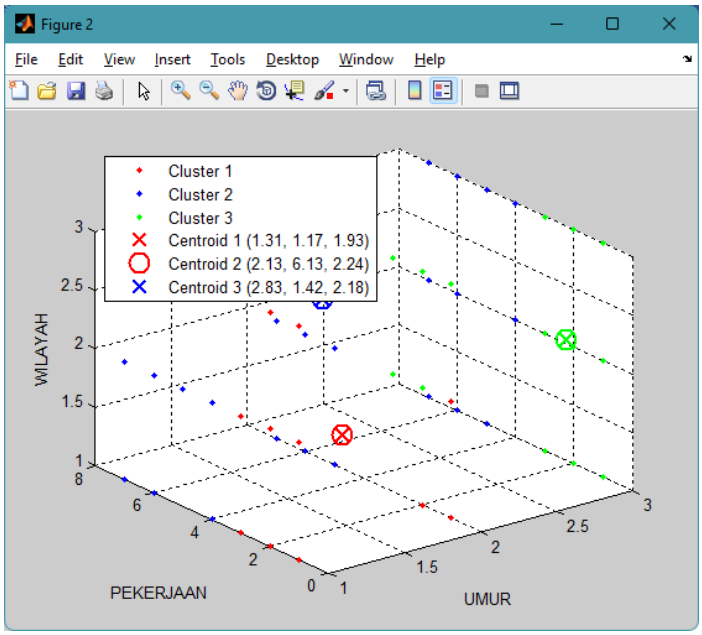

Figure 7. Third Test Cluster Graph

Of the 668 KPR data groupings based on Age, Regional Fund Occupation, 3 groups were obtained, where the largest group in this third test was in cluster 3 with a total of 312 data in groups with centroid centers of 2.83, 1.42, 2.18, namely age 30-41, private company work and West Binjai region. It can be seen that the largest group in the third test is the same as the results of the second test, namely in cluster 3, so the testing phase was stopped in the third test.

3.4 Implementation

In this chapter, we will explain the results of testing the k-means algorithm development software using Matlab (matrix laboratory) R2014a to find out the results of grouping mortgage data based on age, occupation, regional funds. Implementation here is an activity where data that has been transformed is applied to the programming used and processed according to the clustering method with the k-means algorithm, so that it can be seen to what extent the system's performance is in processing data and producing information according to user needs.

4. CONCLUSION

From the results of manual calculation tests carried out using the Clustering method with the K-Means algorithm, it can be seen that from the 20 KPR data used, 3 groups were obtained by age, occupation and region, where the largest group in the KPR data was in Cluster 1, centered on 1.00, 1.29, 2.29, namely KPR data for those aged 22-25, working in private companies and residing in the West Binjai area

From the results of system testing carried out using the Clustering method with the K-Means algorithm, from the 668 KPR data used, 3 groups were obtained with the criteria of Employment, Residence and Complaints. It can be seen from the results of the first test that the group with the most KPR data is in Cluster 2 with 299 data in the group aged 22-25, working in private companies and in the West Binjai area. It can be seen from the test results that the two groups with the most patient data are in Cluster 3 with 299 data in the group aged 22-25, working in private companies and in the West Binjai area. And it can be seen from the test

results that the three groups with the most KPR data are in Cluster 2 with a total of 312 data in groups with centroid centers of 2.83, 1.42, 2.18, namely ages 30-41, jobs in private companies and the West Binjai area..

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