

Smart Time Table using Arduino with Biometric Attendance System

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Abstract:

The project proposes the smart way of student attendance automation and smart time-table. The smart student attendance automation is linked with biometric scanner to identify the student and they are verified with the database. If the student is present, attendance is marked present for that hour and also, the device keeps track of every student by detecting the number of hours student are present. The smart time table displays time table for whole day and by hours, and also it displays the number of student present in the class room.[1-5].

I. INTRODUCTION

Participation frameworks are ordinarily utilized frameworks to stamp the nearness in workplaces and schools for staffs. For understudies, the conventional methods for denoting the participation in participation register are utilized in every one of the schools and universities. Afterward, Staff will enter the understudy's participation in the computerization by the day's end. This makes the entire framework tedious and the possibility of human blunder is high. To defeat these issues, there are RFID based understudy programmed participation framework is being utilized in numerous foundations yet the downside is that anyone can utilize RFID to give their participation. Consequently this undertaking utilizes bio-matric unique mark scanner to give participation of the understudies.

Alongside the biometric participation framework, this task additionally incorporates keen time table framework, which shows the time table of the day and furthermore occasionally shows the times of that hour. This makes the understudies and staffs know the time table. This likewise shows number of understudies are available and number of understudies are missing for that period. This will be a lot simpler for HoDs to know which period is going on and all out number of understudies are in the class without going into study hall on the grounds that the showcase is kept at the entryway.

II. LITERATURE REVIEW

A INTRODUCTION

The current framework utilizes RFID to enter the understudy participation. The fundamental sorts of RFID labels can be delegated perused/compose and read as it were. The

information put away on read/compose labels can be altered, added to, or totally reworked, however just if the tag is inside the scope of the peruser. The information put away on a read no one but tag can be perused, however can't be altered in any capacity. Peruse/compose labels are substantially more costly than read just labels, so they are not utilized for following most ware things. RFID labels are additionally sorted as: Active labels, which contain a battery that powers the microchip and enables it to transmit a sign to the reader.[6-12]

Semi-dynamic (or semi-uninvolved) labels, which contain a battery to run the hardware of the chip, however should draw control from the attractive field made by the peruser so as to speak with the peruser. Latent labels, which depend entirely on the attractive field made by the radio waves conveyed by the peruser to make a present that can be gotten by the reception apparatus inside the detached tag. RFID Construction RF-ID.

furthermore, the ID can be effectively copied and can be utilized without the information on the worry person.[13-18]

C. SURVEYS

As we as a whole realize that RFID based participation framework is the interest of great importance and is utilized in lodgings, emergency clinics, office situations, homes, workshops, grounds, colleges and so forth. Be that as it may, to state the reality, RFID won't exercise if there should be an occurrence of understudies' participation framework. The expense of this venture is less as contrast with the RFID based understudy participation framework. The biometric sensor is supplanting of RFID sensor, and we don't have to spend for what it's worth in RFID label which would be given to each understudy this would cost more as the number increases.[19-23]

III. PROPOSED PROJECT WORK

A. INTRODUCTION

The Smart Time Table utilizing Arduino with Biometric Attendance framework comprises of a Microcontroller which is Arduino load up. The time table is shown in the 8x8 Led Matrix show. This section providers nitty gritty outline of the square graph and capacity of the undertaking

B. BLOCK DIAGRAM

The primary piece of this undertaking is the Arduino uber, which controls every single other segment. The Arduino mega is AT mega 2560 microcontroller-based unit will every one of the segments like precious stone oscillator, control supply, input sticks and out pins are pre-introduced to work the microcontroller. The RTC (Real Time Clock) will be clock which go about as a continuous check for microcontroller in showing time table as indicated by the ongoing. The underneath figure Fig - 2 shows the general

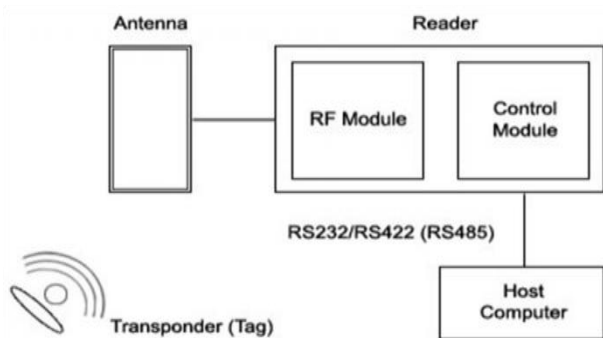


Figure 1 Existing Project RF-ID Tag System

B. PROBLEM IN EXISTING SYSTEM

The RFID tag can be effectively conveyed be the other individual. This may prompt abuse of the ID. This makes the participation framework extremely perplexing, on the grounds that, the participation of the considerable number of understudies can be entered by just a single individual by having theirs RFID. And

square of the proposed venture.

