Original Article

PV based Electric Vehicle charging control system using Internet of things

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Abstract: *In this paper, control strategy is to meet the load demand and reduce power interruption. The power flow from various sources is managed through the use of a Microcontroller connected with a hybrid supply using Relay. The power flow is managed by injecting excess power from the AC grid into the battery to charge it when power is not generated by the PV panel. Power from AC grid is harnessed by transformer coupled bridge converters, and power from PV is harnessed by buck-boost converters connected with battery charging / discharging control. The relay acts as an open circuit when power is generated by the solar panel, or it acts as a closed circuit when power is not produced by the solar panel. When closed circuit, the power is used by the AC grid through rectifier. The simulation results obtained by MATLAB /Simulink demonstrate the performance of this control strategy under different modes of operation and the efficacy of this proposed system.*

Keywords: PV Panel, Bridge Converter, Relay, AC Grid, Rectifier.

INTRODUCTION

This project is based on the development of electric car charging with a combination of solar and grid electricity to encourage the use of electric cars and reduce energy consumption. The rapid depletion of fossil fuels, the ever-increasing demand for energy and the concern about climate change encourage the production of electricity from renewable energy sources. Photovoltaic (PV) has become a popular energy source due to its environmental friendliness and cost-effectiveness. However, these sources are essentially discontinuous. Therefore, it is difficult to provide a stable and continuous power supply using these sources. This can be solved by effectively integrating energy into the storage elements. The interesting complementary behavior of the PV power separation and the network power minimum utilization model combined with the DC-DC converter led to research on their integration and the result is hybrid PV systems.

To integrate multiple renewable energy sources to overcome power interruption and power demand, the conventional approach in our proposed system uses separate single-input converters for each source connected to a common DC-DC converter for maximum output system efficiency. However, these Buck-Boost (DC-DC) converters are not effectively used due to the intermittent nature of renewable energy sources. There are also many electrical conversion steps that reduce the efficiency system.
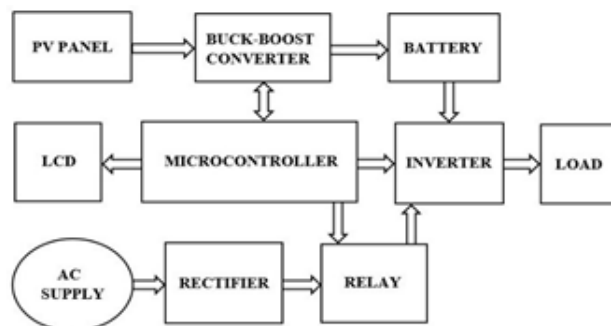

Figure 1: Block diagram

WORKING

The PV panel is connected to an MPPT that works as a Buck-Boost. When the power supply from the PV panel is not enough, the MPPT works as a Boost converter. When the PV panel supply voltage is higher than the optimum voltage, the MPPT acts as a Buck converter and supplies power to the rechargeable battery.

A microcontroller is connected to the system to control the voltage and display the values through an LCD screen. In the second part of this system, the AC power is converted to DC using a full-wave rectifier and fed to the relay module. When the battery voltage is low, the microcontroller triggers the relay module to open the contact. The battery or rectifier input is given to the inverter to convert the DC input to AC input. The microcontroller simultaneously monitors the PV panel voltage, if it is not enough, the relay to charge the battery and then supply power to the inverter. Then the inverter produced 230v for output. We can now charge electric vehicles with a separate adapter according to the vehicle's battery capacity.

METHODOLOGY

MPPT (maximum power point tracking) is applied to acquire the intense electricity from sun irradiance. MPPT cooperates with DC-DC raise converter to control the duty cycle of the enhance converter with the aid of following the maximum present day and voltage of solar PV machine. Incremental Conductance (INC) primarily based MPPT algorithm for solar PV gadget is advanced here. The equation for enforcing the INC algorithm may be easily gotten from the basic energy equation. The equation for electricity is given as, differentiating the above equation with respect to voltage. So the equal load isn't always linear and because of thevarieties in available power source, load can range over a extensive scope of bends. That's why a nonlinear exam is needed for a solid operation.

PV panel is hooked up to the MPPT, which act as buck-boost. when the strength deliver from PV panel isn't always sufficient then MPPT act as an increase converter, when the electricity deliver from PV panel is extra than the most advantageous voltage then the MPPT act as greenback converter and fed to rechargeable battery. The microcontroller is hooked up to the device to display the voltage score and show the values with the help of lcd show. some other part of this device has AC supply transformed to DC supply with the help of the total wave rectifier and given to the relay module. when the voltage from the battery is low the microcontroller triggers the relay module to open touch.

The deliver from battery or from the rectifier is given to the inverter to transform DC supply to AC supply. Microcontroller simultaneously screen the voltage from the PV panel when it is not sufficient then it on relay to fee battery and then give the supply to inverter. Then the inverter produced 230v as output. we are able to now fee the electric vehicles using separate adapter concerning to the potential of the motors battery. The EV charging schedules are calculated in step with EV proprietor necessities and charging traits: energy requirements, connection duration, EV battery performance, charger's electricity rating and charger's performance. In an remoted gadget, excessive energy is typically stored in batteries for the duration of the day and the batteries are used to strength the home equipment in instances whilst PV panels do not absorb enough energy. Bidirectional DC-DC converter (additionally known as digital price controller) performs an important component in an isolated sun device. The purpose is to make sure the battery charging cycle is working at most fulfilling conditions, specially to prevent overcharging and deep disc.

SIMULATION

The above is the simulation model of our proposed system which helps to design and implement our proposed model. The simulation model has all the components that are connected to give the proposed model of our system.

The output waveform from the Simulation results obtained using MATLAB/Simulink show the performance of the proposed system under various modes of operation. The simulation model and efficacy of the proposed system are verified through detailed experimental studies, to demonstrate the capability of the system operation in different modes with the help of MATLAB/Simulink and hardware model
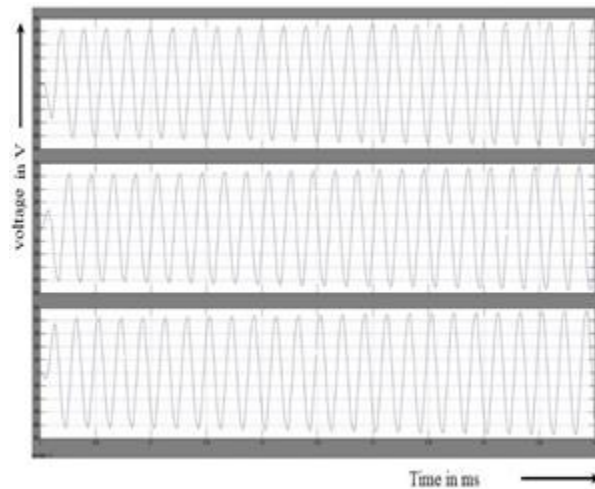
Figure 3: Output Waveform

EXISTING SYSYTEM

There are some power stations for charging the electrical vehicle but not much more because there is heavy power demand for electricity and due to the usage of electrical vehicle is also lesser. The existing system use only grid supply that is main disadvantage because to manage the power demand it is quite difficult. The existing system does not contain hybrid source of energy to manage the power demand.

