



# AN INVESTIGATION OF FINANCIAL LITERACY AMONG UNDERGRADUATE STUDENTS OF SELECTED UNIVERSITIES OF AHMEDABAD

## Dr. Ashish Porwal

Assistant Professor, (Finance and Accounting)
Institute of Law, Nirma University, Ahmedabad
Email: drashishsporwal@nirmauni.ac.in

### Dr. Arun B. Prasad

Associate Professor (Economics)
Institute of Law, Nirma University, Ahmedabad
Email: <a href="mailto:arunprasad16@gmail.com">arunprasad16@gmail.com</a>

#### **Abstract**

One area where many individuals frequently feel powerless is the financial sector. They might even think they've lost control. Many Indians—if not the majority—never received much financial instruction from their parents or at school. We intend to alter it for the following generation. Understanding, analyzing, interpreting, and utilizing financial matters in daily life are all aspects of financial literacy. an effort is undertaken in the study to investigate the effect of financial literateness amongst select University students of Ahmedabad with indication of the opportunities the undergraduates have to attain financial knowledge by proper networks that are utilized to educate undergraduates on fiscal problems. When compared to students with low and medium financial literacy levels, those with better financial knowledge hold more positive opinions about the value of keeping spending, saving and investment records. The pupils' ability to make decisions is positively and significantly impacted by their level of financial literacy. The Gujarat government should create a policy on financial literacy and choose a certain sector to be in charge of providing short-term trainings for youth.

Key Words: Financial Literacy, Financial Awareness, Financial Literacy Level, Students

## Introduction

Financial literacy is the term used to describe a collection of abilities and information that enables people to make wise financial decisions. To make wise financial decisions and eventually achieve individual financial wellbeing, one must have the awareness, knowledge, skills, attitude, and behavior associated with money. Financial literacy is the skill to understand fundamental financial concepts including saving money, opening an account, keeping accurate records of your financial transactions, and how to get access to financial assistance. The capacity to comprehend, assess, and transmit knowledge about money and financial services is known as financial literacy. This involves the capacity to make wise financial decisions, to plan ahead, and to react to unforeseen occurrences and how they can affect one's finances.

A person's and his family's financial wellbeing depend on having the necessary level of financial literacy. It affected both short-term requirements, like managing money on a day-to-day basis, and long-term requirements, like buying a home, funding a child's education, securing a life after retirement, etc. Ineffective money management will lead to actions that increase a person's vulnerability to a financial disaster. For assuring the security of a retired life, mutual funds, pension plans, SIPs, and insurance can be taken into consideration. For this, you need to learn about financial markets and goods, as well as develop the right financial mindset and behavioral abilities.

One of the most important takeaways from the financial crisis of 2008 is that the majority of Americans lack financial literacy. The majority of Americans signed mortgage loan agreements that they could not afford and did not fully understand. Debt has increased in prevalence along with the availability of more sophisticated financial products and services on the market and credit, which has had a huge impact on how people manage their personal finances. To choose wisely among the available financial goods and to interact with today's increasingly sophisticated financial services and products, consumers must be financially literate (Bernanke, 2006). Financially literate individuals typically experience cheaper borrowing expenses for both mortgage loans and credit card debts (Huston, 2012). Consumers with sufficient financial understanding typically save for unforeseen future events as well as for their retirement (Jappelli, 2010). People who at least have a rudimentary understanding of finance can save more money.

There has been speculation that undergraduate students' financial conduct and attitude are also influenced by economic, social, and psychological variables (Roy Morgan Research, 2003). Undergraduate students frequently struggle to keep control of their finances because of economic issues like erratic income, poor savings, and a lack of financial awareness. They consequently experience a financial crisis that affects their way of life. Their financial conduct is also influenced by the sociocultural influences of their peers, parents, and the media.

## **Need and Importance of the Study**

College students, who make up a significant portion of the nation's youth population, are currently in the learning phase and will eventually enter the workforce. India's "young population," which is expected to significantly contribute to the nation's economic development, is viewed as the country's greatest hope. According to the "Youth in India Report, 2017" published by the "Social Statistics Division, Central Statistics Office, Ministry of Statistics and Programme Implementation, Government of India," the youth population makes up 34.8% of the Indian population, or more than one third of the entire population.