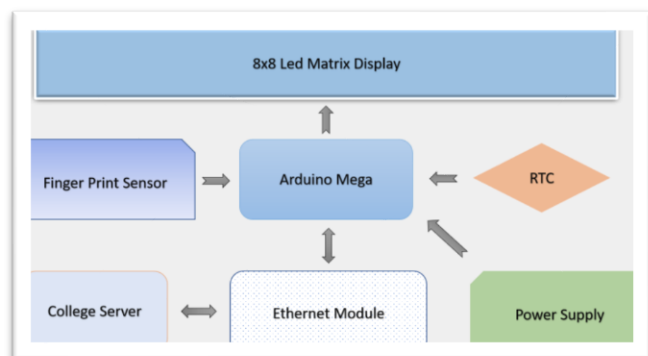


Figure 2 Proposed Block Diagram

The 8x8 Led Matrix Display will be show unit which show time, time table, number of understudies are available inside, number understudies are missing and the present time frame. The Finger print sensor is associated with the microcontroller and henceforth the unique mark is checked for the participation. The coordinated unique finger impression is synced with their move number. The move number is given participation for that period through the school participation server with the assistance of Ethernet Module

C. WORKING OF THE PROJECT

The power circuit suppliers capacity to every one of the segments, for example, Led show, unique mark sensor, Arduino Mega, RTC and Ethernet Module. The time, date and day of the week is shown in the drove presentation of around 20 seconds.[29-32]

And afterward the Arduino checks the present continuous from the RTC Module. In the event that the time isn't class hours, at that point it shows "class over" in the drove presentation. During the working hours, the microcontroller (Arduino Mega) checks the day of the week from the RTC and show the entire day time table in the drove showcase as per the day. This entire day time table is appeared for about a moment. And afterward the showcase shows the hourly astute

period are appear for about a large portion of a second.

At that point the quantity of understudies present and number of understudies are missing are shown in the drove showcase. These above procedures are a cyclic procedure and subsequently these procedures are appear in the driven showcase over and over. In the interim, at whatever point an understudy comes, he needs to put his finger for giving his participation for that period. At the point when he puts his finger, the microcontroller recognizes his job number. Toward the finish of the period the microcontroller gets to the school site and checks present for that individual and for that period as it were.

At the point when the individual is still inside the class, the microcontroller distinguished the job number and stamps present for him for that period toward the finish of the period. The individual needs to put his finger when he leaves his class toward the finish of the period or by the day's end.

The task would be exceptionally valuable for both staff and understudies in all angles. The proposed task would be progressively dependable when contrasted with the current venture. The general advantages are programmed participation utilizing biometric sensor, time table presentation, number of presents and number of absents are likewise display.[24-28]

IV, PROTEUS SIMULATION

The 8x8 network can be found in the proteus library program and every other segment, for example, Arduino, RTC and max7219 IC are likewise can be found in the program. The Arduino Uno is utilized instead of Arduino mega. The association is made according to the association subtleties given in the above points.

The association of Arduino Mega with single max7219 IC and single 8x8 lattice drove

show will be appear in Fig 3

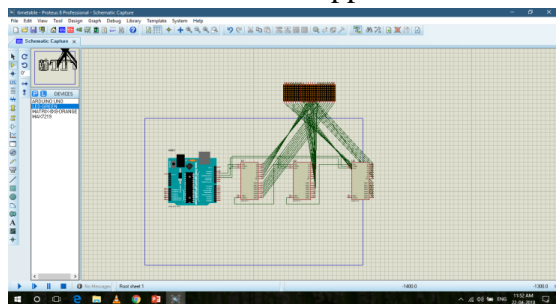


Figure 3 Single 8x8 display with Arduino Uno

The clock (CLK) pin and CS pin are associated for ordinarily for interfacing numerous presentations and Dout pin is associated with Din pin of the following showcase as show in Fig 4