PROPOSED SYSTEM

In an isolated system, immoderate strength is generally saved in batteries all through the day and the batteries are used to strength the home equipment in instances while PV panels do no longer soak up sufficient electricity.

IMPLEMENTTION

The power supply stage is composed of a rectifying circuitry in which 220V AC is rectified to a regulated and filtered DC using a full-wave bridge network. The charge controller circuit comprises of electronic components such as capacitors, resistors, op- amps, diodes, transistors and light emitting diodes. The charge controller circuit in conjunction with the microcontroller is manipulated such that it can detect presence or absence of battery at the charging terminal, wrong battery polarity connection at the charging terminals, charging status of the battery, full charge status of the battery and float charge.
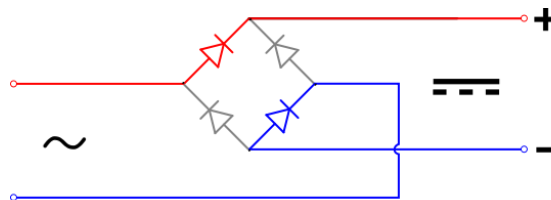
The Arduino microcontroller was used in the work to monitor the battery charge status and to further drive the liquid crystal display to enable the user have a deep knowledge of the system functionalities. The design uses a combination of constant current and constant voltage to charge batteries connected across its terminals for 12V batteries. It is a common problem to alwaysovercharge batteries thereby shortening the life span of the batteries and increasing the Mean Time to Failure of such batteryThe charge controller circuit in conjunction with the microcontroller is manipulated such that it can detect presence or absence of battery at the charging terminal. The battery charger is used to put energy into a secondary cell by forcing electric current through it. An efficient battery charger requires a charge controller whose main function is to keep the

batteries properly charged and safe for the long term and prevent it from deep discharging.The simple inverter circuit consists of Arduino, step up transformer 12-230v and two MOSFET. A voltage regulator, which give constant voltage to Arduino board regardless of battery voltage (Battery voltage must not drop below 11.90V). The two capacitors connected to voltage regulator gives stability which act as filter to convert DC to pure AC. The input capacitor 1000uF helps the inverter to start softly and provide immunity against sudden input voltage fluctuations.Two MOSFETs are employed which can handle around 300 Watt power with heat sink mounted. By turn off and on each MOSFET alternatively we can develop alternating flux to produce alternating current. The transformer is a step down one, which is used in reverse to step-up the voltage and it its center tapped. The transformer's voltage and current parameter also decides maximum output power.

HARDWARE

As the demand for solar electric systems grows, progressive builders are adding Solar Photo Voltaic (PV) as an option for their customer's emphasis will be placed on information that will be useful in including a grid-connected. PV system in a bid for a residential or small commercial building. We will also cover those details of the technology and installation that may be helpful in selecting subcontractors to perform the work, working with a designer, and directing work as it proceeds.

Arrays are most commonly mounted on roofs or on steel poles set in concrete. In certain applications, they may be mounted at ground level or on building walls. Solar modules can also be mounted to serve as part or all of a shade structure such as a patio cover. On roof-mounted systems, the PV array is typically mounted on fixed racks, parallel to the roof for aesthetic reasons and stood off several inches above the roof surface to allow airflow that will keep them as cool as practical.

POWER SUPPLY

The power supply is provided inverter and microcontroller. The DC power supply with both positive and negative output voltages, a step-up transformer is used and Arduino operates at low power. A relay is an electrically operated switch. Where many relays are used to an electromagnet to mechanically operate a switch, but other operating principles are also used, such as solid state relays. Relays are used where it is necessary to control a circuit by a low-power signal where several circuits must be controlled by one signal. The first relays were used in long distance telegraph circuits as amplifiers they repeated the signal coming from one circuit and retransmitted it on another circuit. It is a common problem to always overcharge batteries thereby shortening the life span of the batteries and increasing the Mean Time to Failure of such batteries.

BATTERY

The EV battery charging schedules set by the EV Parking Manager (EVPM) are followed by the EV`s chargers. A two way communication between the EV`s chargers and the EVPM is assumed. The EV Parking Manager has the kW loading capacity limits of the distribution network to which the parking facility's charging infrastructure is connected to (according to the distribution network technical constraints). The loading capacity limits are assumed to be made available by the DSO. The EV batteries are considered as purely resistive loads that charge at a constant power rating. The EV battery charging schedules set by the EV Parking Manager (EVPM) are followed by the EV`s chargers. A two way communication between the EVs' chargers and the EVPM is assumed. The EV Parking Manager has the kW loading capacity limits of the distribution network to which the parking facility's charging infrastructure is connected to (according to the distribution network technical constraints).The EV charging schedules are calculated according to EV owner requirements and charging characteristics: Energy requirements, connection duration, EV battery efficiency

Figure 7: Solar Panel

MPPT ALGORITHM

MPPT (Maximum Power Point Tracking) is utilized to obtain the extreme power from sun irradiance. MPPT cooperates with DC-DC boost converter to control the duty cycle of the boost converter by following the maximum current and voltage of solar PV system. Incremental Conductance (INC) based MPPT algorithm for solar PV system is developed here. The equation for implementing the INC algorithm can be easily gotten from the basic power equation. The equation for power is given as, differentiating the above equation with respect to voltage. So the equivalent load is not linear and because of the varieties in accessible energy source, load can fluctuate over a wide scope of bends. That's why a nonlinear examination is required for a stable operation.

The loading capacity limits are assumed to be made available by the DSO. The EV batteries are considered as purely resistive loads that charge at a constant power rating. The EV Parking Manager calculates and assigns battery charging schedules to EV`s on a first-come first-served basis. The EV charging schedules are calculated according to EV owner requirements and charging characteristics: Energy requirements, connection duration, EV battery efficiency, charger's power rating and charger's efficiency. In an isolated system, excessive electricity is usually stored in batteries during the day and the batteries are used to power the appliances in times when PV panels do not absorb enough energy. The DC-DC buck-boost converter plays an important part in an isolated solar system. The goal is to ensure the battery charging cycle is working at optimal conditions, mainly to prevent overcharging and deep discharge.

