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Utilisation of Machine Learning in Islamic Learning

Rahman[1]
[1]Universitas Islam Negeri Sultan Syarif Kasim Riau, Indonesia

ABSTRACT

Background. Machine learning is a branch of artificial intelligence that has become an important component in modern technology. This is due to its ability to develop computer programmes that can access and process data. In the context of Islamic learning, the application of machine learning can be a solution to improve the learning process and help in checking plagiarism.

Purpose. This research aims to explore the utilisation of machine learning in Islamic learning. The specific objective is to understand the extent to which machine learning can facilitate Islamic religious education students in the learning process and assist in checking plagiarism.

Method. This research uses a quantitative approach by collecting data through the Google Form application distributed to Islamic religious education students as research subjects. The data obtained is in the form of numbers which are then analysed to gain an understanding of the use of machine learning in Islamic learning.

Results. The results showed that the use of machine learning can facilitate Islamic religious education students in learning and is effective in checking plagiarism. Students experience ease in understanding the material and the learning process becomes more efficient.

Conclusion. Based on the research results, it can be concluded that machine learning has great potential in improving Islamic learning by solving various problems that may occur, such as difficulties in understanding the material and plagiarism problems. Nevertheless, this study has limitations in the scope of the subject which only focuses on Islamic religious education students. Therefore, the researcher recommends further research to expand the scope of subjects and deepen the understanding of the use of machine learning in various fields, as a reference for future research.

KEYWORDS

Islamic Religion, Machine Learning, Utilization

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Correspondence:

Rahman,
rahman@uin-suska.ac.id

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INTRODUCTION

In the current era of globalisation, technological development is so rapid that experts call it a revolution or change (Acheampong et al., 2019; Khan et al., 2019). The development of technology is inseparable from various aspects of human life (Madni et al., 2019). Because technology always develops in accordance with the times and science (Schmidt et al., 2019).

Technology has become a very important thing for humans that cannot be separated anymore (Ai et al., 2018). As a result of the existence of technology, many changes have occurred in various aspects of human life. The benefits of technology can find out various information and events that exist in various parts of the world (Abu-elezz et al., 2020). Technology can also facilitate communication between people in various regions and countries that are separated. This is due to the development of technology that knows no boundaries of distance, time, speed, capacity, quantity and so on (Bhatia et al., 2020).

Technological developments are currently also affecting the field of education. Technology has a huge impact on education, both negative and positive impacts (Chen & Lei, 2018). The negative impact of technology in the field of education is to encourage violations of Intellectual Property Rights (IPR) (de Oliveira Garcia et al., 2020). Because of the easier access to information, students become lazy to think. Thus making it easier for students to commit plagiarism in making assignments (Foltýnek et al., 2020). As well as training children to think briefly and be individualistic. Behind this negative impact, there are many positive impacts of technological development. One of them is that the necessary information is available quickly and easily, encouraging new innovations in education that can facilitate the online learning process (Hurlbut, 2018).

Over time, various innovations have emerged that can improve mindsets and develop competencies that can minimise problems in the world of education (Yu et al., 2023). Like Artificial Intelligence, which is a branch of computer science that focuses on developing machine intelligence, thinking and working like humans (Pretorius & Kotze, 2021). Artificial Intelligence is also called the ability of machines to perform tasks like human intelligence. Examples include speech recognition, problem solving, learning and planning (De Vries et al., 2023). The purpose of Artifical Intelligence (AI) is to understand what intelligence is and make machines more useful in education and facilitate learning (Davidovic, 2023). Creating better learning quality and shaping student character values (Saha & Manickavasagan, 2021).

One of the branches of Artificial Intelligence (AI) is machine learning (Stich et al., 2021). Machine learning is a machine designed to learn on its own without user guidance (Bengio et al., 2021) . Machine learning has been developed in other disciplines such as statistics, mathematics, and data mining, so that machines can learn by analysing data without having to be programmed or controlled (Karhade et al., 2018). Machine learning focuses on developing systems or algorithms that continuously learn from data and improve their accuracy without specialised programming (Abualigah et al., 2021). According to Athur Samuel, an American game pioneer in computer and artificial intelligence, machine learning is a branch of science that studies how to give computers the properties of learning without special programming (Germain et al., 2022). Machine learning usually does so if it is based on ideas from prior knowledge and recognises patterns and makes decisions with as little human intervention as possible (Hüllermeier & Waegeman, 2021).

