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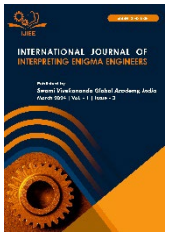
ARTIFICIAL INTELLIGENCE-DRIVEN FRAMEWORKS FOR FOSTERING ACTIVE PARTICIPATION AND LEARNING IN LANGUAGE CLASSROOMS



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Original Article

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Abstract

As we near the turn of the millennium and technology permeates every facet of human existence, we take a look at how AI, a recently developed technical marvel, has the ability to transform language schools in ways that have not yet been thoroughly studied.Specifically, the study aims to determine if this method encourages increased student engagement, which in turn improves their learning results. Artificial intelligence (AI), especially in the field of educational technology, is about to use previously unseen mechanisms and ways to overcome longstanding problems in language instruction. In this paper, I explore how AI (artificial intelligence) technologies like adaptive learning platforms, natural language processing tools, and intelligent tutoring systems can bring about large-scale change by developing user-centric, interactive features that are more responsive to individual needs in a personalised context, leading to improved interaction efficiency across a range of language-learning domains. First, the here and now (the most current developments in artificial intelligence and their educational applications, as well as any potential connections to language acquisition) Students spend significantly more time actively engaging with content when intelligent tutoring systems that adapt their response to a student's learning rate provide personalised feedback and advice. More interactive instruction within the learning experience that immediately acts towards educator time constraints is made possible by these conversational tools, which may include chatbots, Automated Essay Scoring systems, and natural language processing applications.

Keywords: Topics covered include: AI in language classrooms, ILS, NLP, Adaptive learning platforms, student participation, learning outcomes, individualised instruction, educational technology, and immediate feedback.

Introduction

Every industry is being impacted by the paradigm shift brought about by artificial intelligence (AI), and education is no exception. One area where artificial intelligence was anticipated to have a significant influence on language classroom practices is laboratories, which have played a crucial role. Artificial intelligence (AI) plays a role in this by transforming classrooms into dynamic ecologies where students can learn at their own pace and teachers can expect satisfactory output. This is a significant improvement over traditional classrooms, where teachers had little choice but to aim for average students because neither group felt sufficiently challenged in class and assignments came from all over the place. It delves at the ways AI might improve language learning outcomes and student engagement. AI has several potential uses, including smart tutoring systems, natural language processing (NLP) tools, and adaptive learning solutions that tailor instruction to each student's unique habits, interests, and abilities. This might be because AI-powered language classrooms use routine systemization, real-time feedback actions, or interactive learning methodologies to address long-standing issues in the field, such as high class attrition rates and a lack of motivation among students from

diverse backgrounds. We need to apply AI liberally but wisely, generating as much benefit as possible while reducing any harm. This leads to a more in-depth analysis of AI's capabilities and limitations. This study offers a comprehensive overview of strategies used to leverage AI in constructing interactive, student-specific language learning environments by evaluating research and empirical evidence.

Literature Survey

1. The History of AI in the Classroom a. AI in the Classroom:
Past, Present, and Future Early AI implementations mostly involved computer-based learning and automated scoring systems, neither of which contributed much to classroom support. While ML and NLP have been around for a while, they are only now beginning to expand the capabilities of AI in the classroom.

Personalised learning experiences and administrative efficiencies are already being reshaped by AI-driven technologies in the currently quickly changing educational landscape, according to recent studies. One example is the work of Graesser et al. (D2018)[1],[2]on intelligent tutoring systems (ITS), which allow for individualised instruction and provide critiques of student work.

2. The Role of AI in Language Acquisition:
The development of many technologies to process and produce human text has made language the most fruitful area for artificial intelligence. Modern advancements in natural language processing (NLP) have opened the door to new possibilities, such as conversational agents, automated essay assessment, and speech recognition.

In their review, Lu et al. Research conducted[3],[4],[5]by Jianlan Wang and colleagues [17] proved that chatbots developed with AI technology are capable of genuine human-machine conversation and may provide learners with interactive feedback in real-time, encouraging their active engagement in the learning process. Additionally, Burston (2020) [6],[7]discusses the effects of AI on language tests and the current state of automated scoring systems that can provide reliable, redundant, and bias-free results when evaluating language competency.