CONCLUSION

The PV-powered EV battery-buffered EV charging station with smart electricity control has been validated for greater than 12 months on a administrative center charging station at UC Davis West Village. The operation results display that the machine manage, PV electricity estimation, EV charging load projection, and battery SOC optimization are completed as predicted. A PV integrated EV charging station geared up with a buffer battery and with wise power control can nearly eliminate the station's top power call for and reduce the energy alternate with the software grid with the aid of a factor of 2. The anticipated PV power based totally at the extracted weather information displays the actual PV strength era. Extra complex PV strength forecasting models with more accurate hour-by way of-hour weather records may want to improve the accuracy of the anticipated PV electricity. The linear healthy of the ancient EV charging load facts for each day of the week for the contemporary six-week length seems appropriate for extracting the charging sample of a place of work EV charging station. since the cutting-edge charging station has most effective one outlet, the uncertainty and contingency will have an effect on the end result of the burden call for projection. The shrewd electricity control strategy is excellent ideal for charging station structures having one big electricity storage battery and multiple charging stores.

REFERENCES

[1]   Alexandru A.M., De MauroA., Fiasché M., Sisca F.G., Taisch M., Fasanotti L., Grasseni P., A smart web-based maintenance system for a smart manufacturing environment, IEEE 1st International Forum on Research and Technologies forSociety and Industry Leveraging a better tomorrow (2015), 579-584.

[2]   Bojun X.C.W.X.X., Textile Production Management System Based on Client/Server, Cotton Textile Technology 6 (2002).

[3]   Deyi Dong, Zhenquan Shi, The Loom monitoring system design with high reliability and easy maintainability, International conference on Control, Automation and System Engineering.

[4]   Dorian Schneider Yves-Simon Gloy, DoritMerhof, Vision-Based On-Loom Measurement of Yar Densities in Woven Fabrics, IEEE transactions on instrumentation and measurement 64(4) (2015).

[5]   Gerkey B.P., Vaughan R.T., Stoy K., Howard A., Sukhatme G.S., Mataric M.J., Most valuable player: A robot device server for distributed control, IEEE/RSJ International Conference on Intelligent Robots and Systems 3 (2001), 1226-1231.

[6]   Naresh Kumar Miryala, Divit Gupta, "Big Data Analytics in Cloud – Comparative Study," *International Journal of Computer Trends and Technology*, vol. 71, no. 12, pp. 30-34, 2023. Crossref, https://doi.org/10.14445/22312803/IJCTT-V71I12P107

[7]   Jinal Mistry, Ashween Ganesh, Rakesh Ramakrishnan, J. Logeshwaran. (2023, August). IoT based congenital heart disease prediction system to amplify the authentication and data security using cloud computing. *European Chemical Bulletin*, 12(S3), 7201–7213 | Google Scholar

[8]   Muthukumaran Vaithianathan, Mahesh Patil, Shunyee Frank Ng, Shiv Udkar, 2024. "*Energy-Efficient FPGA Design for Wearable and Implantable Devices*" *ESP International Journal of Advancements in Science & Technology (ESP-IJAST)* Volume 2, Issue 2: 37-51. [PDF}

[9]   "reGIFCAPTCHA: Revolutionizing User Interaction and Security in CAPTCHA Technology", International Journal of Emerging Technologies and Innovative Research (www.jetir.org), ISSN:2349-5162, Vol.10, Issue 12, page no.d891-d893, December-2023, Available: http://www.jetir.org/papers/JETIR2312398.pdf

[10]   Venkata Sathya Kumar Koppisetti, 2024. "*The Role of Explainable AI in Building Trustworthy Machine Learning Systems*" *ESP International Journal of Advancements in Science & Technology (ESP-IJAST)* Volume 2, Issue 2: 16-21. [Link]

[11]   Arnab Dey (2022) Automation for CI/CD Pipeline for Code Delivery with Multiple Technologies. Journal of Mathematical & Computer Applications. SRC/JMCA-170. DOI: doi.org/10.47363/JMCA/2022(1)138

[12]   Dhamotharan Seenivasan, "Improving the Performance of the ETL Jobs," International Journal of Computer Trends and Technology, vol. 71, no. 3, pp. 27-33, 2023. Crossref, https://doi.org/10.14445/22312803/IJCTT-V71I3P105

[13]   Dixit, A.S., Nagula, K.N., Patwardhan, A.V. and Pandit, A.B., 2020. Alternative and remunerative solid culture media for pigment-producing serratia marcescens NCIM 5246. *J Text Assoc*, *81*(2), pp.99-103.

[14]   Amit Mangal, 2022. "*Envisioning the Future of Professional Services: ERP, AI, and Project Management in the Age of Digital Disruption*"*ESP Journal of Engineering & Technology Advancements* 2(4): 71-79. [Link]

[15]   Dileep Kumar Pandiya, Nilesh Charankar, 2024, Optimizing Performance and Scalability in Micro Services with CQRS Design, INTERNATIONAL JOURNAL OF ENGINEERING RESEARCH & TECHNOLOGY (IJERT) Volume 13, Issue 04 (April 2024).

[16]   Chanthati, S. R. (2024). Website Visitor Analysis & Branding Quality Measurement Using Artificial Intelligence. Sasibhushan Rao Chanthati. https://journals.e-palli.com/home/index.php/ajet. https://doi.org/10.54536/ajet.v3i3.3212

[17]   V. Kumar Nomula, "A Novel Approach to Analyzing Medical Sensor Data Using Physiological Models," FMDBTransactions on Sustainable Health Science Letters, vol. 1, no. 4, pp. 186 –197, 2023.

[18]   Mallikarjunaradhya, V., Mistry, J., Ganesh, A., & Kiruthiga, T. (2023, August). The smart analysis of cell damage and cancerous prediction using information clustering model. In 2023 *Second International Conference on Smart Technologies for Smart Nation (SmartTechCon)* (pp. 870-875). IEEE. | Google Scholar

[19]   Muthukumaran Vaithianathan, Mahesh Patil, Shunyee Frank Ng, Shiv Udkar, 2024. "*Comparative Study of FPGA and GPU for High-Performance Computing and AI*" *ESP International Journal of Advancements in Computational Technology (ESP-IJACT)* Volume 1, Issue 1: 37-46. [PDF}

[20]   A. Kumar, S. M. Ahmed and V. K. Duleb, "English text compression for small messages," ICIMU 2011 : Proceedings of the 5th international Conference on Information Technology & Multimedia, Kuala Lumpur, Malaysia, 2011, pp. 1-5, doi: 10.1109/ICIMU.2011.6122737.