Machine learning is unlimited as long as they learn the data (Cai et al., 2018). Machine learning is very influential in various fields, such as medicine, industry, communication and also in education (Bordihn et al., 2022). In the world of education machine learning is very useful (Mohan et al., 2019). Among them, the first adapted and depersonalised learning is that machine learning itself is flexible enough to help students learn (Atkinson & Atkinson, 2023). Machine learning learns using algorithms how students consume information. Machine learning gives students the opportunity to continue when they have fully understood the content of the previous lesson (Ros et al., 2022). Secondly, it simplifies tasks, in traditional learning methods, teachers spend a lot of time

doing repetitive tasks such as taking students' attendance. Nowadays machines can be used to reduce these tasks. This gives teachers more time to focus on other tasks.

In education, machine learning has made learning activities easier, faster, and more efficient than manual learning (Zainuddin, 2023). Machine learning can help with assessment by tracking student performance on assignments and trying them out. It can also help to track plagiarism in assignments (Anjali et al., 2021). One of the main advantages of its application is that it helps identify the needs of each student so as to distinguish general problems in the classroom from problems specific to each student (Sofroniou et al., 2020). That is, by machine learning no student is left behind or neglected. With machine learning students are also given a forum where they can voice their complaints. Therefore, incorporating machine learning into learning creating systems makes teaching easier for students (Barzilai et al., 2023).

According to Shalev-Shwartz and Ben-David, machine learning is the study of algorithms that learn to perform certain tasks that people do automatically (Shalev-Shwartz & Ben-David, 2014). Learning here refers to the ability to perform various existing activities or exploit new inferences correctly from previously observed patterns. According to Tom Mitchel, computers that have the ability to learn from experience on their tasks and experience improved performance (1997: 15). Meanwhile, according to Ian Goodfellow et al. in their book, machine learning is basically a form of applied statistics with a greater emphasis on using computers to estimate complex functions statistically (2020:6). machine learning is a discipline that uses algorithms and can analyse data automatically.

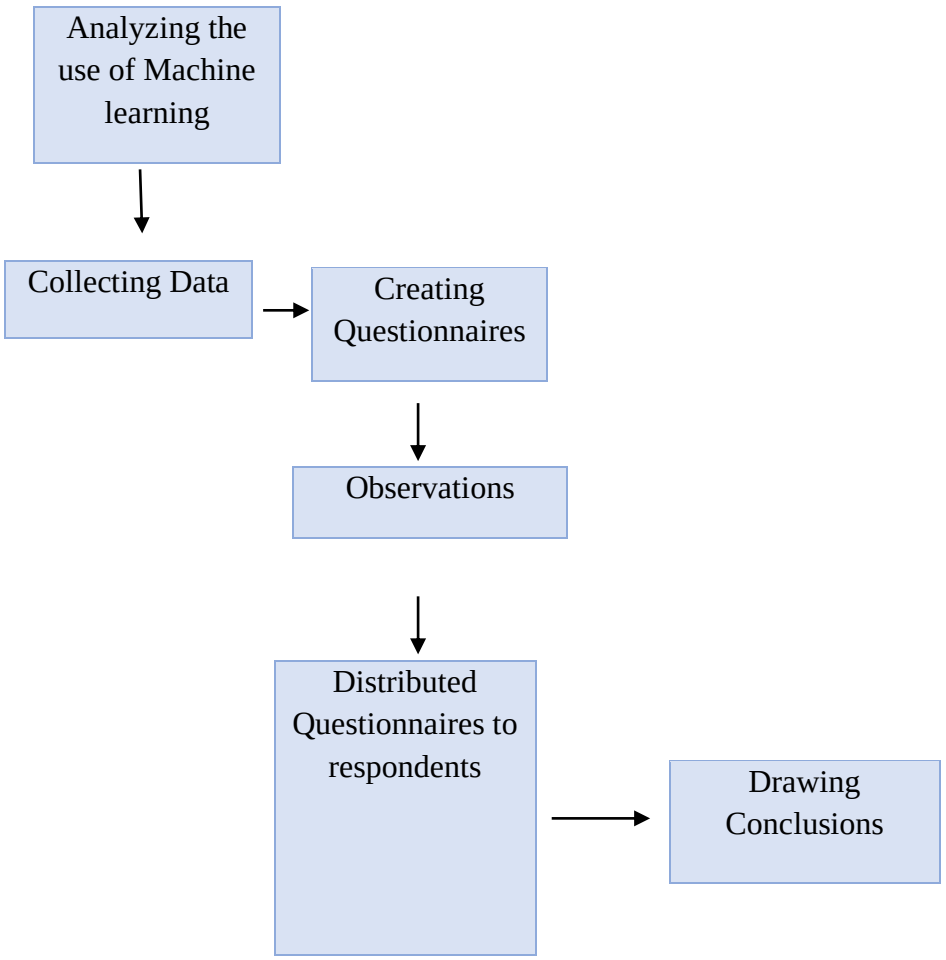
So machine learning is a tool that can facilitate humans in carrying out their activities (Mithu et al., 2022). As a student who can use machine learning, it will greatly facilitate them in every lecture process and the process of making assignments. Students will easily get information that is online and that cannot be found online or review to the library. Machine learning is very important nowadays because it can match human intelligence. Machine learning will continue to develop and learn to analyse data so that the data obtained is less likely to experience errors (Ding et al., 2022). Machine learning in the world of education can also make it easier for teachers or lecturers when making essay questions, absent students. Furthermore, machine learning is an important thing in technology development.

