WWW.IJRPR.COM

International Journal of Research Publication and Reviews

Journal homepage: www.ijrpr.com ISSN 2582-7421

Application and Performance of Machine Learning among Arts and Science college students with special reference to Sacred Heart College(A), Tirupathur.

Ms. K. Monica[1], J. Jacob Stanley Inbaraj [2]

II M.A. Economics[1], Associate Professor of Economics[2]
Sacred Heart College (Autonomous) Tirupathur-635601.
Email:monicaumikarthi11@gmail.com, jacob@shctpt.edu

Introduction

Machine learning has become an integral part of human life and more particularly among the students in the field of higher education. Now a day's humans are replaced by machines in the teaching learning process and this found to be a common phenomenon among the higher educational institutions. By using the Machine Learning process, the results are more accurate and it is also less time consuming and more practical. There are many stages to cross over in the machine learning process and it involves some of the key components like input of data, applying algorithms and expectation of outputs.

In today's world machine learning has become one of the most advanced and vital technological advancements of the present century. It has emerged from the domain of Artificial Intelligence (AI) which mostly focuses on the usage of algorithms and other statistical methods interlinking with other disciplines. The application of machine learning among the college students has become a common trend and its relevance in the field of higher education is remarkable.

The concept of machine learning has got is gross routes in multiple areas and there are also different types and they are supervised learning, unsupervised learning and reinforcement learning. The importance of machine learning cannot be limited to certain output or device because of its universal application across the globe. The importance of machine learning is felt in the career opportunities in the areas of healthcare, data scientist, AI research, etc. Machine learning process is an interdisciplinary application used in economics, mathematics, biology, social sciences and engineering among the students. Latest innovations and discoveries in the process of machine learning equips every student in higher education to develop their own solution to the present day queries and brings a spirit of ownership and entrepreneurship.

In today's world the machine learning has made a remarkable transformation and in reshaping the industries and enhancing their production and productive capacities. In the field of higher education especially among the college students the research on machine learning has nurtured critical skills leading to innovation and inventions. The adoption of machine learning had made a commendable note of the necessity and benefits among the college students in their academic exercise.

Key principles of machine learning process are listed below:

1. Skill Development
    - Analytical Thinking
    - Programming Proficiency
    - Statistical Knowledge
2. Understanding Real-World Applications
    - Problem-Solving Abilities
    - Awareness of Ethical Considerations
3. Career Preparedness
    - Research Publications

- Networking Opportunities

4. Contributing to Innovation and Knowledge

- Innovation
- Knowledge Creation

5. Enhancing Interdisciplinary Collaboration

- Collaborative Projects
- Holistic Knowledge

Literature Review

According to Morris et. al., in their study related to there is a unique challenge in teaching children's artistic skills: while the advanced creative and social aspects of an art form are usually the most captivating and can keep students engaged, these elements depend on foundational sensorimotor abilities and, at times, memorized information that can be dull to cultivate. We propose that computer-based learning can be crucial in linking "bottom-up" (sensorimotor-first) learning in the arts with "top-down" (creativity-first) learning, using machine learning and artificial intelligence methods to serve as the sensorimotor expert. With this approach, learners can engage with elements of advanced creativity and social interaction prior to acquiring the necessary sensorimotor abilities or academic knowledge. **(Morris 2013)**

Latif et. al., in their study on machine learning in higher education: students' performance assessment considering online activity logs, the dataset utilized in this study is among the few that are globally accessible and offers information about students' interactions with classroom activities and their outcomes. This dataset is unique in that it focuses on the dynamic aspects of a student, as opposed to only considering static data such as homework, quiz, and exam grades. It is unique because it establishes the tempo for creating a holistic dataset that encompasses both dynamic and static data pertaining to students. **(Latif 2023)**

The study conducted by Fajardo et. al., on predicting academic success of college students using machine learning techniques they proclaim that, the successful practice carried out during data preprocessing is what makes the prediction model effective. Thus, it is essential to acquire a dataset in a timely manner. Our applied methodology, in contrast to the methodologies examined in the literature, avoided bias in both the predictive model's accuracy rates and the academic status (class). In fact, both the robust predictive model created using XGBoost and the simplified decision tree model were effective. The simplified predictive model identified students with a high potential for academic success in 70% of instances, whereas the robust model did so in 80% of instances. The study offers valuable insights into the factors that contribute to college students' expectations of academic success. It underscores the significance of effective data preprocessing and model simplification methods for generating accurate, meaningful, and comprehensible predictions regarding college students' academic success.**(Fajardo 2024)**

According to Brasca et al., in their study many institutions of higher education are now incorporating data and analytics into their processes as a fundamental component. No matter if the aim is to recognize and enhance support for pain points in the student journey, allocate resources more efficiently, or enhance the experiences of students and faculty, institutions are recognizing the advantages of solutions grounded in data.Institutions can use advanced-analytics techniques to obtain insights into their student populations and identify risks that are more nuanced than those derived from descriptive and diagnostic analytics, which depend on linear, rule-based methods. **(Brasca 2022)**