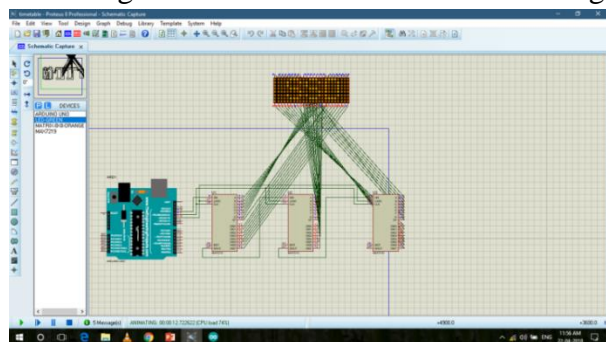


Figure 4 Triple 8x8 displays with Arduino Uno

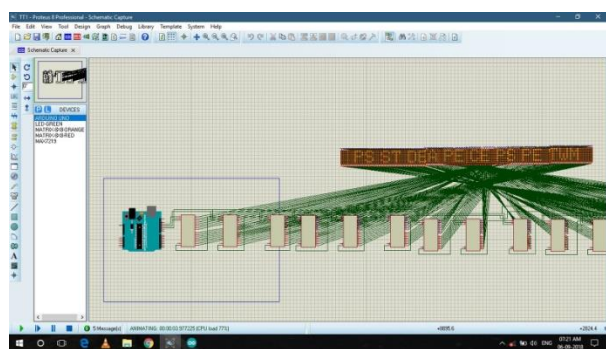


Figure 5 8x8 display with Arduino Uno Simulation

V.HARDWARE IMPLEMENTATION

A.INTRODUCTION

In this chapter the implementation of prototype hardware model of proposed Smart Time Table using Arduino with Biometric Attendance System is discussed. The components which are used for

developing such a hardware model and their specifications are discussed shortly.[33-38]

B. COMPONENTS USED FOR DEVELOPING HARDWARE MODULE

The components used for developing the hardware module are listed below.

- Arduino Mega
- RTC Module
- Finger Print Sensor
- 8x8 Led Matrix Display
- Ethernet Module

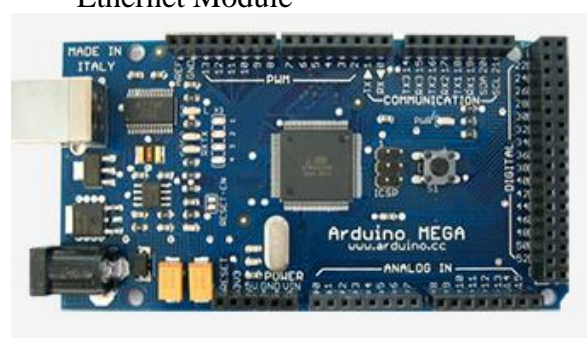


Figure 6 Arduino Mega

Table 1Arduino Mega Specification

Microcontroller	ATmega1280
Operating Voltage	5V
Input Voltage (recommended)	7-12V
Input Voltage (limits)	6-20V
Digital I/O Pins	54 (of which 15 provide PWM output)
Analog_Input_Pins	16
DC Current per I/O Pin	40 mA
DC Current for 3.3V Pin	50 mA
Flash Memory	128 KB of which 4 KB used by bootloader
SRAM	8 KB
EEPROM	4 KB
Clock Speed	16 MHz

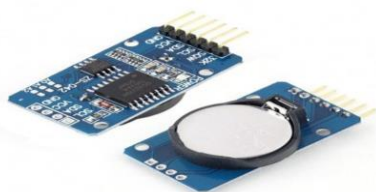


Figure 7 Real Time Clock Module

C. INTERFACING WITH ARDUINO MEGA

The module can work on either 3.3 or 5 V which makes it suitable for many development platforms or microcontrollers. The battery input is 3V and a typical CR2032 3V battery can power the module and maintain the information for more than a year.

The module uses the I2C Communication Protocol which makes the connection to the Arduino Board very easy.