Researchers conducted a study to re-examine the utilisation of machine learning in Islamic religious learning in higher education. Students are expected to be able to use machine learning properly to facilitate the learning of Islamic religion. Researchers can easily find the results and solutions of the learning process as a whole. Machine learning is one of the artificial intelligence that can facilitate students in the learning process. And machine learning is an artificial intelligence that will continue to grow because machine learning continues to learn and correct its mistakes. Machine learning is one of the applications that can influence and improve student learning outcomes. So it can be concluded that machine learning is one of the supports for student learning outcomes and can facilitate the making of student assignments.

RESEARCH METHODOLOGY

This research is a quantitative research that aims to investigate the use of machine learning in Islamic religious education (Lett et al., 2022). Quantitative research is research that describes, summarises, or explains quantitative data obtained from documentary materials such as: interviews, observations, questionnaires or other documentation about the use of machine learning in Islamic religious education. The characteristics of quantitative methods are: clear objectives, approaches, topics, samples, data sources that are determined and detailed from the start (Mi et al., 2022). The

research stage is everything that is hypothetically (if necessary), intended to be completed in preparation. Propose hypotheses to be tested in the research, and the hypotheses determine the predicted results. Data collection allows data presentation and analysis to take place after data collection.



The time and place of research to collect data is in higher education. The topic of this research is to see the feasibility of machine learning in improving student learning outcomes in Islamic religious education (Hochreiter et al., 2023). The method used is quantitative method. This research was conducted in several universities aiming to see the possibility of using machine learning (Mehrabi et al., 2022). Data collection can be done by distributing questionnaires to students to find out how applicable machine learning is to students and also making observations to find out in advance their knowledge, objects of consideration, learning objectives, task problems, preparing observations, determining the necessary secondary data and also recording the results of observations. For example, when researching students at several nearby universities.

RESULT AND DISCUSSION

Machine learning is one of the branches of Artifical Intelligence (AI). Machine learning is artificial intelligence that can solve various problems faced by humans. Machine learning is the science of developing algorithms and statistical models that allow computer systems to perform tasks without explicit instructions, relying instead on patterns and conclusions. The utilisation of machine learning in Islamic learning uses quantitative research methods. quantitative methods are research methods that use a lot of numbers. Starting from data collection to its interpretation.