A study done by Onyema et. al.,Machine learning offers solutions to numerous limitations within the education sector, including academic forecasting. Besides providing smart and precise forecasts regarding academics, it aids teachers and educational organizations in comprehending their students' improvement and facilitating their success. However, many educational institutions in developing countries appear unprepared to adopt machine learning approaches. Nevertheless, due to the changing realities in global education, they will have no choice but to start strategizing on how to incorporate ML and other emerging technologies. Prediction via machine learning and other artificial intelligence solutions holds the potential to transform narratives in the education sector, especially concerning the diagnosis of students' learning patterns and performance. **(Onyema 2022)**

The study carried out by Iqbal H. Sarker. The data as well as the efficacy of the learning algorithms are crucial for a successful machine learning model. Before the system can aid in intelligent decision-making, the sophisticated learning algorithms must be trained using the gathered real-world data and knowledge pertinent to the target application. We also talked about a number of well-known application domains that make use of machine learning methods in order to emphasize their relevance to different actual problems. In conclusion, we have summarized and deliberated on the difficulties encountered as well as the possible research prospects and future paths in this field. The identified challenges present promising research opportunities in the field that require effective solutions across various application areas. **(Iqbal H. Sarker 2021)**

Importance of the study

Machine learning holds a significant importance for multiple reasons particularly in terms of enhancing student's performance, learning capacity and improving the institutional strategies and integrating technology in the fusion of education. This study could explore academic records, learning patterns

and bridging gap between fostering collaboration in understanding of machine learning. Machine learning algorithms, adaptive curriculums, data driven insights, and more efficient resource mobilization could lead to higher academic performance and effective pedagogy.

Statement of the problem

In recent years machine learning has emerged as a transformative technology in improving academic performance. Machine learning has shown significant outcomes and optimizing teaching strategies and augment academic success and institutional decision-making and institutional decision remains largely area of untapped context in the field of higher education. This research aims to fill the gap in the literature providing authenticated challenges, opportunities and impact of machine learning technique in a multi disciplinary academic environment. It will also explore the potential impact of machine learning and its applications on student's academic performance with special reference to Sacred Heart College (Autonomous), Tirupathur.

Objectives of the study

- To study the impact of machine learning processes among the students of Sacred Heart College (A), Tirupathur.
- To examine the challenges faced by the students in machine learning process.

Methodology of the study

This study is a descriptive research design applied to explore and study the impact of machine learning among the Sacred Heart College students. The research design would help the researcher in understanding the students' knowledge and perception regarding machine learning. A sample of 89 students was selected for the study and the sample consists of both undergraduate and postgraduate students of boys and girls. This study used stratified random sampling ensuring that students from all discipline undergoing machine learning are involved. A structured interview schedule was developed to collect the required information for the study and if consists of both closed-ended and open-ended questions. The collected information was further analysed with the help of SPSS and the output were derived accordingly. Simple percentage was used and presented in the form of tables.

Data Analysis and Interpretation

The required data were collected from the selected respondents by using a well structured interview schedule. The researcher collected the data by face to face interview with the respondents and recorded simultaneously. Then the collected data were analyzed by using appropriate statistical methods and interpreted accordingly. The analysis of data is presented in the following table and its interpretations.

Table 1: Gender wise distribution

Gender	Frequency	Percentage
Female	68	76.4
Male	21	23.6
Total	89	100.0

Source: Computed from primary data

The above table depicts the gender wise details of the respondents. It is revealed from the above table that out of 89 respondents 68 of them were female and the remaining 21 were male. In the present-day world men and women are equal and they have got every right to educate themselves. Data related to gender emphasize the gender equality put forth by social activist in pursuing higher education. Now a days in the field of higher education the enrolment of female is on the rise and it is a healthier sign for the development of the economy.

Table 2: Nature of the course

UG/PG	Frequency	Percentage
PG	30	33.7
UG	59	66.3
Total	89	100.0

Source: Computed from primary data

The table portraits that the respondent's nature of the course. The Sacred Heart College has both under graduate and Post graduate. The majority of the respondents were Undergraduate students; compared to Postgraduate students the strength of Undergraduate students was more. The dropouts, lack of

interests for higher studies, and lack of family support are the reason for the smaller number of post graduates. Both UG and PG studying about the Machine learning process.

Table 3: Year of Study

Year	Frequency	Percentage
First	6	6.7
Second	29	32.6
Third	54	60.7
Total	89	100.0

Source: Computed from primary data

The table 3 depicts the year of study of the respondents. It is revealed from the above table, that out of 89 respondents 6 of them were first year students, 29 of them where second year students and 54 of them were third year students. Data was collected from the Undergraduate and Postgraduate students of the Sacred Heart College. In UG compared to first years and second years, the third students have high knowledge about machine learning and its languages. In PG both first years and second years have been studied about the ML languages, software, programs.