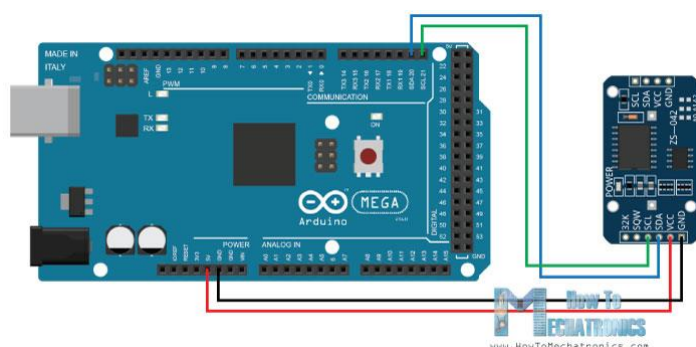


Figure 8 Interfacing of RTC with Arduino Mega

So, all we need is 4 wires, the VCC and the GND pins for powering the module, and the two I2C

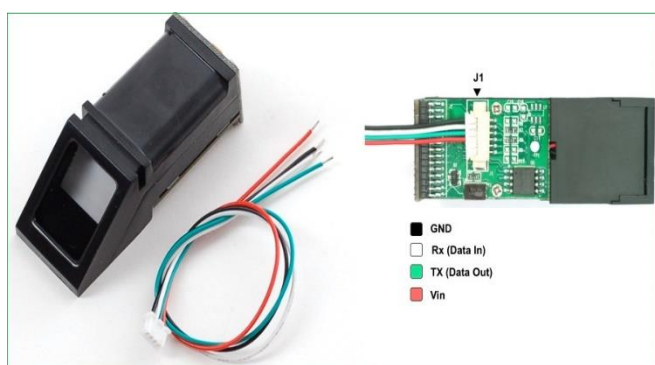


Figure 9 Finger Print Sensor

Fingerprint Sensor	Arduino
VCC	5V (it also works with 3.3V)
TX	RX (digital pin 2, software serial)
RX	TX (digital pin 3, software serial)
GND	GND

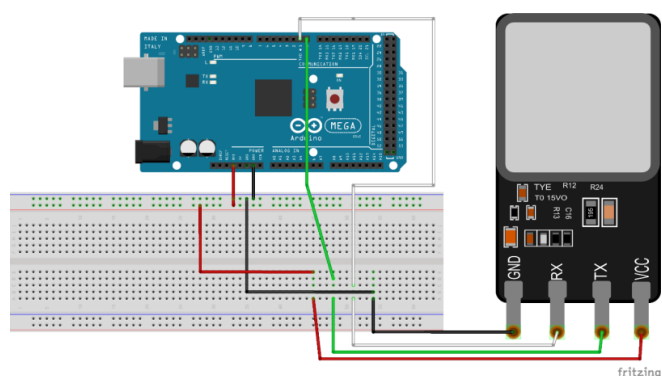


Figure 10 Interfacing of Finger Print with Arduino Mega

D. 8x8 LED MATRIX DISPLAY

These matrixes can be made by circuiting 64 LEDs. The bare LED matrix has 16 pin outs with 8 common positive and another 8-common negative. For connecting this matrix directly to an UNO, we need to spare 16 pins on the UNO. With the output pins low on UNO, we cannot spare 16 PINS. So, we need to connect this matrix to a driver chip. This driver chip along with matrix comes as a set which is shown in below figure.[39-42]

communication pins, SDA and SCL.

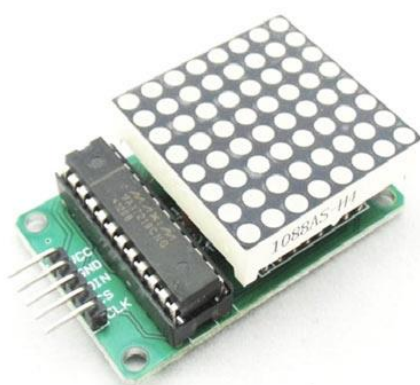


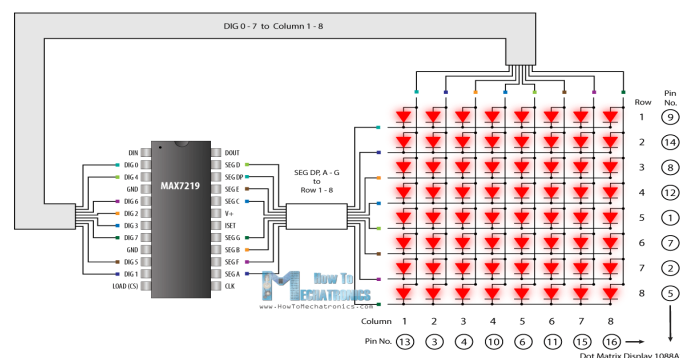
Figure 11 8x8 Matrix Display

This module will be interfaced with Arduino for displaying alphabets, hence the matrix display. First of all, for interfacing LED matrix with Arduino, we need to download a library specifically designed for LED MATRIX.