Collecting quantitative data through distributing questionnaires. Seeking information, formulating questions, obtaining personal data and other insights beyond the research variables. Quantitative research is also called research in the form of using and processing calculations or numbers. This quantitative research method is obtained through a questionnaire as a research instrument that utilises the google form application. Quantitative method is a type of research that produces results that can be obtained by statistical methods or other means of quantification (measurement). Therefore, the use of machine learning in Islamic learning is very influential because it can be an alternative to improve the quality of learning in higher education.

NO	QUESTION	Strongly Agree	Agree	Disagree	Strongly Disagree
1.	Machine learning can be used to increase the accuracy of predictions in various fields in the world of education	10%	88%	2%	0%
2.	Machine learning can be used to check plagiarism in student assignments	18%	82%	0%	0%
3.	Machine learning can increase students' learning potential to achieve superior achievements	22%	72%	6%	0%
4.	Machine learning can motivate students to be more active in learning activities	24%	70%	6%	0%
5.	Machine learning can solve problems in the world of education	14%	82%	4%	0%
6.	Machine learning is the most appropriate solution in the current era of very rapid technological development	26%	68%	6%	0%
7.	Machine learning can be applied at various levels of education	22%	66%	12%	0%
8.	Machine learning can help improve the quality of learning and provide a more effective learning experience	24%	72%	2%	2%
9.	Machine learning can trigger students' enthusiasm in understanding learning.	20%	76%	4%	0%
10.	Machine learning can help students solve various problems that occur during the lecture process	22%	72%	6%	0%
11.	Machine learning is a very important learning machine used in the world of lectures	22%	66%	10%	2%
12.	Machine learning can be used in various fields	16%	76%	8%	0%
13.	Machine learning makes it easier for students in the field of administration	16%	76%	6%	2%
14	Machine learning can be used to create an automatic essay grading system	30%	64%	6%	0%
15.	Machine learning can help in personalized learning	24%	68%	8%	0%
		22%		4%	2%

16.	Machine learning can help in voice assistant learning		72%		
17.	Machine learning can be used to analyze student dropout rates	24%	62%	10%	4%
18.	Machine learning can be used and is able to analyze various data	22%	74%	4%	0 %
19.	Machine learning is able to delete invalid data	20%	74%	6%	0%
20.	Machine learning can search for information online	26%	70%	2%	2%

Table 1.1 Results of Questionnaire Distribution

In the table above, there are several questions about the utilisation of machine learning in Islamic learning for university students. From the table, there are several questions that make it easier for researchers to examine how useful machine learning is for students in learning Islam in higher education. There are 20 questions which contain the utilisation of machine learning for students in higher education. The question that mentions that machine learning can be used to create an automatic essay grading system with a percentage of 30% by reaching the strongly agree category. The table above says that machine learning can search for information online and also says machine learning is the most appropriate solution in the era of rapid technological development at this time, gaining a percentage of 26% by reaching the strongly agree category. Researchers also examined questions 4, 8, 15, and 17 which said that machine learning can motivate students to be more active in learning activities, can help improve the quality of learning and provide a more effective learning experience. Machine learning can help in personalised learning, help analyse dropout rates. From these four questions, the researcher obtained a percentage of 24% in the strongly agree category.

Furthermore, questions 3, 7, 10, 11, 16, and 18 contain that machine learning can increase students' learning potential to achieve superior achievements, can be applied at various levels of education, help students solve various problems that occur during the lecture process. And also contains that machine learning is a very important learning machine in the world of lectures, helps in learning voice assistants, and can be used to analyse various data. So from the 6 questions above obtained a percentage of 22% in the strongly agree category. Researchers also examined the benefits of machine learning that can trigger students' enthusiasm in understanding learners and being able to delete invalid data, from this question obtained a percentage of 20% with a strongly agree category.The next question mentions that machine learning can check plagiarism in student assignments by obtaining a percentage of 18% with a strongly agree category. The table above also shows that machine learning can be applied in various fields, and can facilitate students in the administrative field, so a percentage of 16% can be obtained with a strongly agree category.Furthermore, machine learning can solve various problems in the world of education, getting a percentage of 14% with a strongly agree category.Then machine learning can be used to improve prediction accuracy in various fields in the world of education obtained a percentage of 10% with a strongly agree category.