College students, who are young people, are in the learning stage of life and will go through the same financial life cycle as everyone else, including starting a family, buying assets, planning for children's education and marriage, preparing for medical, health, and financial emergencies, planning for retirement, and so on. Numerous academics have also advocated for providing young people with early financial education in order to better manage the financial life cycle. If college students receive the appropriate financial education during their learning phase of life, it will aid them in developing a favorable financial attitude and acceptable financial behavior, resulting in their becoming fully financially literate.

## **Review of Literature**

**Brenda, J. Cude, et al. (2006)** used qualitative and quantitative data from a multi-state research study to assess university students' general financial administration habits. The study also looked into the process by which college students learn about money and behave in that way. According to the study, parents have a very big impact on how their children manage their money.

In the current study, the financial literacy of graduate and postgraduate students in the Saurashtra region was examined. The goal of the research was to examine the correlation between demographic factors and the degree of financial literacy online. The association between using digital financial services and financial literacy was another goal of the study. Three criteria were used to measure digital financial literacy: knowledge of digital financial services and digital financial products, understanding of digital financial risk and how to manage the same, and familiarity with consumer rights and dispute resolution processes. 135 students were chosen for the measurement of digital financial literacy using a practical sampling method, and information was gathered using a standardized questionnaire. SPSS was used to examine the data. They discovered that, on average, 47% of students correctly answered questions about their digital financial literacy, with a median score of 57. The degree of digital financial literacy is greatly influenced by demographic factors including age and education. However, there are no appreciable disparities between male and female students' scores for digital financial literacy. We discovered a disconnect between the degree of financial knowledge in the digital age and the use of digital financial services (Rajdev et. al., 2020).

According to **Puneet Bhushan and Yajulu Medury (2014)**, financial literacy is the capacity to utilise good judgement while making judgements about the use and management of money. The low degree of financial literacy around the world has been highlighted by prior academics. Governments, organisations, and agencies have nevertheless started a number of programmes to raise the general public's level of financial literacy. According to authors, a person's overall financial literacy is shaped by their parents' views and behaviours towards money as well as their own financial understanding.

Amer Azlan and Abdul Jamal (2016) looked into the factors that influence students' saving habits in Malaysian universities. They made the case that it was important to teach young folks the need of boosting savings in order to assure a sizable additional retirement income. According to the study, individual differences in savings appear to be caused by differences in thinking, behaviour, knowledge, and social context. They also looked at how financial attitude functions as a mediating element in the connection between financial literacy and saving habits. Financial attitude had little bearing on the association between financial literacy and students' saving behaviours, according to structural equation modelling (SEM).

# Research Gap Identified

Few studies in the field of financial literacy focused specifically on college students, according to the review of the literature conducted for this study. The majority of studies neglected the impact of financial literacy on people's money management habits. By integrating practices-related questions, this study offers compelling evidence in this regard. Some studies have looked at the variables that affect how individuals acquire financial information and behavior, but these studies have not identified the sources of such knowledge and behavior.

Thus, an effort is undertaken in the study to investigate the effect of financial literateness amongst select University students of Ahmedabad with indication of the opportunities the undergraduates have to attain financial knowledge by proper networks that are utilized to educate undergraduates on fiscal problems.

## **Objectives of The Study**

- 1. To investigate financial literacy levels among undergraduate students of select universities in Ahmedabad.
- 2. To give recommendations to improve financial literacy.

## **Limitations Of the Study**

- 1. The conclusions of the current study, which focused only on Ahmedabad, might not apply to other regions of the nation or to different divisions or regions of Gujarat where the socioeconomic position of the respondents varies.
- 2. The study's findings cannot be generalized because only university students between the age group of 16 and 24 who were enrolled in various higher education courses provided the data for the study.
- 3. The study's findings are supported by information gathered from undergraduate students.

## Data Analysis and Interpretation

Demographic data is an essential and quantifiable statistic of the population being studied; it is crucial to analyse demographic factors in any research. Demographic information can be used to profile and characterise how business school students think and feel. Psychographic and socio-cultural studies generally include measurable demographic variables. They are hence known as descriptors. The students' individual traits are crucial since they help to create a profile of the responses.