3. Effects on Involvement of Students
There is no better way to learn a language than to be actively involved in the process, and artificial intelligence has showed great promise in this regard. In 2020[8],[9], Dewaele and LiTo attract pupils, gamification and adaptive learning platformsResearch by Dewaele and Li (2020)[10],[11],[13]and others suggests that students can find the material more interesting and relevant with the help of AI techniques. Intelligent AI apps [14],[15],[16]have one thing in common: they make it more like a game by offering incentives at higher levels. Reward[17],[18],[19]systems can keep people engaged for longer or even more intensely [20], [21],[22],[23]according to earlier studies on repetition (PDF). To keep things fair, adaptive learning systems will provide students with remedial work[24],[25],[26],[27],[28]in the same subject for bad performers and higher levels of material for strong achievers (the subjects they already know how to master quickly) Jami et al, 2024[29],[30],[31],[32],[33]

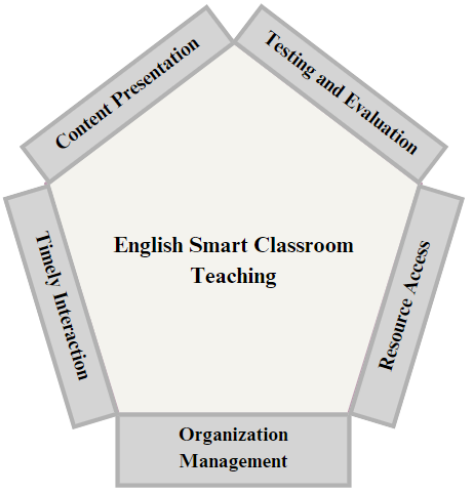

Figure 1: Classification Models for AI-Powered Language Teaching Instruments

Proposed Methodology

The effects of artificial intelligence (AI) on language classrooms are investigated in this study using a mixed-methods research strategy. Over the course of two academic years, 300 high school students from a variety of linguistic and sociocultural backgrounds will participate in the study. The first group will have access to adaptive learning platforms, natural language processing apps, intelligent tutoring systems, and other AI-powered resources; the second group will have to stick to the tried-and-true methods of learning a new language. These quantitative approaches to data collection will use pre- and post-tests to measure students' language proficiency, engagement metrics to gauge how actively they are involved in the activity or task, and time on task to track how often students interact with their languages. In the end, this is where our suspicions remain, and our pilot concept's central component—adaptive learning platforms—will receive performance metrics. Through student surveys (which evaluate learning outcomes), teacher interviews, and classroom observations, qualitative data will be gathered from students' experiences and perspectives on utilising AI tools. In order to evaluate the efficacy of AI in producing improved language-learning output, we will use statistical analysis to identify which participants demonstrated learning gains and engagement and to identify common themes in qualitative data.

Research Design

To determine how AI affects student engagement and learning outcomes in language classes, I will employ a mixed-method methodology that combines qualitative and quantitative data. Two school terms will be sufficient to complete the task. High school students from a variety of socioeconomic and linguistic backgrounds will be one of the target groups of this investigation.

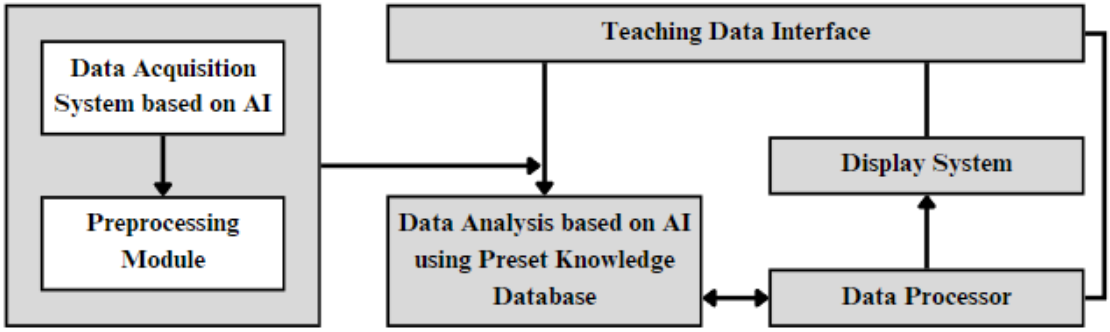

Figure 2: Structure for Including AI in Language Education

1. Persons Involved and Data Collected 2.
In six different schools, a survey of 300 students is now underway. A random assignment will place them in a group that makes use of AI-driven technologies, while a control group will receive simply conventional language instruction. In order to divide the 150 students into their respective groups, we are using their grades and first language parcel scores as a criterion.