[21]   Venkata Sathya Kumar Koppisetti, 2024. "*The Future of Remote Collaboration: Leveraging AR and VR for Teamwork*" *ESP International Journal of Advancements in Computational Technology (ESP-IJACT)* Volume 2, Issue 1: 56-65. [Link]

[22]   Dixit, A.S., Patwardhan, A.V. and Pandit, A.B., 2021. PARAMETER OPTIMIZATION OF PRODIGIOSIN BASEDDYE-SENSITIZED SOLAR CELL. *International Journal of Pharmaceutical, Chemical & Biological Sciences*, *11*(1), pp.19-29.

[23]   Amit Mangal, 2021. "*Evaluating Planning Strategies for Prioritizing the most viable Projects to Maximize Investment Returns*" *ESP Journal of Engineering & Technology Advancements* 1(2): 69-77. [Link]

[24]   Nilesh Charankar, Dileep Kumar Pandiya, 2024, Title: Enhancing Efficiency and Scalability in Microservices Via Event Sourcing, INTERNATIONAL JOURNAL OF ENGINEERING RESEARCH & TECHNOLOGY (IJERT) Volume 13, Issue 04 (April 2024).

[25] "AI-POWERED API ANALYTICS IN THE CLOUD ", International Journal of Emerging Technologies and Innovative Research (www.jetir.org | UGC and issn Approved), ISSN:2349-5162, Vol.11, Issue 6, page no. ppa599-a603, June-2024, Available at : http://www.jetir.org/papers/JETIR2406073.pdf

[26] Komperla, R. C., Pokkuluri, K. S., Nomula, V. K., Gowri, G. U., Rajest, S. S., & Rahila, J. (2024). Revolutionizing Biometrics With AI-Enhanced X-Ray and MRI Analysis. In P. Paramasivan, S. Rajest, K. Chinnusamy, R. Regin, & F. John Joseph (Eds.), Advancements in Clinical Medicine (pp. 1-16). IGI Global. https://doi.org/10.4018/979-8-3693-5946-4.ch001

[27] A. Ganesh, R. Ramakrishnan, A. K. Sekar and J. Logeshwaran, "A Load Balancing Architecture to Improve the Security of Cloud Computing in the Disease Management Centers," 2023 *Second International Conference On Smart Technologies For Smart Nation (SmartTechCon)*, Singapore, Singapore, 2023, pp. 1299-1305, doi: 10.1109/SmartTechCon57526.2023.10391528. | Google Scholar

[28] Muthukumaran Vaithianathan, Mahesh Patil, Shunyee Frank Ng, Shiv Udkar, 2024. "*Low-Power FPGA Design Techniques for Next-Generation Mobile Devices*" ESP International Journal of Advancements in Computational Technology (ESP-IJACT) Volume 2, Issue 2: 82-93. [PDF]

[29] Charankar , N. . (2022). FAULT TOLERANCE TECHNIQUES IN API AND MICRO SERVICES. International Journal on Recent and Innovation Trends in Computing and Communication, 10(12), 275–285. Retrieved from https://ijritcc.org/index.php/ijritcc/article/view/10746

[30] Venkata Sathya Kumar Koppisetti, 2024. "*Machine Learning at Scale: Powering Insights and Innovations*" ESP International Journal of Advancements in Computational Technology (ESP-IJACT) Volume 2, Issue 2: 56-61. [Link]

[31] Chanthati, Sasibhushan Rao. (2021). How the Power of Machine – Machine Learning, Data Science and NLP Can Be Used to Prevent Spoofing and Reduce Financial Risks. 10.13140/RG.2.2.18761.76640.

[32] A.Yuvaraj, S.Vijay, M.Saran, V.Dhinesh, S.Saravanan," Agriculture Fire Monitoring Robot Using IOT," International Journal of Advanced Research in Electrical, Electronics and Instrumentation Engineering, Vol.9, Issue, 03, pp.257-262, 2020.

[33] A.Ananthan, A.M.Dhanesh, J.Gowtham, R.Dhinesh, G.Jeevitha, Dr.S.Saravanan," IoT Based Clean Water Supply", International Journal of Engineering Technology Research & Management, Vol.4, Issue.3, pp.154-162, 2020.

[34] S.Karthikeyan, A.Krishnaraj, P.Magendran, T.Divya, Dr.S.Saravanan," The Dairy Data Acquisition System", International Journal of Engineering Technology Research & Management, Vol.4, Issue.3, pp.163-169, 2020.

[35] A.Arulkumar, S.Balaji, M.Balakrishnan, G.Dineshkumar, S.Saravanan," Design and Implementation of Low Cost Automatic Wall Painting Machine", International Journal of Engineering Technology Research & Management, Vol.4, Issue.3, pp.170-176, 2020.

[36] Dileep Kumar Pandiya, Nilesh Charankar, 2024, Testing Strategies with Ai for Microservices and Apis, INTERNATIONAL JOURNAL OF ENGINEERING RESEARCH & TECHNOLOGY (IJERT) Volume 13, Issue 04 (April 2024)

[37] Ramesh, S. S., Anish Jose, Samraysh, P. R., Mulabagala, H., Minu, M. S., & Nomula, V. K. (2024). Domain Generalization and Multidimensional Approach for Brain MRI Segmentation Using Contrastive Representation Transfer Learning Algorithm. In P. Paramasivan, S. Rajest, K. Chinnusamy, R. Regin, & F. John Joseph (Eds.), Advancements in Clinical Medicine (pp. 17-33). IGI Global. https://doi.org/10.4018/979-8-3693-5946-4.ch002

[38] B. Namatherdhala, A. Ganesh, N. Memon and J. Logeshwaran, "The smart detection of neuro-pathological effects of alzheimer patients using neural networks," 2023 *Second International Conference On Smart Technologies For Smart Nation (SmartTechCon)*, Singapore, Singapore, 2023, pp. 858-863, doi: 10.1109/SmartTechCon57526.2023.10391384. | Google Scholar

[39] Kuraku, Sivaraju and Kalla, Dinesh and Smith, Nathan and Samaah, Fnu, Safeguarding FinTech: Elevating Employee Cybersecurity Awareness In Financial Sector (December 29, 2023). International Journal of Applied Information Systems (IJAIS), Volume 12– No.42, December 2023, Available at SSRN: https://ssrn.com/abstract=4678581

[40] Venkata Sathya Kumar Koppisetti, 2024. "*Robotic Process Automation: Streamlining Operations in the Digital Era*" ESP International Journal of Advancements in Computational Technology (ESP-IJACT) Volume 2, Issue 2: 74-81. [Link]

[41] "THE IMPACT OF AI ON API MONETIZATION: DYNAMIC PRICING, PERSONALIZATION, AND BUSINESS INTELLIGENCE", International Journal of Emerging Technologies and Innovative Research (www.jetir.org), ISSN:2349-5162, Vol.11, Issue 6, page no.a19-a22, June-2024, Available : http://www.jetir.org/papers/JETIR2406003.pdf

[42] Gaayathri, R. S., Rajest, S. S., Nomula, V. K., & Regin, R. (2023). FMDB Transactions on Sustainable Computer Letters.

