Journal of Artificial Intelligence and Engineering Applications

Website: https://ioinformatic.org/

15th February 2024. Vol. 3. No. 2; e-ISSN : 2808-4519

Prediction Analysis of Literacy Numeracy and Technology Adaptation Abilities of Students Who Participate in Teaching Campuses Using the KNN Algorithm

Rozaq Habibi [1]*, I Gusti Prahmana[2], Indah Ambarita[3], Lina Arliana Nur Kadim[4]

[1234]*STMIK Kaputama*

rozaqhabibi456@gmail.com [1]; igustiprahmana4@gmail.com [2], yesnovada@yahoo.com[3], lina_arliana@yahoo.com[4]*

Abstract

Literacy and numeracy skills, technological adaptation carried out by students during the Ministry of Education and Culture's campus teaching program are influenced by the limited competencies possessed by students which are not in accordance with the study program and learning can be influenced by location, network and distance to school, influencing independent campus program activities which are less effective. and efficient in teaching. So the learning and teaching process when students are on site inspection is primarily and foremost when students carry out observations at the target school. Literacy is the process of training students in the knowledge of reading techniques. Numeracy is the process of training students in knowledge of counting techniques and technological adaptation which plays a very important role in influencing digital literacy and numerization. Students and teachers still experience difficulties in the field of hardware technology and many still have low knowledge in carrying out and implementing technological adaptation in schools. with location, network and distance for schools in remote areas. Higher education greatly influences the teaching competence of students who take part in campus teaching programs. So students carry out literacy, numerization and technology adaptation programs according to their study program. Assist the campus in analyzing the campus teaching competency of the Ministry of Education, Culture and Research and Technology's campus teaching program using the K-Nearst Neighbor algorithm. By predicting the level of teaching competency, students in the campus teaching program can know the teaching competency abilities of students who take part in the campus teaching program. Based on testing using 35 test data, the value K = 3 predicts the level of teaching quality and competency so that the system accuracy is 75%, proven by testing the Python programming language system.

Keywords: *Literacy, Numeracy, Teaching Campus, Technology Adaptation, Independent Campus*

1. Introduction

Kampus Merdeka-Merdeka Belajar, a new policy programmed by the Ministry of National Education in mid-2019. Based on an approach to school students and students to be able to determine lessons or courses that suit their interests, so that students and students can work optimally in accordance with their talents and abilities that will significantly change the fate of the nation.The existence of the Teaching Campus program aims to help restore the quality of education after the Covid 19 pandemic and equal distribution of education throughout Indonesia so that there is no gap between schools [1]. In addition, literacy and numeracy skills in students have regressed due to lack of maximum education during the COVID-19 pandemic, lack of facilities, and lack of understanding related to the Independent Curriculum. For almost more than 2 years, Indonesia has implemented all activities carried out at home, including learning from home. Learning from home is appropriate to avoid transmission of the COVID-19 virus but has a lack of effectiveness for children's learning [10].

The Teaching Campus is part of the Merdeka Belajar Kampus Merdeka (MBKM) program which invites students throughout Indonesia to become teachers and teach elementary school students in the 3T area, namely the front, lagging and outermost in order to strengthen learning and help schools in their learning period [2].

The ability of literacy, numeracy and technology adaptation carried out by students during the campus teaching program of the Ministry of Education and Culture and Technology from the first to fifth batch is influenced by the limited competencies possessed by students not in accordance with the study program.as well as location, network and distance to school affect the activities of the independent campus program which is less effective and efficient in teaching [8]. With the prediction of the level of teaching competence of students, campus teaching campus programs can determine the ability of student teaching competencies in campus teaching programs at STMIK Kaputama. With an analysis to assess the competence of students who follow the teaching campus of the Ministry of Education and Culture in accordance with the Teaching Campus program plan, namely to increase student motivation and interest in learning starting from understanding literacy, numeracy and technology adaptation [3].

Students teach students to learn in a fun way according to the main program of the Teaching Campus. Campus teaching activities have succeeded in improving student literacy, numeracy and technology adaptation in the learning process and daily life. So this research in the process of the teaching campus student learning system needs to know college campuses with different study programs in the teaching competence of the Ministry of Education and Culture and Technology [1].

The K-Nearest Neighbor (KNN) algorithm is an algorithm that can make predictions. The working principle of this algorithm is very simple, namely by calculating the closest distance. This means that if there is a new object inserted that is not recognized, then the K-NN algorithm will look for the object closest to the newly entered object in the database, and then perform the same action on the newly inserted object to the closest object.