Name of UniversityNo. of StudentsNirma University (Private)89Gujarat University (State)62Ahmedabad University (Private)24Total175

**Table 3.1 University of the Students** 

For the best possible management of the available cash, it is essential to have the right expertise. In this context, the current study gathered data on the respondents' financial management abilities. According to the poll, 51.4% (90) students have the knowledge about Time Value of Money.

Risk and anticipated rewards are linked with investment decisions. An investor can make a well-informed investment selection by doing their research first. Also, it is a situation that meets the requirements of an effective market. Although research on market efficiency has produced conflicting results, this does not lessen the need of investors having a thorough grasp of the connection between risk and return. So, it is obvious that people that actively engage in

investing have stronger financial standing than the typical person. It is expected that the financial literacy of these investors will rise as a result of their reading, information acquisition, and experience. Data reveals that 77.1% (135) students possess the knowledge of "Diversification of Funds".

59.4% (104) students have the Financial Knowledge on overspending of funds. Experts believe that students must have Financial Knowledge of Overspending because it will help them to organise their spending so that they will not go Bankrupt.

70.3% (123) students are aware about the safer place to park their funds out of the available alternatives. As per the Experts if students will keep Funds in Saving Bank Account it will be safe as well as they earn interest on the amount saved.

They also appear to be able to make informed financial decisions and have comfortable conversations about money-related topics. Also, they appear to have an understanding of financial concepts and terminologies.

Spending and saving habits are determined as major factors influencing financial behaviour. Financial behaviour is significantly influenced by financial management. Financial management and respondents' spending and saving patterns were significantly correlated. The findings showed that respondents exercised enough caution when making financial decisions, made purchases based on their ability to pay, kept records for future use, and voiced their financial opinions.

64.6% (113) respondents are of the opinion to Save a portion of pocket money in Saving Bank Account. As per the opinion taken from the Experts, students who are saving a portion of pocket money in Saving Bank account are considered of a good Financial Behaviour which will help them in long run.

Financial Products	Preference	Frequency
Fixed Deposit Account	1	60
	2	25
	3	26
	4	20
	5	21
	6	23
Public Provident Fund Account	1	26
	2	42
	3	35
	4	33
	5	22
	6	17
Mutual Funds	1	39
	2	46
	3	37
	4	21
	5	20
	6	12

**Table 3.2 University of the Students** 

Stock Market	1	35
	2	37
	3	29
	4	28
	5	27
	6	23
Debt Funds	1	26
	2	31
	3	30
	4	41
	5	25
	6	22
Pension Schemes	1	30
	2	41
	3	27
	4	27
	5	25
	6	25

As per Table 3.2, 60 students have given 1<sup>st</sup> preference to the Fixed Deposit which shows that they are cautious about parking their funds and they want safety of funds along with minimum return.

Only 26 students have given 1<sup>st</sup> preference to PPF a/c and Debt Funds. As per the *Expert's opinion* students should give preference to *PPF a/c* over FD if they want *safety* of funds along with *the return*. This shows that students are not having knowledge about the safety and return from PPF a/c.

32 students are not informing in advance for expenditures at college. 70 students are informing sometimes and 73 are informing well in advance every time for the expenditures at college.

Experts believe that the students who are not informing their parents for expenditures in advance at college shows a negative financial attitude and this will impact their future. It shows that they don't know how to do financial planning which is an important element of Financial Literacy.

The majority of the time, financial planning is centred on considerations for taxes, liabilities, insurance, investments, retirement, and estate planning. To reach a desired degree of financial wellbeing and prevent insolvency issues, good financial planning is regarded as being essential. Additionally, it was discovered that it had a significant correlation with elderly financial satisfaction during retirement.

Experts suggests that, a person should take above average risk till the age of 40 years. After that a person should seek for stable returns with low risk factor. Since our respondents are students so as per the Experts, they can take risk to achieve greater growth with their investable funds but they do this only after doing market research.

Risk and anticipated rewards are linked with investment decisions. An investor can make a well-informed investment selection by doing their research first. Additionally, it is a situation that meets the requirements of an effective market. Although research on market efficiency has

produced conflicting results, this does not lessen the significance of investors having a thorough understanding of the connection between risk and return. Therefore, it is obvious that those who actively engage in investing have stronger financial standing than the average person. It is expected that the financial literacy of these investors will rise as a result of their reading, information acquisition, and experience.