E. Circuit Connection of 8x8 with Max 7219 IC

The MAX7219 LED driver saves you processor pins and processing time. Using a 7219 you can drive 64 LEDs while you only need 3 wires to interface it to a microcontroller (This excludes VCC and GND which are assumed to be available). In addition, you can daisy chain multiple 7219 chips for bigger displays.

There are 16 output lines from the 7219 driving 64 individual LEDs. Our eyes remember a flash of light for approximately 20ms, so when you continuously flash a light (or an LED) at a rate at or faster than 20ms, then it appears that the light never goes off. This is how the 7219 works. All the LEDs are individually turned on for a short time, at rate greater than 20ms.



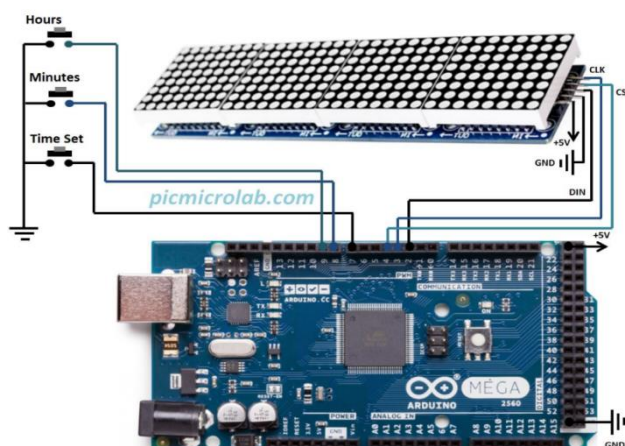


Figure 13 Interfacing of 8x8 Led Display with Arduino Mega

G. ARDUINO ETHERNET SHIELD

The Arduino Ethernet Shield allows you to easily connect your Arduino to the internet. This shield enables your Arduino to send and receive data from anywhere in the world with an internet connection. You can use it to do fun stuff like control robots remotely from a website, or ring a bell every time you get a new twitter message. This shield opens up endless amounts of possibility by allowing you to connect your project to the internet in no-time flat.

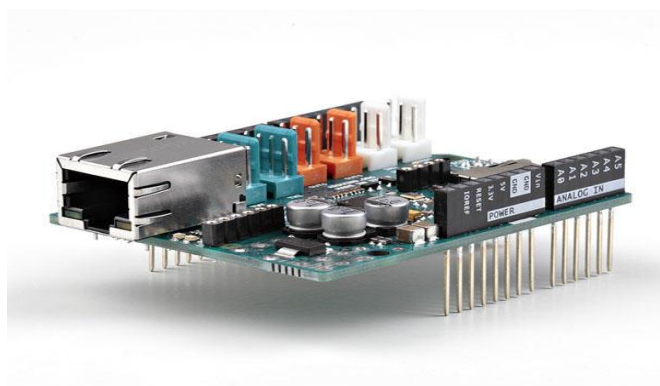


Figure 14 Ethernet Shield Module

H. Interfacing Ethernet Module with Arduino Mega

Connect the shield to your computer or a network hub or router using a standard ethernet cable (CAT5 or CAT6 with RJ45 connectors).

Connecting to a computer may require the use of a cross-over cable



Figure 15 Ethernet Shield with Arduino Mega

I. Arduino IDE Installation

The installation of Arduino IDE on computer and prepare the board to receive the program via USB cable. First you must have your Arduino board (you can choose your favourite board) and a USB cable. In case you use Arduino UNO, ArduinoDuemilanove, Nano, Arduino Mega 2560, or Diecimila, you will need a standard USB cable (A plug to B plug), the kind you would connect to a USB printer as shown in the following image.



Figure 16 USB Type-B Cable

In case you use Arduino Nano, you will need an A to Mini-B cable instead as shown in the following image.



Figure 17 Mini USB Cable

VI. Conculsion

The project has been fully verified and checked. The complied program is uploaded in the Arduino Mega board with help of USB cable. The program uploaded successfully. All the components such as finger print sensor, RTC, 8x8 Led Display and Ethernet Module works normally.