2. Research Methods

2.1. Independent Learning Independent Campus

The Independent Campus Learning Policy (MBKM) is a learning activity in higher education that gives students the right and freedom to study outside the study program for three semesters which can be taken for learning outside the study program in higher education and/or learning outside higher education [9]. The Teaching Campus is part of the MBKM program which aims to provide opportunities for students to learn and develop themselves through activities outside the lecture classroom [7].

2.2. Technology adaptation

The Teaching Campus focuses on improving literacy and numeracy skills at elementary, middle school and vocational school levels. The Teaching Campus Program opens up space for students to be able to dedicate their skills and knowledge to helping these students.Technological adaptation is adapting oneself to certain situations to face a problem by using the practical application of knowledge [4].

2.3. Algorithm K-Nearst Neightbor

K-Nearest Neighbor (KNN) is an algorithm for carrying out classification by comparing the neighbor distance of each data point with the data to be predicted. Classification is a method used to group objects based on certain characteristics. In the Python programming language, classification algorithms can be carried out in several ways. One classification algorithm is K-Nearest Neighbors (KNN), where grouping is based on the proximity between objects. The model resulting from the kNN classification learning machine in Python can be used to predict an object [11].

1.Steps in the KNN algorithm:

Determine the number of neighbors (K) that will be used to consider class determination.Calculate the distance from the new data to each data point in the dataset. Take a number of K data with the closest distance, then determine the class of the new data.

To find how close or far the distance between points in class k is usually calculated using Euclidean distance. Euclidean distance is a formula for finding the distance between 2 points in two-dimensional space. The following is the formula for calculating Euclidean distance:

$$d = \sqrt{(x_1 - x_1)^2 + (y_1 - y_2)^2} \quad (1)$$

Information:
x = sample data
y = data uji
d = distance

2.4. Python programming

Python is an interpreter programming language and can be done with the paradigm of object-oriented programming, functions, or in the usual way, namely procedural oriented programming, the application of python is used in making lightning analysis on transmission lines using the paradigm of object-oriented programming [5].

3. Results And Discussion

The KNN algorithm must have data that is processed as a calculation analysis looking for accuracy values where the data is in the form of testing data and training data, the following is the analysis data that will be carried out in the search calculation process. Analysis of predictions of the level of teaching quality competence in literacy, numeracy and technology adaptation to students The following data is below:

Table 1: Teaching Campus Competency Dataset

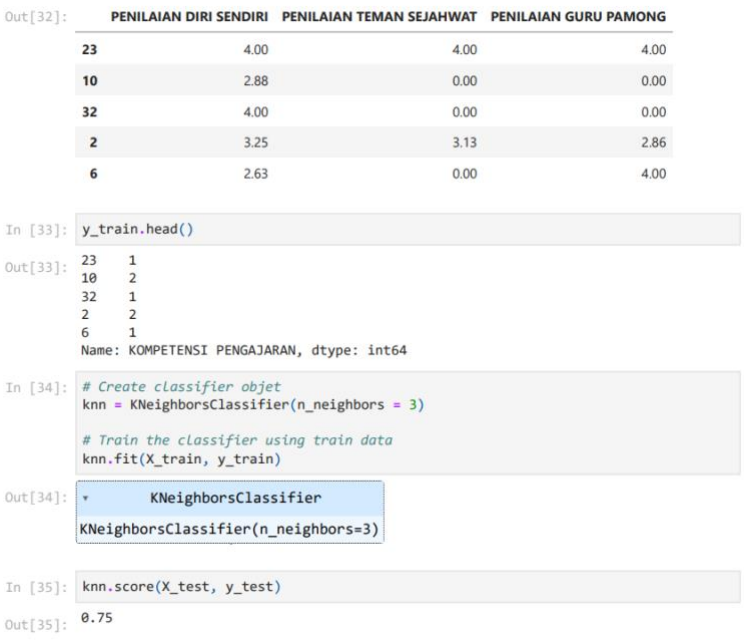
Self-Assessment	Peer Assessment	Civil Service Teacher Assessment	Teaching Competencies
3,63	3,68	4	1
4	4	4	1
3,25	3,13	2,86	2
4	4	4	1