## **Suggestion and Conclusion**

According to the study, less than 50% students have an understanding of general finance, borrowing and saving, investments, and insurance. This shows that the students' financial literacy is below average. This indicates that students' knowledge of general finance, borrowing and saving, investing, and insurance is insufficient (poor). Only 15.7% of respondents reported having high financial knowledge, while 28.3% of respondents were categorised as having medium financial knowledge. In contrast remaining students who failed the exam had low financial understanding. As a result, the results indicate that select Universities students of Ahmedabad lack financial literacy.

Lack of finance courses in the curriculum for students who do not have major in business or economics, as well as little exposure to financial issues, are the key factors that may contribute to low financial literacy among select university students in Ahmedabad.

According to the respondents' basic demographic and financial exposure factors, there are also considerable variances in the respondents' financial literacy levels. Males are more financially literate than females since there is a large gender gap in the respondents' responses.

Students' fields of study also significantly differ from one another, indicating that those studying business and economics are more financially knowledgeable than those studying other subjects. This could occur as a result of business and economics students taking courses that have a financial focus or are concerned with financial matters. Therefore, it follows that they will have higher financial understanding than students who do not take finance classes.

When compared to students with low and medium financial literacy levels, those with better financial knowledge hold more positive opinions about the value of keeping spending, saving and investment records. The pupils' ability to make decisions is positively and significantly impacted by their level of financial literacy.

The Gujarat government should create a policy on financial literacy and choose a certain sector to be in charge of providing short-term trainings for youth. The policy should create a working strategy to increase financial literacy utilising various short- and long-term techniques. The national, regional, local, public, and private initiatives should create awareness about financial knowledge and the need to develop financial understanding about saving, investing, and insurance in order to promote and coordinate financial education. Only being informed and empowered to make financial decisions can be achieved through financial literacy.

## References

1. Agarwal, P., Ansari, S., Yadav, S., & Kureel, R. (2015). A study on financial literacy among working women in educational sector of Jhansi district: With special reference to investment avenue. *International Journal of Advance Research in Science and Engineering*, 4(1), 54-61.

- 2. Aggarwal, M., & Gupta, M. (2014). Awareness of financial literacy among college students. *Journal of Management Sciences and Technology*, 2(1), 1-13.
- 3. Ansong, A., & Gyensare, M. A. (2012). Determinants of university working-students' financial literacy at the University of Cape Coast, Ghana. *International Journal of business and Management*, 7(9), 126.
- 4. Atkinson, A., & Messy, F. A. (2012). Measuring financial literacy: Results of the OECD/International Network on Financial Education (INFE) pilot study.
- 5. Bernanke, B. (2006). A message from Chairman Bernanke. Federal Reserve Bank of Dallas, July.
- 6. Cude, B., Lawrence, F., Lyons, A., Metzger, K., LeJeune, E., Marks, L., & Machtmes, K. (2006). College students and financial literacy: What they know and what we need to learn. *Proceedings of the Eastern Family Economics and Resource Management Association*, 102(9), 106-109.
- 7. Martin, M. (2007). A literature review on the effectiveness of financial education.
- 8. Nash, D. R. (2012). Financial literacy: an Indian scenario. *Asian Journal of Research in Banking and Finance*, 2(4), 79-84.
- 9. Rajdev, A. A., Modhvadiya, T., & Sudra, P. (2020, November). An Analysis of Digital Financial Literacy among College Students. *Pacific Business Review International*, 13(5), 32-40.
- 10. Ramasawmy, D., Thapermall, S., Dowlut, S. A., & Ramen, M. (2013, February). A study of the level of awareness of financial literacy among management undergraduates. In *Proceedings of 3rd Asia-Pacific Business Research Conference* (pp. 25-26).
- 11. Remund, D. L. (2010). Financial literacy explicated: The case for a clearer definition in an increasingly complex economy. *Journal of consumer affairs*, 44(2), 276-295.
- 12. Roberts, J. A., & Jones, E. (2001). Money attitudes, credit card use, and compulsive buying among American college students. *Journal of consumer affairs*, 35(2), 213-240.
- 13. Ansarullah, S. I., Saif, S. M., Andrabi, S. A. B., Kumhar, S. H., Kirmani, M. M., & Kumar, D. P. (2022). An intelligent and reliable hyperparameter optimization machine learning model for early heart disease assessment using imperative risk attributes. Journal of Healthcare Engineering, 2022. https://doi.org/10.1155/2022/9882288.
- Kumhar, S. H., Ansarullah, S. I., Gardezi, A. A., Ahmad, H., Abd Elgawad, A. E. E.,
   Shafiq, M. (2023). Translation of English Language into Urdu Language Using
   LSTM Model. Computers, Materials & Continua, 74(2), 3899-3912.
   https://doi.org/10.32604/cmc.2023.032290.
- 15. G. S. P. Ghantasala et al., "Tech-Enabled Banking Revolt: The Transformational Era of IT in the Financial Sector," 2023 Seventh International Conference on Image Information Processing (ICIIP), Solan, India, 2023, pp. 133-136, doi: 10.1109/ICIIP61524.2023.10537647.
- 16. Shaik, R. B., Banu, S. B., Siddiqui, S. A., Jyothi, M. K., Bhaumik, A., Chandini, S., & Aarif, M. (2023). Organizational Commitment Of Employee A Rising Risk In The Educational Sector. Boletin de Literatura Oral-The Literary Journal, 10(1), 2496-2505.