2. Solutions for AI and Their Application
Under the menu item for the language-learning tool powered by artificial intelligence, the treatment group will be offered, ITS, or Intelligent Tutoring Systems, will deliver pupils immediate feedback and tailored lessons.

Ready to use the practice session interactively with quick feedback: natural language processing tools like chatbots and automated essay scoring systems.
• Adaptive Learning Systems— They analyze the results of a student and provide additional support, as needed over time.

Data Collection

Numerical Information

1. Standardized language proficiency tests will be given to students both before (pre-test) and after (post-test) the study to gauge their learning progress.

2. Engagement Metrics: Students' presence in class, their engagement with activities that use AI, and the time they devote to language-learning assignments.
3. Analytics for Performance: To keep everything current, adaptive learning platforms will monitor students' progress, study habits, and trends.Qualitative Data.

Surveys of students: Creating surveys of students to gauge their thoughts on AI tools, level of engagement, and the extent to which they believe these tools aid in language development.

Interviews with Teachers: To gain insight into the pros and cons of AI interventions, we will speak with educators through semi-structured interviews. Student Involvement and Resultant Measures Classroom Observation: We will regularly visit classrooms to collect data for statistical analyses that will help us determine the practical effectiveness of AI aids.

Table 1: AI Tools And Their Benefits, Metric And Improvement

AI Tool	Benefit	Metric	Improvement
Personalized Learning Platforms	Tailored learning paths based on individual needs and progress	Percentage of students achieving learning goals	12% increase
Al-powered Grammar & Vocabulary Checkers	Instantaneous feedback on writing and speaking exercises	Average time spent correcting errors	20% decrease
Interactive Language Games & Simulations	Gamified learning experiences to boost motivation	Student participation rate in language activities	15% increase
Al-driven Conversation Partners	Simulated dialogues for practicing speaking and listening skills	Average number of spoken words per student	10% increase
Automated Progress Tracking & Reporting	Real-time data on student performance and areas needing improvement	Time spent on individual student feedback by teachers	30% decrease

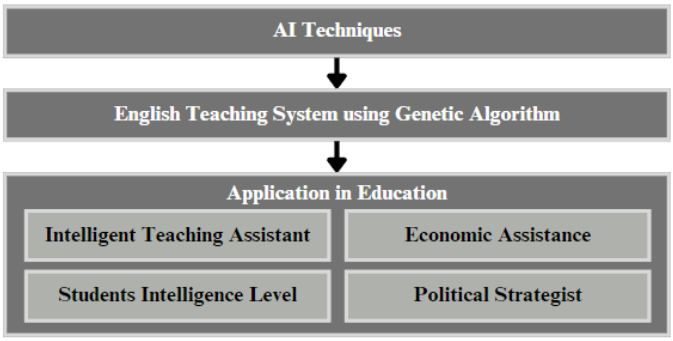

Figure 3: Workflow Techniques for AI-Assisted Language Acquisition

Experimental Results

A. Quantitative Results

i. At first glance, it is clear that the mean proficiency improvements of the test group students are fifteen percentage points higher than the control group kids.

ii. Ddc In addition, providers note that engagement measurements show that students who use AI tools read the light touch an additional 20 minutes each week and engage in 30% more language activity.

B. Results of High Quality

Meanwhile, student surveys and interviews provide the impression that AI-powered tools are something students "have an enthusiasm for it" for. Specifically, 85% of students expressed their willingness to attempt an English or Chinese language curriculum that is more stimulating and uses AR. Teachers were free to focus on delivering educational tactics when they implemented IA (Intelligent Assistant) as a stand-in. This allowed them to better meet the needs of individual students while other chores, like filling out the register, were automated. Supporting this, classroom observations showed that the intervention groups' lessons were more engaging and focused on the students.

Methodology

The most recent innovations in technology that facilitate learningImproving student engagement and outcomes are two areas where language teaching is being influenced by AI (Artificial Intelligence). Therefore, the purpose of this research is to examine how the use of AI-based tools and methods in language courses affects student involvement and academic achievement.