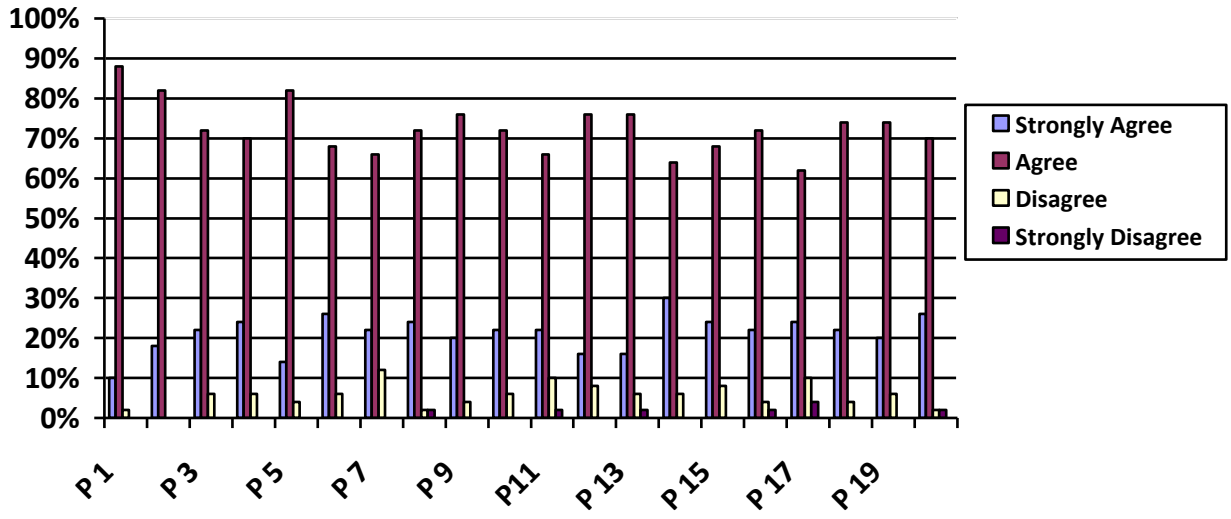
Researchers also examined that machine learning can be used to improve prediction accuracy in various fields in education with a percentage of 88% in the agree category. Furthermore, machine learning can check plagiarism in student assignments and can solve problems in the world of education with a percentage of 82% in the agree category. In questions 9, 12, and 13, it is stated that

machine learning can trigger students' enthusiasm in learning, can be utilised in various fields, can facilitate students in the field of administration, then get a percentage of 76% with the category of agree. The next question states that machine learning can analyse various data and is able to delete invalid data with a percentage of 74% in the agree category. In questions 3, 8, 10, and 16 which stated that machine learning can increase students' learning potential to achieve superior performance, help improve the quality of learning and provide a more effective learning experience. Machine learning can also help students in solving various problems that occur during the lecture process, and help in learning voice assistants. From the 4 questions above, we can get a percentage of 72% in the agree category.

Then the researcher also examined machine learning can motivate students to be more active in learning activities and can search for information that is online with a percentage of 70% in the agree category. Furthermore, researchers also examined that machine learning is the most appropriate solution in the current era of rapid technological development, and helps in personalised learning with a percentage of 68% in the agree category. Researchers also examined that machine learning can be applied at various levels of education and is a very important machine learning used in the world of lectures, obtaining a percentage of 66% with the category of agree. Furthermore, machine learning and the percentage of 64% obtained the agreed category. Furthermore, the question of machine learning can be used to analyse student dropout rates with a percentage of 62% in the agree category.

Researchers also conducted research that machine learning can be applied at various levels of education with a percentage of 12% in the disagree category. Furthermore, machine learning is a very important learning machine used in the world of lectures, and can be used to analyse college dropout rates with a percentage of 10% in the disagree category. Furthermore, machine learning can be used in various fields and help personalised learning with a percentage of 8% disagreeing. In questions 3, 4, 6, 10, 13, 14, and 19, it is stated that machine learning can increase students' learning potential to achieve superior performance, motivate students to be more active in learning activities, and is the most appropriate solution in this era of rapid technological development. Machine learning can help students in solving various problems that occur during the lecture process, facilitate students in the administrative field, and be able to eliminate invalid data. From the question above, it obtained a percentage of 6% in the disagree category.