- 17. Banu, S. R., Banu, S. B., Shaik Chandini, D. V., Jyothi, M. K., & Nusari, M. S. (2022). Assessment of research skills in undergraduates students. Journal of Positive School Psychology, 6938-6948.
- 18. S. B. Banu, S. W. Akhtar, S. Arshad, S. R. Banu, S. Chandini and G. P. Ghantasala, "High Heels Are No More an Accessory of Fashion for Women- A Study Unrevealing the Health Effects of Wearing High Heels," 2024 10th International Conference on Communication and Signal Processing (ICCSP), Melmaruvathur, India, 2024, pp. 406-410, doi: 10.1109/ICCSP60870.2024.10543799.
- 19. Sahu, G., Anant, M., & Tiwari, S. The Impact of Social Media on the Positive Development of Teenagers in the Contemporary age
- 20. Sahu, G., Anant, M., Tiwari, S., & Gupta, T. C. (2024). SEZ-Led Economic Growth: Evaluating The Impact Of Export Promotion Policies On Developing Countries, With A Focus On India—An Analytical Study. Educational Administration: Theory and Practice, 30(4), 1215-1220.
- 21. Sahu, G., Anant, M., & Tiwari, S. (2023). Information and Communication Technology (ICT) in the context of Rural Women Empowerment. The journal of contemporary issues in business and government, 29(3), 323-329.
- 22. Sahu, G., Anant, M., & Tiwari, S. The Impact of Social Media on the Positive Development of Teenagers in the Contemporary age.
- 23. Malik, A., Gautam, S., Abidin, S., & Bhushan, B. (2019, July). Blockchain technology-future of IoT: including structure, limitations and various possible attacks. In 2019 2nd international conference on intelligent computing, instrumentation and control technologies (ICICICT) (Vol. 1, pp. 1100-1104). IEEE.
- 24. Abidin, S., Swami, A., Ramirez-Asís, E., Alvarado-Tolentino, J., Maurya, R. K., & Hussain, N. (2022). Quantum cryptography technique: A way to improve security challenges in mobile cloud computing (MCC). Materials Today: Proceedings, 51, 508-514.
- 25. Abidin, S., Vadi, V. R., & Rana, A. (2021). On confidentiality, integrity, authenticity, and Freshness (CIAF) in WSN. In Advances in Computer, Communication and Computational Sciences: Proceedings of IC4S 2019 (pp. 87-97). Springer Singapore.
- 26. Sucharitha, Y., Vinothkumar, S., Rao Vadi, V., Abidin, S., & Kumar, N. (2021). Wireless communication without the need for pre-shared secrets is consummate via the use of spread spectrum technology. J Nucl Ene Sci Power Generat Techno, 10(9), 2.
- 27. Abidin, S. (2019). Enhancing security in WSN by artificial intelligence. In International Conference on Intelligent Data Communication Technologies and Internet of Things (ICICI) 2018 (pp. 814-821). Springer International Publishing.
- 28. Bhoopathy, V., Behura, A., Reddy, V. L., Abidin, S., Babu, D. V., & Albert, A. J. (2021). WITHDRAWN: IOT-HARPSECA: A SECURE DESIGN AND DEVELOPMENT SYSTEM OF ROADMAP FOR DEVICES AND TECHNOLOGIES IN IOT SPACE.
- 29. Abidin, S. (2017). Greedy Approach for Optimizing 0-1 Knapsack Problem. Communications on Applied Electronics, 7(6), 1-3.