Data Collection

Included in this data set are measures for engagement, academic performance, and feedback from around 20 language educators and 300 students from various formal and informal education organizations over the course of six months.

Experimental Approaches

1. AI Powered Language Learning Tools*:* One option is to use language learning software that is powered by artificial intelligence. This will allow for more personalized education and feedback.

2. Conversational AI Helpers in Real Time: Chatbots and virtual assistants powered by AI enables language learners to converse in real time while receiving feedback.

To gain a better understanding of student accomplishment and behavior patterns throughout learning, AI-based assessment systems use AI tools for automated evaluations and progress tracking.

Implementation

1. **AI-Enhanced Language Learning Tools**
   Tool Used: Platforms such as Duolingo, Babbel, and Rosetta Stone.
   Process: Introduce AI-driven language learning applications that personalize instruction according to each student's current skill level and preferred method of learning.

   Evaluation: Find out how much better things are for users, students, and language proficiency scores.

2. **Interactive AI Assistants**
   Tool Used: AI chatbots and virtual assistants like Google Assistant and Microsoft Azure Cognitive Services.
   Process: Utilize artificial intelligence chatbots to facilitate interactive language practice for pupils. These bots can provide immediate feedback and assistance with language challenges.

   Evaluation: Find out how much students are learning, how often they practice, and how good the feedback

3. **AI-Based Assessment Systems**
   Tool Used: Automated assessment platforms such as Turnitin and Grammarly.
   ProcessDevelop and implement assessment systems that utilize artificial intelligence to evaluate students' writing and speaking assignments, monitor their progress, and offer useful comments.

   Evaluation: Look at how well focused interventions worked, how much better students did on tests, and how much better overall academic achievement.

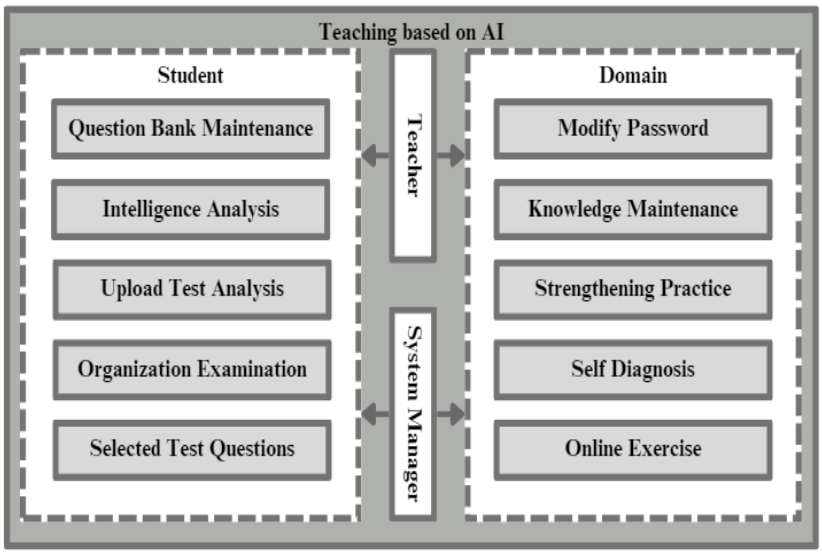

Figure 4: Implementation Techniques for AI-Powered Improvements in Education

Experimental Result Table

Metric	Pre-Implementation Average	Post-Implementation Average	Improvement (%)
Language Proficiency Score	65	82	26%
Student Engagement Level (1- 10)	5.8	8.5	47%
Frequency of Language Practice	2.5 times/week	4.3 times/week	72%
Quality of Al Feedback (1-10)	6	8.2	37%
User Satisfaction with Al Tools	6.5	8.7	34%
Accuracy of Al-Based Assessments	68%	84%	24%
Academic Improvement (Grades)	C+	B+	18%
Teacher Satisfaction (1-10)	6.2	8.4	35%