Furthermore, in questions 5, 9, 16, and 18, it states that machine learning can solve problems in the world of education, triggers students' enthusiasm in understanding learning, helps in voice assistant learning, is used and is able to analyse various data, from the above statement obtained a percentage of 4% in the disagree category. Furthermore, questions 1, 8, and 20 stated that machine learning can be used to improve prediction accuracy in various fields in education, can help improve the quality of learning and provide a more effective learning experience, search for information that is online, from these statements obtained a percentage of 2% in the disagree category. The next question states that machine learning can be used to check plagiarism in student assignments, obtaining a percentage of 0% with the category of disagree. The researcher also examined that machine learning can be used to analyse students' college dropout rate, obtaining a percentage of 4% with a strongly disagree category. In questions 8, 11, 13, 16, and 20 obtained a percentage of 2% with a strongly disagree category. Furthermore, questions 1, 2, 3, 4, 5, 6, 7, 9, 10, 12, 14, 15, 18, and 19 obtained a percentage of 0% with a strongly disagree category.



The graph above shows that the utilisation of machine learning in Islamic learning in higher education. This research data uses 20 questions to find out students' opinions on the utilisation of machine learning. The question that got the highest rank with the category of strongly agree at a percentage of 30% in question 14. The next highest results were questions number 6 and 20 obtained a percentage of 26% with a category of strongly agree. The next highest result is in questions number 4, 8, 15, and 17 getting a percentage of 24% in the strongly agree category. The next highest results are in questions 2, 7, 10, 11, 16 and 18 obtained a percentage of 22% in the strongly agree category. The next highest results are in questions number 9 and 19 obtained a percentage of 20% in the strongly agree category. The next highest result is question number 2 obtained a percentage of 18% with a strongly agree category. The next highest results in questions 12 and 13 obtained a percentage of 16% with a strongly agree category. The next highest results in questions 12 and 13 obtained a percentage of 16% in the strongly agree category. The next highest result is in question 5 obtained a percentage of 14% in the strongly agree category.The next highest result in question number 1 obtained a percentage of 10% in the strongly agree category.The graph above also shows that question number 17 obtained a percentage of 4% with a strongly disagree category is the highest result, followed by the highest results in questions number 8, 11, 13, 16, and 20 obtained a percentage of 2% in the strongly disagree category.The next results of questions number 1, 2, 3, 4, 5, 6, 7, 99, 10, 12, 14, 15, 18, and 19 obtained a percentage of 0% which can be categorised as strongly disagree.From the graph above, it can be obtained that the most results are in the strongly agree category and the least are in the strongly disagree category.

he next highest percentage was in question number 1 with a percentage of 88% in the agree category. Research data with the second highest category, namely in questions 2 and 5, obtained a percentage of 82% in the agreed category. The third highest result is in questions number 9, 12 and 13 obtained a percentage of 76% with the agreed category. The next highest result with a percentage of 72% in questions number 3, 8, 10 and 16 obtained the agreed category. The next highest results are questions number 4 and 20 obtained a percentage of 70% with the agreed category. The next highest results in questions number 6 and 15 obtained a percentage of 68% in the agree category. The next highest results in questions number 7 and 11 obtained a percentage of 66% with the agreed category. The next highest result is question number 14 obtained a percentage of 64% with the agreed category. The next highest result question number 17 obtained a percentage of 62% with the category agree. The graph above shows that the percentage of 12% is the highest

result in the disagree category in question number 7. The next highest result in question numbers 11 and 17 obtained a percentage of 10% in the disagree category. The next highest results in questions number 12 and 15 obtained a percentage of 8% in the disagree category. The next highest results in questions number 3, 4, 6, 10, 13, 14, and 19 obtained a percentage of 6% in the disagree category. The next highest results are in questions number 5, 9, and 18 with a percentage of 4% in the disagree category. The next highest results in question numbers 1, 8 and 20 obtained a percentage of 2% with the category of disagree.