- 30. ajid, M., Jawed, M. S., Abidin, S., Shahid, M., Ahamad, S., & Singh, J. Capacitated Vehicle Routing Problem Using Algebraic Harris Hawks Optimization Algorithm. In Intelligent Techniques for Cyber-Physical Systems (pp. 183-210). CRC Press.
- Abidin, S., Raghunath, M. P., Rajasekar, P., Kumar, A., Ghosal, D., & Ishrat, M. (2022, July). Identification of disease based on symptoms by employing ML. In 2022 International Conference on Inventive Computation Technologies (ICICT) (pp. 1357-1362). IEEE.
- 32. Malik, A., Parihar, V., Srivastava, J., Kaur, H., & Abidin, S. (2023, March). Prognosis of diabetes mellitus based on machine learning algorithms. In 2023 10th International Conference on Computing for Sustainable Global Development (INDIACom) (pp. 1466-1472). IEEE.
- 33. Vadi, V. R., Abidin, S., Khan, A., & Izhar, M. (2022). Enhanced Elman spike neural network fostered blockchain framework espoused intrusion detection for securing Internet of Things network. Transactions on Emerging Telecommunications Technologies, 33(12), e4634.
- 34. Abidin, S., Dhariwal, M. K., Rane, K. P., Sivakumar, G., Babu, D. V., & Kumar, I. R. (2021). Development and Organize of Wireless Sensor Network in Home Management using IoT. International Journal of Aquatic Science, 12.
- 35. Chadha, S., Mittal, S., & Singhal, V. (2020). Ancient text character recognition using deep learning. International Journal of Engineering Research and Technology, 3(9), 2177-2184.
- 36. Chadha, S., Mittal, S., & Singhal, V. (2019). An insight of script text extraction performance using machine learning techniques. International Journal of Innovative Technology and Exploring Engineering, 9(1), 2581-2588.
- 37. Gupta, N., Chauhan, R., & Chadha, S. (2020). Unmanned Aerial Vehicle (UAV) for Parcel Delivery. Int. J. Eng. Res. Technol, 13(10), 2824-2830.
- 38. Chadha, S., Chauhan, R., & Gupta, N. (2022). Flood Prediction And Rainfall Analysis Using LightGradient Boosted Machine. NeuroQuantology, 20(9), 1690.
- 39. Makkar, I. S., & Chadha, S. (2024, March). Unsupervised Emotion Matching for Image and Text Input. In 2024 IEEE International Conference on Interdisciplinary Approaches in Technology and Management for Social Innovation (IATMSI) (Vol. 2, pp. 1-6). IEEE.
- 40. Gupta, N., Chadha, S., Chauhan, R., & Singhal, P. (2023, December). Damage Evaluation Following Natural Disasters Using Deep Learning. In International Advanced Computing Conference (pp. 90-103). Cham: Springer Nature Switzerland.
- 41. Gupta, N., Chadha, S., Srivastava, G., & Chauhan, R. (2021, October). Mortality Rate Extrapolation Based on Symptomatic Symptoms of Novel Corona Virus. In 2021 5th International Conference on Information Systems and Computer Networks (ISCON) (pp. 1-5). IEEE.
- 42. ShikhaChadha, D. S., & Singhal, V. Ancient Text Character Recognition Using Deep Learning.