3	0	4	1
3	3,75	3,86	1
2,63	0	4	1
3,75	0	4	1
3,88	4	3,57	1
4	4	4	2
2,88	0	0	2
0	0	0	1
3,25	0	3,5	1
2,65	0	4	3
3,88	4	3,57	1
4	3,25	3,79	1
3,25	3,13	2,86	1
……	……	……	..
3,25	3,13	2,75	1

Through analysis to assess the competence of students who attend the teaching campus of the Ministry of Education and Culture, in accordance with the Teaching Campus program plan, which is to increase student motivation and interest in learning starting from understanding literacy, numeracy and adaptation to technology. Students educate their students to learn in a fun way according to the main program of the Teaching Campus. Teaching activities on campus have succeeded in improving student literacy, numeracy and technology adaptation in the learning process and daily life. So in this study, in the process of the learning system, campus students, teachers need to know about college campuses with different study programs in the competence of teaching campus teachers of the Ministry of Education and Culture of Research and Technology.

4. Testing

The results of the program display analysis process predict the level of teaching quality competence in literacy, numeracy and technology adaptation to students can be seen in the picture below:



Out[32]:

	PENILAIAN DIRI SENDIRI	PENILAIAN TEMAN SEJAHWAT	PENILAIAN GURU PAMONG
23	4.00	4.00	4.00
10	2.88	0.00	0.00
32	4.00	0.00	0.00
2	3.25	3.13	2.86
6	2.63	0.00	4.00

```
In [33]: y_train.head()

Out[33]: 23    1
         10    2
         32    1
         2     2
         6     1
         Name: KOMPETENSI PENGAJARAN, dtype: int64

In [34]: # Create classifier objet
         knn = KNeighborsClassifier(n_neighbors = 3)

         # Train the classifier using train data
         knn.fit(X_train, y_train)

Out[34]: KNeighborsClassifier
         KNeighborsClassifier(n_neighbors=3)

In [35]: knn.score(X_test, y_test)

Out[35]: 0.75
```

Fig 1: Accuracy Test Results with Python

In the picture above, the results of the python program that have been tested for the accuracy of predicting teaching competence for STMIK Kaputama students who have been researched amounted to 0.75%. With the value of the distance of the nearest neighbor with the Value of K = 3. So the results of the research are the competence of students in teaching MBKM Teaching Campus with good results.

