



SRI MANAKULA VINAYAGAR
ENGINEERING COLLEGE
(AN AUTONOMOUS INSTITUTION)



DEPARTMENT OF
ELECTRICAL AND ELECTRONICS ENGINEERING

ELECTRIC VEHICLE CLUB ANNUAL REPORT

(Academic Year: 2023 to 2024)



Submitted by
Dr.D .Sivaraj
Assistant Professor
Faculty Coordinator



Preface

The EV Club of the Department of Electrical and Electronics Engineering at Sri Manakula Vinayagar Engineering College serves as a progressive technical platform dedicated to fostering awareness, innovation, and research-oriented learning in the field of sustainable mobility and emerging transportation technologies. The club provides a structured environment where students gain a comprehensive understanding of modern energy-efficient systems, sustainable engineering practices, and evolving mobility solutions through systematic technical engagement and collaborative learning. Guided by faculty coordinators and actively supported by student members, the club organizes expert talks, technical discussions, design challenges, workshops, project-based learning activities, and industry interaction sessions to bridge the gap between academic knowledge and real-world applications. It encourages analytical thinking, system-level understanding, design optimization approaches, and innovation-driven project development, thereby strengthening students' technical competence and problem-solving abilities. By promoting teamwork, leadership qualities, research orientation, and professional ethics, the EV Club plays a vital role in preparing students to contribute effectively to the advancement of sustainable technologies and to meet the growing demands of the modern engineering landscape with responsibility and technical excellence.



Faculty Coordinator
Dr. D. Sivaraj



HOD/ EEE
(Dr. P. Jamuna)



Dr. AA. Arivalagar
IQAC coordinator



Dean Academics
(Dr. S. Abbumalar)



Director cum Principal
(Dr. V.S.K. Venkatachalapathy)

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ABOUT THE INSTITUTE

Sri Manakula Vinayaga Educational Trust was founded to provide quality and affordable education to the weaker sections of society. The trust established Sri Manakula Vinayagar Engineering College (SMVEC) in 1999. SMVEC is an autonomous institution affiliated to Pondicherry University. It offers 13 undergraduate, 8 postgraduate and 11 Research programs in engineering. SMVEC has been accredited by NAAC with “A” grade and NBA. The institution is also accredited by TATA consultancy services. The college has a good placement record with students getting job offers from top companies in India and abroad. SMVEC students have won many awards and accolades for their academic achievements. To be globally recognized for excellence in quality education, innovation and research for the transformation of lives to serve the society.

Vision

- To nurture the cornerstone of excellence in engineering education and drive innovation by seamlessly integrating the fundamentals of Science and Humanities

Mission

M1: Quality Education : To provide comprehensive academic system that amalgamates the cutting edge technologies with best practices.

M2: Research and Innovation : To foster value-based research and innovation in collaboration with industries and institutions globally for creating intellectuals with new avenues.

M3: Employability and Entrepreneurship : To inculcate the employability and entrepreneurial skills through value and skill based training.

M4: Ethical Values : To instill deep sense of human values by blending societal righteousness with academic professionalism for the growth of society.



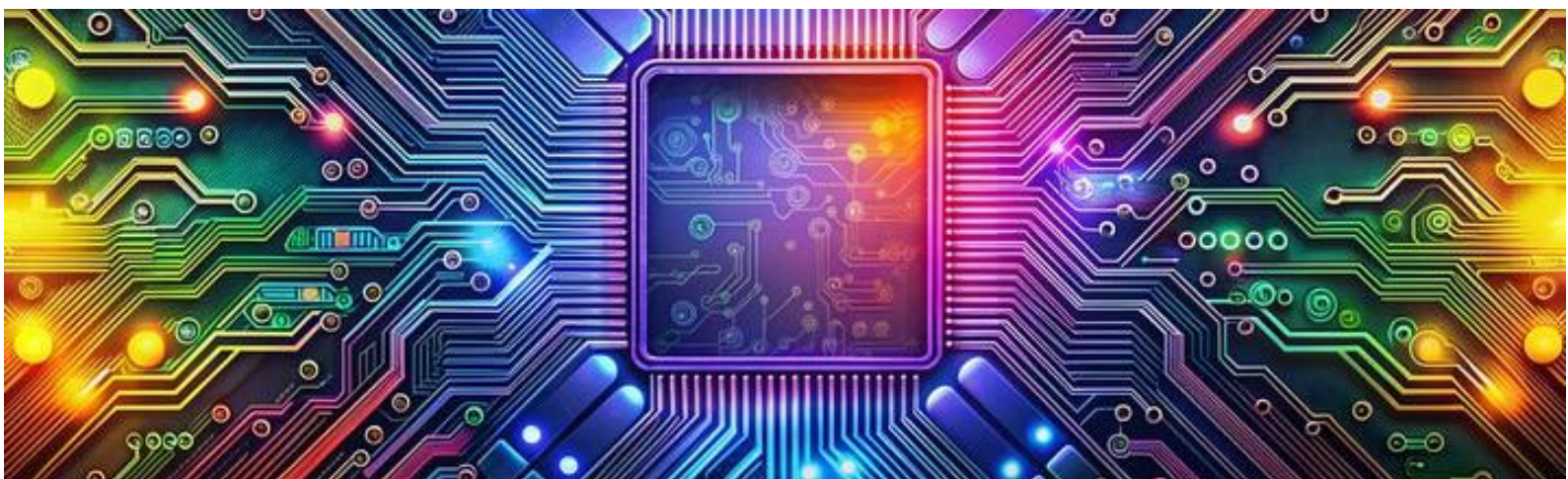
ABOUT DEPARTMENT

Vision

To promote proficiency in the field of Electrical and Electronics Engineering by creating a stimulating environment for research, innovation and entrepreneurship.