[43] Venkata Sathya Kumar Koppisetti, 2024. "*Deep Learning: Advancements and Applications in Artificial Intelligence*" ESP International Journal of Advancements in Computational Technology (ESP-IJACT) Volume 2, Issue 2: 106-113. [Link]

[44] "Leveraging Low-Code Platforms for Rapid API Development", International Journal of Science & Engineering Development Research (www.ijrti.org), ISSN:2455-2631, Vol.9, Issue 6, page no.49 - 55, June-2024, Available : http://www.ijrti.org/papers/IJRTI2406009.pdf

[45] N.Harish, R.Jayakumar, P.Kalaiyarasan, G.Vijayakumar, S.Saravanan," IoT Based Smart Home Energy Meter", International Journal of Engineering Technology Research & Management, Vol.4, Issue.3, pp.177-183, 2020.

[46] M.Amaran, S.Mannar Mannan, M.Madhu, Dr.R.Sagayaraj, Dr.S.Saravanan," Design and Implementation of Low

Cost Solar Based Meat Cutting Machine", International Journal of Engineering Technology Research & Management, Vol.4, Issue.3, pp.184-190, 2020.

[47] R.Anbarsan, A.Arsathparvez, K.S.Arunachalam, M.Swathisriranjani, Dr.S.Saravanan," Automatic Class Room Light Controlling Using Arduino", International Journal of Engineering Technology Research & Management, Vol.4, Issue.3, pp.192-201, 2020.

[48] Naga Ramesh Palakurti, Bridging the Gap: Frameworks and Methods for Collaborative Business Rules Management Solutions , International Scientific Journal for Research: Vol. 6 No. 6 (2024): ISJR

[49] Pratiksha Agarwal, Arun Gupta, "Harnessing the Power of Enterprise Resource Planning (ERP) and Customer Relationship Management (CRM) Systems for Sustainable Business Practices," International Journal of Computer Trends and Technology, vol. 72, no. 4, pp. 102-110, 2024. Crossref, https://doi.org/10.14445/22312803/IJCTT-V72I4P113

[50] Shreyaskumar Patel "Performance Analysis of Acoustic Echo Cancellation using Adaptive Filter Algorithms with Rician Fading Channel" Published in International Journal of Trend in Scientific Research and Development (ijtsrd), ISSN: 2456-6470, Volume-6 | Issue-2, February 2022, pp.1541-1547, URL: https://www.ijtsrd.com/papers/ijtsrd49144.pdf

[51] Borra, Praveen; An overview of cloud data warehouses: Amazon Redshift(AWS), Azure Synapse(Azure),and Google BigQuery (GCP) International Journal of Advanced Research in Computer Science 15 3, 23-27, 2024,IJARCS.

[52] Kalla, Dinesh and Smith, Nathan and Samaah, Fnu, Satellite Image Processing Using Azure Databricks and Residual Neural Network (November 24, 2023). International Journal of Advanced Trends in Computer Applications, Volume 9, Number 2, November - 2023, pp. 48-55, Available at SSRN: https://ssrn.com/abstract=4650627

[53] Palakurti, N. R. (2023). The Future of Finance: Opportunities and Challenges in Financial Network Analytics for Systemic Risk Management and Investment Analysis. International Journal of Interdisciplinary Finance Insights, 2(2), 1-20.

[54] S. E. V. S. Pillai and K. Polimetla, "Enhancing Network Privacy through Secure Multi-Party Computation in Cloud Environments," 2024 International Conference on Integrated Circuits and Communication Systems (ICICACS), Raichur, India, 2024, pp. 1-6, doi: 10.1109/ICICACS60521.2024.10498662.

[55] D. D. Rao, "Multimedia Based Intelligent Content Networking for Future Internet," 2009 Third UKSim European Symposium on Computer Modeling and Simulation, Athens, Greece, 2009, pp. 55-59, doi: 10.1109/EMS.2009.108.

[56] Yadav, A. B. (2023). GEN AI-DRIVEN ELECTRONICS: INNOVATIONS, CHALLENGES AND FUTURE PROSPECTS. International Congress on Models and Methods in Modern Investigations, 113–121. Retrieved from https://conferenceseries.info/index.php/congress/article/view/1609

[57] V. Kakani, B. Kesani, N. Thotakura, J. D. Bodapati and L. K. Yenduri, "Decoding Animal Emotions: Predicting Reactions with Deep Learning for Enhanced Understanding," 2024 IEEE 9th International Conference for Convergence in Technology (I2CT), Pune, India, 2024, pp. 1-6, doi: 10.1109/I2CT61223.2024.10543616.

[58] A. B. Yadav and P. S. Shukla, "Augmentation to water supply scheme using PLC & SCADA," 2011 Nirma University International Conference on Engineering, Ahmedabad, India, 2011, pp. 1-5, doi: 10.1109/NUiConE.2011.6153314.

[59] Katragadda, V. . (2024). Leveraging Intent Detection and Generative AI for Enhanced Customer Support. Journal of Artificial Intelligence General Science (JAIGS) ISSN:3006-4023, 5(1), 109–114. https://doi.org/10.60087/jaigs.v5i1.178.

[60] Sure, T. A. R. (2023). The Internet of Things: Securing Smart Technologies for the Mobile Age, Journal of IOT Security and Smart Technologies, 2(3), 21-25.

[61] Chanthati, S. R. (2024). Artificial Intelligence-Based Cloud Planning and Migration to Cut the Cost of Cloud Sasibhushan Rao Chanthati. American Journal of Smart Technology and Solutions, 3(2), 13–24. https://doi.org/10.54536/ajsts.v3i2.3210.

[62] Artificial Intelligence-Based Cloud Planning and Migration to Cut the Cost of Cloud SR Chanthati - Authorea Preprints, 2024 http://dx.doi.org/10.22541/au.172115306.64736660/v1 Sasi-Rao: SR Chanthati will pick up the Google scholar and Chanthati, S. R. (2024).