Based on the data obtained from filling out the questionnaire, the use of machine learning in learning Islamic religion is one of the ways that can be used to facilitate students in learning Islamic religion and improve student learning outcomes. There are students who agree with the use of machine learning on the grounds that it can make it easier to check plagiarism when making assignments and can search for information that is online. However, there are also students who disagree with the use of machine learning on the grounds that machine learning can make students lazy in finding information and more dependent on online information and lazy to read. Machine learning is considered as one of the human intelligence that can solve problems and also machine learning can facilitate students in administrative matters in higher education. In addition, by using machine learning, students can analyse various data and delete invalid data.

The use of machine learning is the best solution for students who can use it wisely and well. because students can use it to find assignments that are not obtained online and can arouse students' enthusiasm for learning so that later quality and innovative students will be formed. In the graph above, there are several examples of the benefits of machine learning such as increasing student motivation, helping in voice assistant learning, and being able to analyse the dropout rate of a student. The form of machine learning utilisation above is in the form of questions filled in by respondents when distributing questionnaires in order to obtain accurate, systematic, clear and reliable information. In this study, the researcher emphasised the question to Islamic education students in higher education. Because this research is about the use of machine learning in Islamic learning and the target object is the college level. So it can be ascertained that the utilisation of machine learning is aimed at Islamic religious education students in higher education.

Machine learning has many benefits for students in increasing the potential contained within themselves, so that lecture material is easy to understand. Students are also easy to find references needed when making assignments such as using Google and Teano applications. Machine learning actually not only makes it easier for students but also makes it easier for lecturers in making essay questions, analysing information obtained from students about attendance and knowing student learning activities. In using machine learning, students can complete their assignments quickly compared to not using machine learning or doing it manually. Machine learning is very important in the current era because the existing system will continue to learn and correct its mistakes so that the possibility of being wrong will be smaller or minimal.

The result of this research is the utilisation of machine learning for university students in Islamic learning. Machine learning can improve student achievement, motivate students to be more active in learning. Machine learning is the most appropriate thing to use today because in this era, humans have depended on technology, such as in the world of education today, students can learn at home online without having to meet face to face. The method used by researchers in this study is a quantitative method that uses a lot of numbers to get accurate and clear data. Data obtained by distributing questionnaires, interviews, documentation and going directly to the field to obtain accurate and clear data. By using this quantitative method, researchers can explain and detail the data obtained from distributing these questionnaires. This method can also facilitate researchers in

making bar charts scientifically by using data from sources and conditions based on what is in the results of the research and distribution of questionnaires.

The purpose of this research is to determine the use of machine learning for students. Some students have applied machine learning in the learning process and some other students have not utilized machine learning in the learning process, because they lack understanding or do not master computer technology well. Usually those who use machine learning more are people who understand technology and also students who are in their final semester. Machine learning has many benefits if used well and can also have negative impacts if not used well. It is hoped that students who have not used and applied machine learning in learning can use machine learning to make learning easier. So, the researcher hopes that future researchers can help students apply machine learning well, especially Islamic religious education students.

CONCLUSION

Machine learning is a branch of Artificial Intelligence (AI) that is widely researched and can be used as problem solving. So, based on the results of the research and discussion above, it can be concluded that the use of machine learning in Islamic religious learning is very important. Because machine learning can be an alternative that students can use to make the learning process easier for them. From the research results of 50 students, it is explained in a bar graph, namely in a graph with the percentage of students who strongly agree, agree, disagree and strongly disagree with the use of machine learning in teaching Islamic religion for students. And there is also a table containing 20 questions about machine learning that researchers have tested on students. Based on the results of this research, the use of machine learning in learning Islamic religion is a method that students can use to facilitate the lecture process, search for assignments, as well as facilitate the administrative process at higher education. Machine learning can be a means of increasing student creativity and enthusiasm for learning. So it will create students who are wise, innovative, superior and accomplished in the field of Islamic religious education.

AUTHORS' CONTRIBUTION

Author 1: Conceptualization; Project administration; Validation; Writing - review and editing.
Author 2: Conceptualization; Data curation; In-vestigation.
Author 3: Data curation; Investigation.
Author 4: Formal analysis; Methodology; Writing - original draft.
Author 5: Supervision; Validation.

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