Figure 18 Final Output

The purpose of the project is to reduce the staffs work in terms of attendance and to save time during class hours from taking attendance. And also, to help staffs and students with time table. The final hardware capable of doing all the things listed above and the aim of the project is achieved successfully. The final result show that this project is valid and can be commercialized.

The project was tested in all the passible ways to find out pros and cons of the project. During the testing process there were many faults or mistakes were found in the program. Those mistakes were corrected and again tested to have accurate result.

In all the cases the project worked fine. There is no technical error in this project.

REFERENCES

- [1] Zhu. M., Luo.F.L., "Implementing of developed voltage lift technique on SEPIC, CUK and double-output DC-DC converters", *IEEE Trans. Ind. Electron. Appl.*, Vol. 23, No. 25, pp. 674-681, 2007.
- [2] M. Jinno, P. Y Chen, Y. C. Lai, and K. Harada, "Investigation on the ripple voltage and the stability of synchronous rectifier buck converters with high output current and low output voltage", *IEEE Trans. Ind. Electron.*, Vol. 57, No. 3, pp. 1008-1016, 2010.
- [3] J. A. Morales-Saldana, R. Galarza-Quirino, J. Leyva-Ramos, E. E. Carbajal-Gutierrez and M. G. Ortiz-Lopez, "Modeling and control of a cascaded boost converter with a single switch", *IECON 2006 - 32nd Annual Conference on IEEE Industrial Electronics*, pp. 591-596, 2006.
- [4] Luo, F.-L., Hong Ye, "Advanced DC/DC converters", CRC Press. London, 2006.
- [5] F.J perez-Pinal and I. Cervantes, "Multi-objective control for cascade boost converter with single active switch", *2009 IEEE International Electric Machines and Drives Conference*, pp. 1858-1862, 2009.
- [6] F. L. Luo, H. Ye, "Positive output cascade boost converters", in *IEE Proceedings - Electric Power Applications*, Vol. 151, No. 5, pp. 590-606, 2004.
- [7] Davood Ghaderi, Mehmet Çelebi, "Implementation of PI controlled cascaded boost power converters in parallel connection with high efficiency", *Journal of Electrical Systems*, Vol. 13, No.2, pp. 307-321, 2017.
- [8] Pinaa, P. Ferrãoa, J. Fournierb., B. Laca, "Small signal modeling of a DC-DC type double boost converter integrated with SEPIC converter using state space averaging approach", *Energy Procedia*, Vol. 117, pp. 835-846, 2017.
- [9] Wan, X., Zhang, K., Ramkumar, S., Deny, J., Emayavaramban, G., Ramkumar, M. S., & Hussein, A. F. (2019). A Review on Electroencephalogram Based Brain Computer Interface for Elderly Disabled. *IEEE Access*, 7, 36380-36387.
- [10] Sanjeevikumar Padmanaban, Emre Ozsoy, Viliam Fedák and Frede Blaabjerg, "Development of sliding mode controller for a modified boost Cuk converter configuration", *Energies*, Vol.10, No.1513, 2017.
- [11] Ahmed A. A.Hafez, "Multi-level cascaded DC/DC converters for PV applications",