[63] Avani Dave, Nilanjan Banerjee, and Chintan Patel. 2020. SRACARE: Secure Remote Attestation with Code Authentication and Resilience Engine. In 2020 IEEE International Conference on Embedded Software and Systems (ICESS). IEEE, Shanghai, China, 1–8. https://doi.org/10.1109/ICESS49830.2020.9301516.

[64] Bhattacharya, S., & Kewalramani, C. (2024). Securing Virtual Reality: A Multimodal Biometric Authentication Framework for VRaaS. International Journal of Global Innovations and Solutions (IJGIS). https://doi.org/10.21428/e90189c8.25802e82

[65] Naga Ramesh Palakurti, 2023. "*Evolving Drug Discovery: Artificial Intelligence and Machine Learning's Impact in Pharmaceutical Research*" ESP Journal of Engineering & Technology Advancements 3(3): 136-147. [Link]

[66] Chanthati, S. R. (2024). Product Colour Variation Management with Artificial Intelligence. Sasibhushan Rao Chanthati. American Journal of Education and Technology, 3(3), 46–52. https://doi.org/10.54536/ajet.v3i3.3213

[67] Naga Ramesh Palakurti, 2022. "*AI Applications in Food Safety and Quality Control*" ESP Journal of Engineering & Technology Advancements 2(3): 48-61. [Link]

[68] Chanthati, S. R. (2024). An automated process in building organic branding opportunity, budget Intensity, recommendation in seasons with Google trends data. Sasibhushan Rao Chanthati. https://doi.org/10.30574/wjaets.2024.12.2.0326

[69] Kumar Shukla, Shashikant Tank, 2024. "CYBERSECURITY MEASURES FOR SAFEGUARDING INFRASTRUCTURE FROM RANSOMWARE AND EMERGING THREATS", International Journal of Emerging Technologies and Innovative Research (www.jetir.org), ISSN: 2349-5162, Vol.11, Issue 5, page no.i229-i235, May-2024, Available: http://www.jetir.org/papers/JETIR2405830.pdf

[70] Sukhdev S. Kapur, Ashok Ganesan, Jacopo Pianigiani, Michal Styszynski, Atul S Moghe, Joseph Williams, Sahana Sekhar Palagrahara Chandrashekar, Tong Jiang, Rishabh Ramakant Tulsian, Manish Krishnan, Soumil Ramesh Kulkarni, Vinod NairJeba Paulaiyan, 2021. *Automation of Maintenance Mode Operations for Network Devices*, US10938660B1. [Link]

[71] Kumar Shukla, Nimeshkumar Patel, Hirenkumar Mistry, 2024. "Transforming Incident Responses, Automating Security Measures, and Revolutionizing Defence Strategies through AI-Powered Cyber security", International Journal of Emerging Technologies and Innovative Research (www.jetir.org), ISSN: 2349-5162, Vol.11, Issue 3, page no.h38-h45, March-2024, Available: http://www.jetir.org/papers/JETIR2403708.pdf

[72] Lekkala, Chandrakanth, AI-Driven Dynamic Resource Allocation in Cloud Computing: Predictive Models and Real-Time Optimization (February 06, 2024). J Artif Intell Mach Learn & Data Sci | Vol: 2 & Iss: 2, Available at SSRN: https://ssrn.com/abstract=4908420 or http://dx.doi.org/10.2139/ssrn.4908420

[73] Patel, N. (2024, March). SECURE ACCESS SERVICE EDGE(SASE): "EVALUATING THE IMPACT OF CONVEREGED NETWORK SECURITYARCHITECTURES IN CLOUD COMPUTING." Journal of Emerging Technologies and Innovative Research. https://www.jetir.org/papers/JETIR2403481.pdf

[74] Ayyalasomayajula, Madan Mohan Tito, Sathishkumar Chintala, and Sandeep Reddy Narani. "Optimizing Textile Manufacturing With Neural Network Decision Support: An Ornstein-Uhlenbeck Reinforcement Learning Approach." Journal of Namibian Studies: History Politics Culture 35 (2023): 335-358.

[75] Vishwanath Gojanur, Aparna Bhat, "Wireless Personal Health Monitoring System", IJETCAS:International Journal of Emerging Technologies in Computational and Applied Sciences,eISSN: 2279-0055,pISSN: 2279-0047, 2014. [Link]

[76] Ayyalasomayajula, Madan Mohan Tito, et al. "Proactive Scaling Strategies for Cost-Efficient Hyperparameter Optimization in Cloud-Based Machine Learning Models: A Comprehensive Review." ESP Journal of Engineering & Technology Advancements (ESP JETA) 1.2 (2021): 42-56.

[77] Mistry, H., Shukla, K., & Patel, N. (2024). Transforming Incident Responses, Automating Security Measures, and Revolutionizing Defence Strategies throughAI-Powered Cybersecurity. Journal of Emerging Technologies and Innovative Research, 11(3), 25. https://www.jetir.org/

[78] Ayyalasomayajula, M., & Chintala, S. (2020). Fast Parallelizable Cassava Plant Disease Detection using Ensemble Learning with Fine Tuned AmoebaNet and ResNeXt-101. Turkish Journal of Computer and Mathematics Education (TURCOMAT), 11(3), 3013–3023.

[79] Aparna Bhat, "Comparison of Clustering Algorithms and Clustering Protocols in Heterogeneous Wireless Sensor Networks: A Survey," 2014 INTERNATIONAL JOURNAL OF SCIENTIFIC PROGRESS AND RESEARCH (IJSPR)-ISSN : 2349-4689 Volume 04- NO.1, 2014. [Link]

[80] Ayyalasomayajula, Madan Mohan Tito, et al. "Implementing Convolutional Neural Networks for Automated Disease Diagnosis in Telemedicine." 2024 Third International Conference on Distributed Computing and Electrical Circuits and Electronics (ICDCECE). IEEE, 2024.

[81] Shashikant Tank Kumar Mahendrabhai Shukla, Nimeshkumar Patel, Veeral Patel, 2024." AI BASED CYBER SECURITY DATA ANALYTIC DEVICE", 414425-001, [Link]

[82] Ayyalasomayajula, Madan Mohan Tito, Akshay Agarwal, and Shahnawaz Khan. "Reddit social media text analysis for depression prediction: using logistic regression with enhanced term frequency-inverse document frequency features." International Journal of Electrical and Computer Engineering (IJECE) 14.5 (2024): 5998-6005.