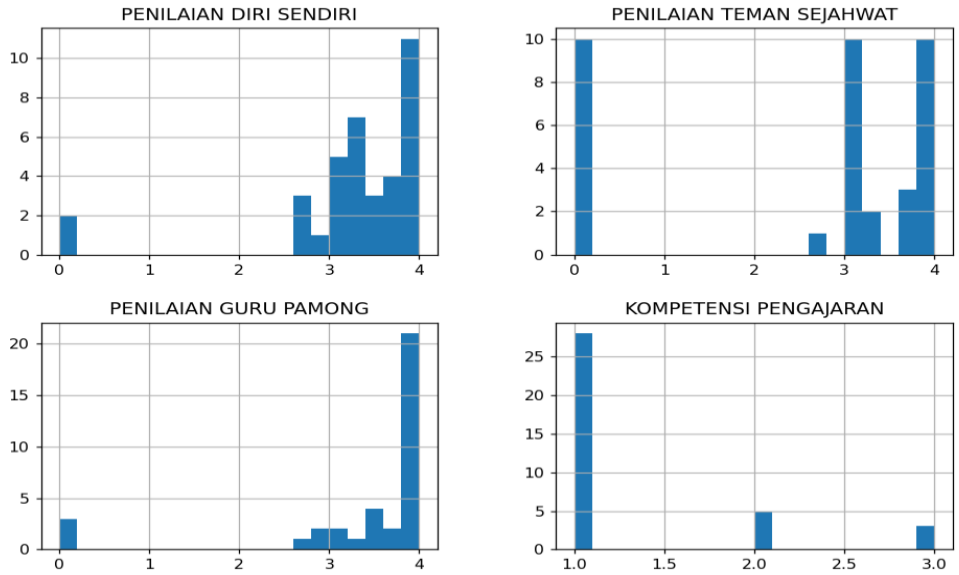


Fig 2: Grouping Data Set Results

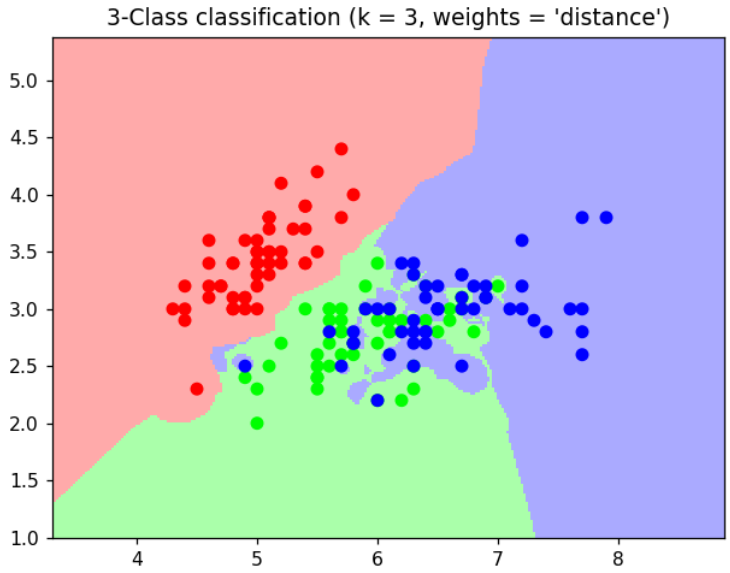


Fig 3: Classification results for Nearest Neighbor Distance K=3

5. Conclusions

The KNN algorithm can solve the problem of predicting the level of Competency Teaching Quality Level in Literacy, Numerization and Technology Adaptation for students participating in the Independent Learning Teaching Campus program at STMIK Kaputama . Based on testing using 35 test data exist with a predicted value of K = 3. Competency Teaching Quality Level so that system accuracy is 75%, proven by testing the Python programming language system.

References

[1] A.Waldi, N. M. Putri, I. Indra, V. Ridalfich, D. Mulyani, and E. Mardianti, "Peran Kampus Mengajar dalam Meningkatkan Literasi, Numerasi dan Adaptasi Teknologi Peserta Didik Sekolah Dasar di Sumatera Barat," J. Civ. Educ., vol. 5, no. 3, pp. 284–292, 2022, doi: 10.24036/jce.v5i3.725.

[2] Nizam, "MBKM Guidebook," pp. 1–42, 2020.

[3] F. P. N. Wahyuni and D. Tranggono, "Upaya dalam Meningkatkan Literasi, Numerasi, dan Adaptasi Teknologi Siswa melalui Program Kampus Mengajar 4 di SMP Widya Gama Mojosari," J. Pengabdi. Nas. Indones., vol. 4, no. 1, pp. 125–133, 2023, doi: 10.35870/jpni.v4i1.128.

[4] T. Trismawati et al., "Adaptasi Teknologi Informasi Pembelajaran untuk Meningkatkan Efektifitas Keberhasilan Pembelajaran Daring di SDN Sumber Wetan 1 Probolinggo," J. Abdi Panca Marga, vol. 3, no. 1, pp. 46–50, 2022, doi: 10.51747/abdipancamarga.v3i1.986.
[5] M. Reza et al., "Artifical Intelligence : Image Processing & Application with Python," Semin. Nas. Pengabdi. Masy. LPPM UMJ, vol. 1, no. 1, pp. 1–8, 2022, [Online]. Available: http://jurnal.umj.ac.id/index.php/semnaskat.
[6] G. Prahmana and K. Annatasia Br Sitepu, "Knearst Algorithm Analysis – Neighbor Breast Cancer Prediction Coimbra," J. Artif. Intell. Eng. Appl., vol. 1, no. 3, pp. 226–230, 2022, doi: 10.59934/jaiea.v1i3.97.
[7] M. Tohir, "Buku Panduan Merdeka Belajar-Kampus Merdeka," 2020.
[8] Dewayani, Sofie, dkk. Inspirasi Pembelajaran yang Menguatkan Literasi Pada Mata Pelajaran Bahasa Indonesia untuk Jenjang Sekolah Menengah Pertama. Direktorat Sekolah Menengah Pertama. 2021.
[9] Susanto, Dicky, dkk. Inspirasi Pembelajaran yang Menguatkan Numerasi Pada Mata Pelajaran Matematika untuk Jenjang Sekolah Menengah Pertama. Direktorat Sekolah Menengah Pertama. 2021.
[10] A. R. Isnain, J. Supriyanto, and M. P. Kharisma, "Implementation of K-Nearest Neighbor (K-NN) Algorithm For Public Sentiment Analysis of Online Learning," IJCCS (Indonesian J. Comput. Cybern. Syst., vol. 15, no. 2, p. 121, 2021, doi: 10.22146/ijccs.65176.