- Alexandria Engineering Journal*, Vol.54, No. 4, pp. 1135-1146, 2015.
- [12] Ayhan Ozdemir, Zekiye Erdem, "Double-loop PI controller design of the DC-DC boost converter with a proposed approach for calculation of the controller parameters", *Systems and Control Engineering*, Vol. 232, No. 2, pp. 137–148, 2018.
- [13] P.Nagaveni, M.Siva RamKumar, M.Nivetha, A.Amudha, G.Emayavaramban, "Electrical Energy Audit –An Experience in a Small Scale Textile Mill" *International Journal of Innovative Technology and Exploring Engineering*, 8(10) pp 4102-4107
- [14] Balachander Kalappan, D., & Ponnusamy, V. (2013). Optimization of Cost of Energy of Real Time Renewable Energy System Feeding Commercial Load Case Study: A Textile Show Room in Coimbatore, India. *Life Science Journal*, 10(7s).
- [15] Wan, X., Zhang, K., Ramkumar, S., Deny, J., Emayavaramban, G., Ramkumar, M. S., & Hussein, A. F. (2019). A Review on Electroencephalogram Based Brain Computer Interface for Elderly Disabled. *IEEE Access*, 7, 36380-36387.
- [16] Sivaram Krishnan, M., Amudha, A., & Siva Ramkumar, M. (2018). Execution Examination Of Three Phase Ac To Three Phase Ac Matrix Converter Using Distinctive Transporter Based Exchanging Algorithms. *International journal of Pure and Applied Mathematics*, 118(11), 609-617.
- [17] Amudha, D. A., Ramkumar, M. S., & Krishnan, M. S. DESIGN AND SIMULATION OF ZETA CONVERTER WITH ZVZCS SWITCHING TECHNIQUE. *Journal of Engineering and Applied Sciences*, 14(9), 2764-2774.
- [18] Ali, M. V. M., Babar, M., Nguyen, P. H., & Cobben, J. F. G. (2017). Overlaying control mechanism for solar PV inverters in the LV distribution network. *Electric Power Systems Research*, 145, 264-274.
- [19] Mawarni, D. E., Ali, M. V. M., Nguyen, P. H., Kling, W. L., & Jerele, M. (2015, September). A case study of using OLTC to mitigate overvoltage in a rural european low voltage network. In *2015 50th International Universities Power Engineering Conference (UPEC)* (pp. 1-5). IEEE.
- [20] Ali, M. V. M., Nguyen, P. H., & Cobben, J. F. G. (2016, October). Coordinated control to mitigate over voltage and under voltage in LV networks. In *2016 IEEE PES Innovative Smart Grid Technologies Conference Europe (ISGT-Europe)* (pp. 1-5). IEEE.
- [21] Ali, M. V. M., Paterakis, N. G., Nguyen, P. H., & Cobben, J. F. G. (2017, June). A LV network overvoltage mitigation strategy based on epsilon-decomposition. In *2017 IEEE Manchester PowerTech* (pp. 1-6). IEEE.
- [22] Ali, M. V. M., Nguyen, P. H., & Cobben, J. F. G. (2016, December). Internet of things in LV grids: Framework and experiments. In *2016 Saudi Arabia Smart Grid (SASG)* (pp. 1-5). IEEE.
- [23] Viyathukattuva, Mansoor & Amudha, Alagarsamy & Ramkumar, M.Siva & Gopalakrishnan, G Emayavarmban. (2019). Relation between Solar PV Power Generation, Inverter Rating and THD. *International Journal of Advanced Manufacturing Technology*. 9. 4570-4575.
- [24] T. Kalimuthu, M. Siva Ramkumar, Dr.A. Amudha, Dr.K. Balachander and M. Sivaram Krishnan "A High Gain Input-Parallel Output-Series DC/DC Converter with Dual Coupled-Inductors" *Journal of Advanced Research in Dynamical and Control Systems*, (12), pp 818-824
- [25] S. Tamil Selvan, M. Siva Ramkumar, Dr.A. Amudha, Dr.K. Balachander and D. Kavitha "A DC-DC Converter in Hybrid Symmetrical Voltage Multiplier Concept" *Journal of Advanced Research in Dynamical and Control Systems*, (12), pp. 825-830
- [26] M. Jayaprakash, D. Kavitha, M. Siva Ramkumar, Dr.K. Balacahnder and M. Sivaram Krishnan, "Achieving Efficient and Secure Data Acquisition for Cloud-Supported Internet of Things in Grid Connected Solar, Wind and Battery Systems" *Journal of Advanced Research in Dynamical and Control Systems*, (12), pp 966-981 .
- [27] D. Kavitha, M. Siranjeevi, Dr.K. Balachander, M. Siva Ramkumar and M. Sivaram Krishnan "Non Isolated Interleaved Cuk Converter for High Voltage Gain Applications" *Journal of Advanced Research in Dynamical and Control Systems*, 10(5), pp 1256-1261
- [28] S.Vivekanandan, M. Siva Ramkumar, Dr.A.Amudha, M. Sivaram Krishan, D. Kavitha "Design and Implementation of Series Z-Source Matrix Converters" *Journal of Advanced Research in Dynamical and Control Systems*, 10(5) , pp 1095-1102