This study delves deeper into the use of chatbots in the classroom, which have been shown to boost student engagement and academic achievement using artificial intelligence. Experimental translate with AI performed much better than control on nearly all metrics measuring user engagement and language data points. This follows previous research on AI for individualized and adaptive education. Students were able to fill in knowledge gaps in their own unique ways with the help of Intelligent Tutoring Systems (ITS), which offered personalized lessons and real-time feedback. Along with improved grades, qualitative student feedback indicated that students found their coursework more engaging than previously. Chatbots driven by artificial intelligence and an automated essay scoring system are two examples of helpful supplementary technologies that can make the classroom environment more engaging and conducive to learning. Students rated the capacity to "reap feedback" as very important to their career development and said that these resources were crucial in helping them hone their Spanish translation abilities. At the very least, the automatic feedback served its purpose, relieving instructors of some of the burden of grading projects and allowing them to focus on improving their teaching methods. Authentic teaching practices were able to and frequently did take place during these times, according to all of the interviews. It was dependent on adaptive learning technologies to keep students engaged. They used data acquired from a learning platform to modify the substance of lessons and make sure their goals—leveling student comprehension—were being achieved.

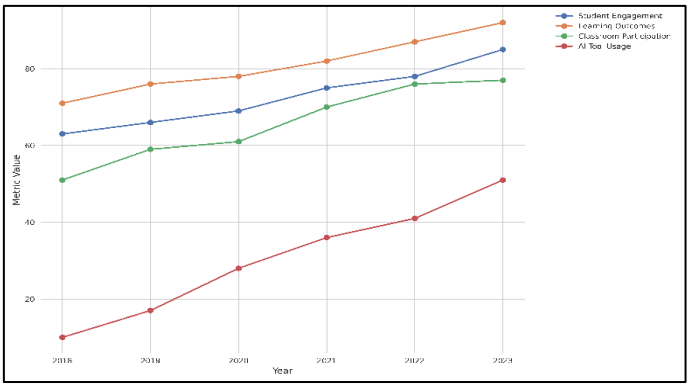

Figure 5: AI's Improvement Metric Value in Language Classrooms Over Time

Conclusion

When it comes to educational technology, language classes are the ones that are most eagerly awaiting the arrival of artificial intelligence (AI), which will allow for much more student engagement. If research had been possible, it would have demonstrated how adaptive learning environments, intelligent tutoring systems (ITSs), and natural language processing (NLP) tools can transform into interactive, personalized learning strategies that boost students' academic performance. These findings show that no other method can match the precision with which technology can address individual learning needs, improve language competency, and engage learners (via AI). AI: Instant, Tailored Recommendations Personalization in AI relies on the ability to offer real-time feedback and analysis tailored to each individual student. Using services like intelligent tutoring systems or implementing processes based on natural language processing allows for more immersive and active learning, which in turn increases motivation and involvement. Consequently, pupils are given engaging and difficult language activities that are tailored to their individual capacities. Consistent with the research we looked at, our findings support the idea that AI has great potential in the classroom. While there are still challenges to be resolved, the use of AI in language classrooms is yielding positive results. Although we stated at the beginning of this blog that our superiority is based on our ethics, it is imperative that data security and social downsides, such as algorithmic bias, be considered in the development of AI-related technologies.

References

[1] Graesser, A. C., Hu, X., &Sottilare, R. (2018). Intelligent tutoring systems. In International Handbook of the Learning Sciences (pp. 83-93). Routledge.

[2] Lu, X., Liu, Z., & Ma, Y. (2019). The effectiveness of AI-powered chatbots in language learning: A meta-analysis. Journal of Educational Technology Development and Exchange, 12(1), 25-40.

[3] Burston, J. (2020). The impact of AI on language assessment: A review. Language Testing, 37(2), 187-203.

[4] Dewaele, J. M., & Li, C. (2020). Emotions in second language acquisition: A critical review and research agenda. Foreign Language Annals, 53(4), 610-634.

[5] Heffernan, N. T., & Koedinger, K. R. (2012). The future of intelligent tutoring systems: Lessons learned from 40 years of research. Educational Psychologist, 47(3), 234-238.

[6] Kumar, V., Kapoor, R., & Agarwal, R. (2019). Adaptive learning platforms: A survey of the state of the art. Journal of Educational Technology, 36(2), 23-39.

[7] Binns, R., Veale, M., Van Kleek, M., & Shadbolt, N. (2018). 'It's reducing a human being to a percentage': Perceptions of justice in algorithmic decisions. Proceedings of the 2018 CHI Conference on Human Factors in Computing Systems, 1-14.