- 43. Verma, S., Gupta, N., Anil, B. C., & Chauhan, R. (2022). A Novel Framework for Ancient Text Translation Using Artificial Intelligence. ADCAIJ: Advances in Distributed Computing and Artificial Intelligence Journal, 11(4), 411-425.
- 44. Mandala, V. (2018). From Reactive to Proactive: Employing AI and ML in Automotive Brakes and Parking Systems to Enhance Road Safety. International Journal of Science and Research (IJSR), 7(11), 1992–1996. https://doi.org/10.21275/es24516090203
- 45. Mandala, V. (2019). Optimizing Fleet Performance: A Deep Learning Approach on AWS IoT and Kafka Streams for Predictive Maintenance of Heavy Duty Engines. International Journal of Science and Research (IJSR), 8(10), 1860–1864. https://doi.org/10.21275/es24516094655
- 46. Mandala, V. (2019). Integrating AWS IoT and Kafka for Real-Time Engine Failure Prediction in Commercial Vehicles Using Machine Learning Techniques. International Journal of Science and Research (IJSR), 8(12), 2046–2050. https://doi.org/10.21275/es24516094823
- 47. Mandala, V., & Surabhi, S. N. R. D. (2024). Integration of AI-Driven Predictive Analytics into Connected Car Platforms. IARJSET, 7(12). https://doi.org/10.17148/iarjset.2020.71216
- 48. Mandala, V. Towards a Resilient Automotive Industry: AI-Driven Strategies for Predictive Maintenance and Supply Chain Optimization.
- 49. Mandala, V., & Surabhi, S. N. R. D. (2021). Leveraging AI and ML for Enhanced Efficiency and Innovation in Manufacturing: A Comparative Analysis.
- 50. Mandala, V. (2021). The Role of Artificial Intelligence in Predicting and Preventing Automotive Failures in High-Stakes Environments. Indian Journal of Artificial Intelligence Research (INDJAIR), 1(1).
- 51. Mandala, V., & Surabhi, S. N. R. D. Intelligent Systems for Vehicle Reliability and Safety: Exploring AI in Predictive Failure Analysis.
- 52. Mandala, V., & Kommisetty, P. D. N. K. (2022). Advancing Predictive Failure Analytics in Automotive Safety: AI-Driven Approaches for School Buses and Commercial Trucks.
- 53. Mandala, V., & Mandala, M. S. (2022). ANATOMY OF BIG DATA LAKE HOUSES. NeuroQuantology, 20(9), 6413.
- 54. Mandala, V., Premkumar, C. D., Nivitha, K., & Kumar, R. S. (2022). Machine Learning Techniques and Big Data Tools in Design and Manufacturing. In Big Data Analytics in Smart Manufacturing (pp. 149-169). Chapman and Hall/CRC.
- 55. Mandala, V. (2022). Revolutionizing Asynchronous Shipments: Integrating AI Predictive Analytics in Automotive Supply Chains. Journal ID, 9339, 1263.
- Mandala, V., & Surabhi, S. N. R. D. (2024). Machine Learning Algorithms for Engine Telemetry Data: Transforming Predictive Maintenance in Passenger Vehicles. IJARCCE, 11(9). https://doi.org/10.17148/ijarcce.2022.11926
- 57. Surabhi, S. N. R. D., Mandala, V., & Shah, C. V. AI-Enabled Statistical Quality Control Techniques for Achieving Uniformity in Automobile Gap Control.
- 58. Shah, C. V., Surabhi, S. N. R. D., & Mandala, V. ENHANCING DRIVER ALERTNESS USING COMPUTER VISION DETECTION IN AUTONOMOUS VEHICLE.

- 59. Mandala, V., Jeyarani, M. R., Kousalya, A., Pavithra, M., & Arumugam, M. (2023, April). An Innovative Development with Multidisciplinary Perspective in Metaverse Integrating with Blockchain Technology with Cloud Computing Techniques. In 2023 International Conference on Inventive Computation Technologies (ICICT) (pp. 1182-1187). IEEE.
- 60. Mandala, V., Rajavarman, R., Jamunadevi, C., Janani, R., & Avudaiappan, T. (2023, June). Recognition of E-Commerce through Big Data Classification and Data Mining Techniques Involving Artificial Intelligence. In 2023 8th International Conference on Communication and Electronics Systems (ICCES) (pp. 720-727). IEEE.