[83] Aparna Bhat, Rajeshwari Hegde, "Comprehensive Study of Renewable Energy Resources and Present Scenario in India," 2015 IEEE International Conference on Engineering and Technology (ICETECH), Coimbatore, TN, India, 2015. [Link]

[84] Ayyalasomayajula, Madan Mohan Tito. "Innovative Water Quality Prediction For Efficient Management Using Ensemble Learning." Educational Administration: Theory and Practice 29.4 (2023): 2374-2381.

[85] Sarangkumar Radadia Kumar Mahendrabhai Shukla ,Nimeshkumar Patel ,Hirenkumar Mistry,Keyur Dodiya 2024." CYBER SECURITY DETECTING AND ALERTING DEVICE", 412409-001, [Link]

[86] Ayyalasomayajula, Madan Mohan Tito, Srikrishna Ayyalasomayajula, and Sailaja Ayyalasomayajula. "Efficient Dental X-Ray Bone Loss Classification: Ensemble Learning With Fine-Tuned VIT-G/14 And Coatnet-7 For Detecting Localized Vs. Generalized Depleted Alveolar Bone." Educational Administration: Theory and Practice 28.02 (2022).

[87] Aparna K Bhat, Rajeshwari Hegde, 2014. "Comprehensive Analysis Of Acoustic Echo Cancellation Algorithms On DSP Processor", International Journal of Advance Computational Engineering and Networking (IJACEN), volume 2, Issue 9, pp.6-11. [Link]

[88] Ayyalasomayajula, M. M. T., Chintala, S., & Sailaja, A. (2019). A Cost-Effective Analysis of Machine Learning Workloads in Public Clouds: Is AutoML Always Worth Using? International Journal of Computer Science Trends and Technology (IJCST), 7(5), 107–115.

[89] Nimeshkumar Patel, 2022." QUANTUM CRYPTOGRAPHY IN HEALTHCARE INFORMATION SYSTEMS: ENHANCING SECURITY IN MEDICAL DATA STORAGE AND COMMUNICATION", Journal of Emerging Technologies and Innovative Research, volume 9, issue 8, pp.g193-g202. [Link]

[90] Bhat, A., & Gojanur, V. (2015). Evolution Of 4g: A Study. International Journal of Innovative Research in ComputerScience & Engineering (IJIRCSE). Booth, K. (2020, December 4). How 5G is breaking new ground in the construction industry. BDC Magazine.https://bdcmagazine.com/2020/12/how-5g-is-breaking-new-ground-in-the-constructionindustry/. [Link]

[91] Nimeshkumar Patel, 2021." SUSTAINABLE SMART CITIES: LEVERAGING IOT AND DATA ANALYTICS FOR ENERGY EFFICIENCY AND URBAN DEVELOPMENT", Journal of Emerging Technologies and Innovative Research, volume 8, Issue 3, pp.313-319. [Link]

[92] Bhat, A., Gojanur, V., & Hegde, R. (2014). 5G evolution and need: A study. In International conference on electrical, electronics, signals, communication and optimization (EESCO)−2015.[Link]

[93] Chintala, S. ., & Ayyalasomayajula, M. M. T. . (2019). OPTIMIZING PREDICTIVE ACCURACY WITH GRADIENT BOOSTED TREES IN FINANCIAL FORECASTING. Turkish Journal of Computer and Mathematics Education (TURCOMAT), 10(3), 1710–1721. https://doi.org/10.61841/turcomat.v10i3.14707

[94] A. Bhat, V. Gojanur, and R. Hegde. 2015. 4G protocol and architecture for BYOD over Cloud Computing. In Communications and Signal Processing (ICCSP), 2015 International Conference on. 0308-0313. Google Scholar. [Link]

[95] Bharatbhai Pravinbhai Navadiya. (2024). *A Survey on Deep Neural Network (DNN) Based Dynamic Modelling Methods for Ac Power Electronic Systems*. International Journal on Recent and Innovation Trends in Computing and Communication, 12(2), 735–743. Retrieved from https://ijritcc.org/index.php/ijritcc/article/view/11078

[96] M. Hindka, "Securing the Digital Backbone: An In-depth Insights into API Security Patterns and Practices", Computer Science and Engineering, Vol. 14, No. 2, pp. 35-41, 2024.

[97] M. Hindka, "Design and Analysis of Cyber Security Capability Maturity Model", International Research Journal of Modernization in Engineering Technology and Science, Vol. 6, No. 3, pp. 1706-1710, 2024.

[98] Hindka, M. (2024, June). Optimization Accuracy of Secured Cloud Systems Using Deep Learning Model. In 2023 4th International Conference on Intelligent Technologies (CONIT) (pp. 1-5). IEEE.

[99] M. Siva Kumar et al, "Efficient and low latency turbo encoder design using Verilog-Hdl," Int. J. Eng. Technol., vol. 7, no. 1.5, pp. 37–41, Dec. 2018,[Link]

[100] Kartheek Pamarthi, 2024." Analysis On Opportunities And Challenges Of Ai In The Banking Industry", International Journal of Artificial Intelligence and Data Science, Volume 1, Issue 2:10-23[Link]

[101] Akbar Doctor,2023." Biomedical Signal and Image Processing with Artificial Intelligence Chapter Manufacturing of Medical Devices Using Artificial Intelligence-Based Troubleshooters", Springer Nature Switzerland AG, Volume 1, PP-195-206.[LINK]

[102] DOCTOR A., VONDENBUSCH B., KOZAK J., Bone segmentation applying rigid bone position and triple shadow check method based on RF data, Acta of Bioengineering and Biomechanics, 2011, Vol. 13, 3–11.[LINK]

[103] Rajarao Tadimety Akbar Doctor, 2016." A METHOD AND SYSTEM FOR FLICKER TESTING OF LOADS CONTROLLED BY BUILDING MANAGEMENT DEVICES", patent Office IN, Patent number-201641009974, Application number, 201641009974, [LINK]

[104] Rajarao Tadimety Akbar Doctor, Sambiah Gunkala, 2016." A Method and System For Automated Light Intensity Testing Of Building Management, patent Office IN, Patent number 201641001890, Application number 201641001890, [LINK].

[105] Rajarao Tadimety Akbar Doctor, 2015." A Method And System For Analysing Electronic Circuit Schematic" Patent officeIN, Patent number 6529/CHE/2014, Application number 201641001890, [LINK].