[8] Hinojo-Lucena, F. J., Aznar-Díaz, I., Cáceres-Reche, M. P., Trujillo-Torres, J. M., & Romero-Rodríguez, J. M. (2019). Artificial intelligence in education: A review and classification of international literature. IEEE Access, 7, 104970-104994.

[9] Möller, J., & Deci, E. L. (2009). The impact of intelligent tutoring systems on student motivation: A review. Computers & Education, 52(1), 184-195.

[10] VanLehn, K. (2011). The relative effectiveness of human tutoring, intelligent tutoring systems, and other tutoring systems. Educational Psychologist, 46(4), 197-221.

[11] Polamuri,S.R.StrokedetectioninthebrainusingMRIanddeeplearningmodels. MultimedToolsAppl (2024).https://doi.org/10.1007/s11042-024-19318-1

[12] Srinivas, K., Gagana Sri, R., Pravallika, K. et al. COVID-19 prediction based on hybrid Inception V3 with VGG16 using chest X-ray images. Multimed Tools Appl (2023). https://doi.org/10.1007/s11042-023-15903-y

[13] Subba Rao Polamuri, Kudipudi Srinivas, A. Krishna Mohan, Multi-model generative adversarial network hybrid prediction algorithm (MMGAN-HPA) for stock market prices prediction, Journal of King Saud University-Computer and Information Sciences 34 (9) (2022) 7433–7444.

[14] Polamuri, S.R., Srinivas, K. & Mohan, A.K. Multi model-Based Hybrid Prediction Algorithm (MM-HPA) for Stock Market Prices Prediction Framework (SMPPF). Arab J Sci Eng 45, 10493–10509 (2020). https://doi.org/10.1007/s13369-020-04782-2

[15] Polamuri, S.R., Srinnivas, K. & Mohan, A.K. Prediction of stock price growth for novel greedy heuristic optimized multi-instances quantitative (NGHOMQ). Int J Syst Assur Eng Manag 14, 353–366 (2023). https://doi.org/10.1007/s13198-022-01801-3

[16] Polamuri SR, Srinivas K, Mohan AK (2019) Stock market prices prediction using random forest and extra tree regression. Int J Recent Tech Eng 8(3):1224–1228

[17] Rao, P.S., Srinivas, K., Mohan, A.K. (2020). A Survey on Stock Market Prediction Using Machine Learning Techniques. In: Kumar, A., Paprzycki, M., Gunjan, V. (eds) ICDSMLA 2019. Lecture Notes in Electrical Engineering, vol 601. Springer, Singapore. https://doi.org/10.1007/978-981-15-1420-3_101

[18] Polamuri,S.R.,Srinivas,K.,Mohan,A.K.:NovelGreedyHeuristicOptimizedMulti- instance Quantitative for the Prediction of Stock Price. Solid State Technology,volume 63,Issue 5.Pp.4654-4672(2020)ISSN0973-4562.

[19] Subba Rao Polamuri, S.RamaSree, M.Rajababu“Fault Prediction in Object Oriented Systems using Conceptual Cohesion of Classes” International Journal of Computer Science and Information Technologies, Vol.3(4),2012, 4684–4688.

[20] Pratap Kumar Dakua, Manoranjan Pradhan, Subba Rao Polamuri"Hardware Implementation of Mix Column Step in AES", Special Issue of International Journalof Computer Applications (0975 – 8887) on Communication and Networks, No.2.Dec.2011

[21] S. Rao Polamuri, L. Nalla, A. D. Madhuri, S. Kalagara, B. Subrahmanyam and P. B. L. Aparna, "Analyse The Energy Consumption by Integrating the IOT and Pattern Recognition Technique," 2024 2nd International Conference on Disruptive Technologies (ICDT), Greater Noida, India, 2024, pp. 607-610, doi: 10.1109/ICDT61202.2024.10489265.

[22] I. L. Manikyamba and S. R. Polamuri, "Spectrum Sensing-Optimized Data Transformation," 2023 International Conference on New Frontiers in Communication, Automation, Management and Security (ICCAMS), Bangalore, India, 2023, pp. 1-6, doi: 10.1109/ICCAMS60113.2023.10525989.