- [29] N. Eswaramoorthy, Dr.M. Siva Ramkumar, G. Emayavaramban, A. Amudha, S. Divyapriya, M. Sivaram Krishnan, D. Kavitha "A Control Strategy for A Variable Speed Wind Turbine with A Permanent Magnet Synchronous Generator Using Matrix Converter with SVPWM" International Journal of Recent Technology and Engineering, 8(1S4) pp 178-186
- [30] P. Jeyalakshmi, Dr.M. Siva Ramkumar, IR.V. Mansoor, A. Amudha, G. Emayavaramban, D. Kavitha, M. Sivaram Krishnan, "Application of Frequency based Matrix Converter in Wind Energy Conversion System Employing Synchronous Generator Using SVPWM Method" International Journal of Recent Technology and Engineering, 8(1S4) pp 187-195
- [31] Charles Stephen, .A. Amudha, K. Balachander, .Dr.M. Siva Ramkumar, G. Emayavaramban, IR.V. Manoor, "Direct Torque Control of Induction Motor Using SVM Techniques" International Journal of Recent Technology and Engineering, 8(1S5) pp 196-202
- [32] N. Saravanakumar, A. Amudha, G. Emayavaramban, Dr.M. Siva Ramkumar, S. Divyapriya, "Stability Analysis of Grid Integration of Photovoltaic Systems Using Partial Power Converters" International Journal of Recent Technology and Engineering, 8(1S5) pp 203-210
- [33] S.Divyapriya, K.T.Chandrasekaran, A.Amudha, Dr.M.Siva Ramkumar, G.Emayavaramban, "Low Cost Residential Micro Grid System based Home to Grid Backup Power Management" International Journal of Recent Technology and Engineering, 8(1S5) pp 303-307
- [34] N. Thiyaagarajan, Dr.M. Siva Ramkumar, A. Amudha, G. Emayavaramban, M. Sivaram Krishnan, D. Kavitha, "SVPWM based Control of SCIG-Matrix Converter for Wind Energy Power Conversion System" International Journal of Recent Technology and Engineering, 8(1S5) pp 211-218
- [35] N. Seethalakshmi, A. Amudha, S. Divyapriya, G. Emayavaramban, Dr.M. Siva Ramkumar, IR.V. Mohamed Mansoor, "Voltage Frequency Controller with Hybrid Energy Storage System for PMSG Based Wind Energy Conversion System" International Journal of Recent Technology and Engineering, 8(1S5) pp 219-229
- [36] G. Suresh, A.Amudha, Dr.M. Siva Ramkumar, G. Emayavaramban, IR.V.Manoor, "Bidding Strategy of Electricity Market Considering Network Constraint in New Electricity Improvement Environment" International Journal of Recent Technology and Engineering, 8(1S5) pp 230-234
- [37] G. Krishnan, M. Siva Ramkumar, A. Amudha, G. Emayavaramban, S. Divyapriya, D. Kavitha, M. Sivaram Krishnan, "Control of A Doubly Fed Induction Generator for Wind Energy Conversion System Using Matrix Converter with SVPWM Technique" International Journal of Recent Technology and Engineering, 8(1S5) pp 235-243
- [38] S. Viswalingam, G. Emayavaramban, Dr.M. Siva Ramkumar, A. Amudha, K. Balachander, S. Divyapriya, IR.V. Mohamed Mansoor "Performance Analysis of a Grid Connected PV-Wind with Super Capacitor Hybrid Energy Generation & Storage System" International Journal of Recent Technology and Engineering, 8(1S5) pp 658-666
- [39] N.Pandiarajan, G.Emayavaramban, A.Amudha, Dr.M.Siva Ramkumar, IR.V.Mohamed Mansoor, K.Balachander, S.Divyapriya, M..Sivaram Krishnan, "Design and Electric Spring for Power Quality Improvement in PV-Based Dc Grid" International Journal of Recent Technology and Engineering, 8(1S5) pp 242-245
- [40] V.Jayaprakash, S.Divyapriya, A.Amudha, G.Emayavaramban, Dr.M.Siva Ramkumar, "Nano - Grid Smart Home With Plug-in Electric Vehicle using a Hybrid Solar-Battery Power Source" International Journal of Recent Technology and Engineering, 8(1S5) pp 246-248
- [41] K.T.Chandrasekaran, S.Divyapriya, A.amudha, Dr.M.Siva Ramkumar, G.Emayavaramban, "Modeling and Control of Micro Grid Based Low Price Residential Home to Grid Power Management System" International Journal of Recent Technology and Engineering, 8(1S5) pp 261-265