Table 4: Course of the respondent

Course	Frequency	Percentage
B.Sc. Artificial Intelligence	6	6.7
B.Sc. Computer Science	15	16.9
B.Sc. Data Science	15	16.9
BCA	23	25.8
M.Sc. Computer Science	10	11.2
MCA	20	22.5
Total	89	100.0

Source: Computed from primary data

The above table represents the course of the respondents. The data were collected from the particular departments in sacred heart college. B.Sc. Artificial Intelligence, B.Sc. Computer Science, B.Sc. Data Science, BCA, M.Sc. Computer Science, and MCA these are the departments were studying about the ML applications, programming languages, software, and algorithms. Out of 89 respondents, majority of the respondents are BCA, MCA, followed by B.Sc. Computer Science and Data science. It is clear that the Machine Learning plays a vital role in student's education system.

Table 5: Gadgets used by the students

Gadget	Frequency	Percentage
Desktop	3	3.4
Laptop	54	60.7
Mobile	32	36.0
Total	89	100.0

Source: Computed from primary data

The table 5 shows the gadgets used by the students. It is clear that the majority of the students used Laptop for the Machine Learning process, followed by mobile. To learn machine concepts is quite difficult to the students to adapt. Machine learning process will be done by using of gadgets like desktop, laptop, and mobile. According to the student's economic capacity they use the gadgets. The installation of desktop is costlier compared to laptop and mobile. ML process could enable the students to complete the projects on time, makes the work easier.

Table 6: Application of software

Software	Frequency	Percentage
Google Cloud	18	20.2

Java	15	16.9
Python	45	50.6
SPSS	11	12.4
Total	89	100.0

Source: Computed from primary data

The students use various applications and tools in machine learning process. It is clear from the above table 6 that the machine learning contains software's and programming languages like Google cloud, java, python, and SPSS the students use one of the software for their academics. Majority of the student's used Python has an application of software. Python has a high scope in the IT fields which creates the demand to learn ML. Due to the expected growth of its market size; Python is poised to offer a promising career, with thousands of job openings and profitable salaries. Followed by Python the majority of the students responds to Google cloud Programming which provides a robust and secure platform that can assist companies in scaling their resources, enhancing security, and accessing various services.

Table 7: Impact, Benefits, Challenges and Factors influencing machine learning process

Impact	Better understanding of concepts	24	27.0
	Development of soft skills	23	25.8
	Enhanced programming skills	7	7.9
	Improved problem-solving skills	32	36.0
	Increased Motivation	3	3.4
Total number of respondents		89	
Challenges	Data-Related Challenges	41	46.1
	Mathematical and Computational Challenges	23	25.8
	Time and cost while adapting ML process	25	28.1
Total number of respondents		89	
Benefits	Career Benefits	21	23.6
	Data Analysis and Interpretation	22	24.7
	Educational benefits	9	10.1
	Improved Programming skills	20	22.5
	Problem-Solving and Critical Thinking	17	19.1
Total number of respondents		89	
Factors	Cognitive Abilities and Skill	12	13.5
	Knowledge and Experience	46	51.7
	Learning Style and Preferences	14	15.7
	Motivation and Interest	17	19.1
Total number of respondents		89	100.0

Source: Computed from primary data

In the present study the researcher made an attempt to find out some of the major variables contributing to machine learning process. Among these variables, impact, challenges, benefits and factors influencing machine learning process. It is clear from the above table that though several aspects contribute to the impact of machine learning process the improved problem solving occupies a dominant role. In the field of higher education, the skill of learning problem solving is enunciated to a greater extent followed by other issues like enhanced learning process, improved soft skills and better terms of motivation.

In the process of adapting machine learning among students faced data-related challenges, the availability of ML related data and materials are very less due to lack of technological improvement in colleges. The learning of ML related concepts will lead to increase in the career benefits of the students and also it may enhance the knowledge of students to analyse the data and interpretation. In the above table it revealed that the factors which influenced the students to learn ML is knowledge and experience is, in this modern education system the ML plays a vital role in the development of student's education and helps to improve the knowledge of students and gains better user experience.

Conclusion

The research carried out on the Application, Performance of Machine Learning among the students of Sacred Heart College (A), Tirupathur has revealed that a significant level of awareness and engagement of students in different disciplines acknowledge that the potential of machine learning there remains a gap in the application and performance because of its complex process. This emphasizes the need for more comprehensive curriculum design, conduct

of more awareness programmes in the form of workshops, symposia and hands on training which will enable the students to enhance their skills and confidence in machine learning process. This study also portrays that with right support and enough resources the students of Sacred Heart College (A), Tirupathur could become key contributors in the growing field of Artificial Intelligence and excel in academic curriculum and even in extracurricular activities to foster innovation among the students.

Acknowledgement

We would like to express our sincere thanks to the Sacred Heart Fellowship, Research Grant given by the Sacred Heart College(A), Tirupathur District – 635 601 for their generous support and funding for the project on "Application ad Performance of Machine Learning among Arts and Science college students with special reference to Sacred Heart College(A), Tirupathur" (Ref. SHC/SH Fellowship/2024/21). We are very grateful to the management for motivating and upholding the research in education. Their invaluable support helped to complete the project successfully.

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