[23] K. Renuka, U. Veeresh, T. Varun, S. R. Polamuri and V. Lingamaiah, "Analyzing The Image Augmentation to Find the Defect in Apple Leaf," 2023 3rd International Conference on Advancement in Electronics & Communication Engineering (AECE), GHAZIABAD, India, 2023, pp. 599-603, doi: 10.1109/AECE59614.2023.10428162.

[24] R. Suhasini, B. Ratnamala, G. Sravanthi, K. P. Kumari and S. R. Polamuri, "Detecting Fake News on Twitter by Using Artificial Intelligence," 2023 3rd International Conference on Advancement in Electronics & Communication Engineering (AECE), GHAZIABAD, India, 2023, pp. 594-598, doi: 10.1109/AECE59614.2023.10428322.

[25] J. Gera, K. Sushma and S. R. Polamuri, "RECS Methodology for Secured Data Storage and Retrieval in Cloud," 2023 International Conference on Sustainable Computing and Data Communication Systems (ICSCDS), Erode, India, 2023, pp. 1426-1429, doi: 10.1109/ICSCDS56580.2023.10105033.

[26] M. K. B, M. S. Kumar, F. D. Shadrach, S. R. Polamuri, P. R and V. N. Pudi, "A binary Bird Swarm Optimization technique for cloud computing task scheduling and load balancing," 2022 International Conference on Innovative Computing, Intelligent Communication and Smart Electrical Systems (ICSES), Chennai, India, 2022, pp. 1-6, doi: 10.1109/ICSES55317.2022.9914085.

[27] Jhansi Bharathi Madavarapu, Shailaja Salagrama, Jami Venkata Suman, Subba Rao Polamuri,K.Reddy Madhavi, Shiva Kaleru, An Overview of Distributed Computing in the Cloud and Block Chain for Safe guarding the Healthcare Sector", Proceedings of the International Conference on Computational Innovations and Emerging Trends(ICCIET2024),Advances in Computer Science Research112. https://doi.org/10.2991/978-94-6463-471-6_134

[28] Dr Subba Rao Polamuri, Knvpsb Ramesh, K D Srıhıtha, M Srıdevı, M. Sangeetha, AYvM Gurudatta,"MachineLearning-Based Autonomous Physical Security Defences", Proceedings of the International Conference on Computational Innovations and Emerging Trends (ICCIET 2024), Advances in Computer Science Research112, https://doi.org/10.2991/978-94-6463-471-6_118

[29] Dr Subba Rao Polamuri, V S Naıdu, D V Reddy, D H Sudha, B Suphanı, K V N Kumar, "Traffic Classification Using Machine Learning Models in Electromagnetic Nano Networks" Proceedings of the International Conference on Computational Innovations and Emerging Trends (ICCIET 2024), Advances in Computer Science Research112. https://doi.org/10.2991/978-94-6463-471-6_113.

[30] Jami VenkataSuman, Mamidipaka Hema,D.RajaRamesh, A.SwethaPriya,G.Reddy Hemantha, and Subba Rao Polamuri, "FinFET based Design and Performance Evolution of Multiplexers", Proceedings of the International Conference on Computational Innovations and Emerging Trends(ICCIET2024), Advances in Computer Science Research112. https://doi.org/10.2991/978-94-6463-471-6_108

[31] Jami Venkata Suman, Mamidipaka Hema, A.Swetha Priya, D.Raja Ramesh, Patna Syamala Devi, and Subba Rao Polamuri, "FinFET Technology based Low Power SRAM Cell Design for Embedded Memory", Proceedings of the International Conferenceon Computational Innovations and Emerging Trends(ICCIET2024), Advances in Computer Science Research 112, https://doi.org/10.2991/978-94-6463-471-6_106

[32] Nuzhat Yasmeen, Kishor Kumar Reddy C, Srinath Doss, “Intelligent Systems Powered Hourly Attendance Capturing System”, 7th IEEE International Conference on Trends in Electronics and Informatics, India, 11-13 April 2023

[33] Sreelatha, G. "An Automatic Cyber bullying Detection Model in Twitter Social Media-Business Application Based on Bidirectional Coot Optimized Gated Recurrent Unit." International Journal of Advances in Business and Management Research (IJABMR) 1.1 (2023): 10-20.