[106] Shrikaa Jadiga, "Big Data Engineering Using Hadoop and Cloud (GCP/AZURE) Technologies," International Journal of Computer Trends and Technology, vol. 72, no. 8, pp.60-69, 2024., [Link]

[107] Shrikaa Jadiga, A. S. (2024). AI Applications for Improving Transportation and Logistics Operations. International Journal of Intelligent Systems and Applications in Engineering, 12(3), 2607–2617 [Link]

[108] Amrish Solanki, Kshitiz Jain, Shrikaa Jadiga, "Building a Data-Driven Culture: Empowering Organizations with Business Intelligence," International Journal of Computer Trends and Technology, 2024; 72, 2: 46-55. [Link]

[109] Darji P., Patel J., Patel B., Chudasama A., Fnu P.I.J., Nalla S. A comprehensive review on anticancer natural drugs. World J. Pharm. Pharm. Sci. 2024; 13:717–734. [Link]

[110] Ankitkumar Tejani, 2021. "Assessing the Efficiency of Heat Pumps in Cold Climates: A Study Focused on Performance Metrics", ESP Journal of Engineering & Technology Advancements 1(1): 47-56. [Link]

[111] Ankitkumar Tejani, 2021. "Integrating Energy-Efficient HVAC Systems into Historical Buildings: Challenges and Solutions for Balancing Preservation and Modernization", ESP Journal of Engineering & Technology Advancements 1(1): 83-97. [Link]

[112] Mihir Mehta, 2024." *Evaluating the Trade-offs Between Fully Managed LLM Solutions and Customized LLM Architectures: A Comparative Study of Performance, Flexibility, and Response Quality",* International Journal of Management, IT & Engineering, volume 14, Issue 10, [Link]

[113] Dhameliya, N. (2023). Revolutionizing PLC Systems with AI: A New Era of Industrial Automation. American Digits: Journal of Computing and Digital Technologies, 1(1), 33-48.

[114] Vikramrajkumar Thiyagarajan, 2024. "*Predictive Modeling for Revenue Forecasting in Oracle EPBCS: A Machine Learning Perspective",* International Journal of Innovative Research of science, Engineering and technology (IJIRSET), Volume 13, Issue 4, [Link]

[115] T Jashwanth Reddy, Voddi Vijay Kumar Reddy, T Akshay Kumar, 2018. "Population Diagnosis System", International Journal of Advanced Research in Computer and Communication Engineering, Volume 7, Issue 2, pp. 207-210. Doi: 10.17148/IJARCEE.2018.7238 [Link]

[116] Kanubaddhi , R. . (2024). Machine Learning Using Cassandra as a Data Source: The Importance of Cassandra's Frozen Collections in Training and Retraining Models . Journal of Artificial Intelligence General Science (JAIGS) ISSN:3006-4023, 1(1), 219–228. https://doi.org/10.60087/jaigs.v1i1.228

[117] Radhika Kanubaddhi, Saidaiah Yechuri, Venkata Ramana Kandula, 2024."Survey on using Natural Language Processing (NLP) on Electronic Health Records",INTERNATIONAL JOURNAL OF ENGINEERING, SCIENCE and - volume 13,issue 5, May 2024, PP 19-23. [Link]

[118] Suman, Chintala (2024) *Evolving BI Architectures: Integrating Big Data for Smarter Decision-Making.* American Journal of Engineering, Mechanics and Architecture, 2 (8). pp. 72-79. ISSN 2993-2637

[119] Chintala, Suman & Thiyagarajan, Vikramrajkumar. (2023). Harnessing AI for Transformative Business Intelligence Strategies. 1. 81-96. 10.56472/25838628/IJACT-V1I3P109.

[120] Suman Chintala, "Boost Call Center Operations: Google's Speech-to-Text AI Integration," *International Journal of Computer Trends and Technology*, vol. 72, no. 7, pp.83-86, 2024. Crossref, https://doi.org/10.14445/22312803/IJCTT-V72I7P110

[121] Chintala, Suman. (2024). Smart BI Systems: The Role of AI in Modern Business. ESP Journal of Engineering & Technology Advancements. 10.56472/25832646/JETA-V4I3P05.

[122] Gokul Ramadoss , 2022." Care and Disease Management: Why Managed Care Organizations (MCOs) Need to have an Inclusive Approach to Patient Care", Progress in Medical Science, VOL 6, NO. 3, PAGE 1 – 5, [Link]

[123] Gokul Ramadoss , 2022." EHR & EMR - A Wholesome View on its Impact in EDI Transaction", Progress in Medical Science, VOL 6, NO. 5, PAGE 1 – 4, [Link]

[124] Ali, A., & Sunil Kumar Suvvari (2023). Effect of motivation on academic performance of engineering students: A study in Telangana, India. *International Journal of Engineering Research and Management Studies (IJERMS)*, 6(12), 1-5. https://www.ijerms.com/DOC/Isues%20pdf/2023/December-2023/1.pdf

[125] Sunil Kumar Suvvari , & DR. VIMAL DEEP SAXENA. (2023). Effective Risk Management Strategies for Large-Scale Projects. *Innovative Research Thoughts*, *9*(1), 406–420. https://doi.org/10.36676/irt.v9.i1.1477

[126] Narani, Sandeep Reddy& Sunil Kumar Suvvari (n.d.). Cybersecurity and cloud computing: The challenges and solutions for securing data and applications in cloud environments. *Independent Researcher, Texas, USA.*

[127] Anusha Medavaka, 2024. "*AWS AI from Financial Services Transforming Risk Management and Investment Strategies" ESP International Journal of Advancements in Computational Technology (ESP-IJACT)* Volume 2, Issue 3: 116-129.

[128] Muthukumaran Vaithianathan, Mahesh Patil, Shunyee Frank Ng, Shiv Udkar, 2024. "*Verification of Low-Power Semiconductor Designs Using UVM"*, *ESP Journal of Engineering & Technology Advancements* 4(3): 28-44.

[129] Lakshmana Kumar Yenduri, 2024. "*Low Latency High Throughput Data Serving Layer for Generative AI Applications using the REST-based APIs" ESP International Journal of Advancements in Computational Technology (ESP-IJACT)* Volume 2, Issue 3: 61-76.

[130] Anusha Medavaka, 2023. "*Building Intelligent Systems on AWS: From Data Lakes to AI-Powered Insights", ESP International Journal of Advancements in Computational Technology (ESP-IJACT)* Volume 1, Issue 3: 68-80.

[131] Rajiv Tulsyan, Pranjal Shukla, Nitish Arora, Tushar Singh, Manni Kumar, 2024. "*AI Prediction Of Stock Market Trends: An Overview For Non-Technical Researchers*", Proceedings Of The 2nd International Conference On Emerging Technologies And Sustainable Business Practices-2024 (ICETSBP 2024), Atlantis Press, Pp. 341-353, [Link]