Mission

- Academic Excellence: To impart high quality technical education with problem solving capabilities by innovative pedagogy in emerging technologies
- Industrial and Societal Needs: To cater the dynamic needs of the industry and society by strengthening industry - institute interaction.
- Research and Innovation: To nurture the spirit of research attitude by carrying out innovative technologies pragmatically.
- Placement and Entrepreneurship: To inculcate the professionalism in career by advancing synergetic skills to compete in the corporate world.



About Electric Vehicle Club:

Electric Vehicles club serves as a place of community for students to discuss, learn, and working on projects related to Electric Vehicles. Members of the Electric Vehicles club are offered with a range of programs and activities such as seminars, project competitions and exposition. The club is supported the students in strategizing and organising activities that will help them knowledge and skills in Electric Vehicles. The clubs aims to guide students and prepare them to pursue their professional careers in industries specialising in Electric Vehicles.

Objectives:

- To develop basic understanding of Electric Vehicles.
- To develop basic understanding of electric motors, battery technology.
- To aid in enhancing management skills by organizing events and working in teams.
- To give students hands-on learning experience in the field of electric vehicle and battery management system.
- To aid students to build proto-types of electric vehicles
- To conduct technical programmes such as training, workshops, internships, and expert talks in relevant areas.

Functions:

- Provide detail budgeting for making electric vehicle proto-types.
- Model components or modules of electric vehicles using appropriate software
- Take part in electric vehicle competitions.
- The EV club can organize awareness campaigns, workshops, and presentations to introduce and educate the college community about electric vehicles. These initiatives can cover topics such as EV technology, benefits, charging infrastructure, government incentives, and the role of EVs in combating climate change.
- The EV club can organize educational workshops and seminars on campus to deepen the understanding of EV technology, charging infrastructure, and related topic
- The EV club can foster collaboration and networking among students, faculty and industry professionals interested in electric vehicles.

EEE CLUB

Office Bearers and their Portfolios:

S.No	Name	Position
1.	Dr.D.Sivaraj – Assistant Professor / EEE	Staff Coordinators
2.	Mr.R.Ragupathy – Assistant Professor / EEE	
3.	Mr. Pavithran. S	President
4.	Mr. Praveenkumar.S	Vice President
5.	Mr. Gopinath.V	Secretary
6.	Mr. A.Tamilvanan	Treasurer
7.	Mr. Mugilan. P	Joint Secretary
8.	Mr. Premkumar T	
9.	Mr. Ramanan	Joint Treasurer
10.	Mr. Navanithiyam K	
11.	Mr. M.Sivaganesh	Executive Members
12.	Mr. Nijanthan S	
13.	Mr. Elamparuthi. K	
14.	Mr. Gandham Nagendra Karthik	Technical Members
15.	Mr.S Raghul	
16.	Mr.Arunaish.R	



Dr. D.Sivaraj
Assistant Professor
Faculty



Pavithran S
President



PraveenKumar
Vice President



Elamparuthy
Executive Member



Gandham Nagendra Karthik
Technical Member

Student Members:

S.No	Name of the student	Year
1	Vaitheeswaran N	III
2	Anjana Berlin	III
3	Kokilavani S	III
4	Mugilan. P	III
5	A.Tamilvanan	III
6	Premkumar T	III
7	Ramanan	III
8	Bhuvanesh M	III
9	Navanithiyan K	III
10	Gopinath.V	III
11	S Raghul	III
12	Aarthi.P	III
13	Praveenkumar.S	III
14	Vishwa	II
15	Lokesh.N	II
16	R.Archana	II
17	Vijayalakshmi.S	II
18	Gandham Nagendra Karthik	II
19	Sowmya.S	II
20	M.Sivaganesh	II
21	Nijanthan S	II
22	Elamparuthi. K	II
23	D.Naveenkumar	I
24	Arunaish.R	I
25	Saileshwar.T	I
26	Nathesh.N.B	I
27	Mohamed Harun Rasheed.S	I
28	Vishva P	I
29	Harinee	I
30	Iyyappan	I
31	Ramesh Kumar. P	I
32	Ragul A	I
33	Mohamed Abdul Kalam.K	I
34	Herwin	I
35	Karmukilan. A	I
36	S. Ramya	I
37	A. Balakumaran	I
38	M.Sivapothiskalicahran	I
39	Callis Joseph. E	I
40	Mohamad Kaseem M	I
41	Thogesh.M	I
42	P.Gopikrishnan	I
43	Srilogeshwaran S	I
44	Mukesh Kumar R	I
45	Thiruvengadam P	I
46	Karthikraja S	I
47	Dhinish.N	I
48	Raakesh.K	I

EEE CLUB

49	Tharanitharan.M	I
50	Thilipan Siva Hari . S	I
51	Unil Kumar.D	I
52	B. Surya Prakash	I
53	Yuganigan. J	I
54	Poojitha.A	I
55	Gokulraj. R	I
56	Vishva. S	I
57	R.Yugandiran	I
58	G.Praveen	I
59	Arun Pratap	I
60	Tharani	I
61	Ashwin kumar.A	I

Inverter Pulse Generation using Arduino Report

Date: 16.09.2023

Venue: Lecture Hall, EEE Department

Introduction

An inverter is an electronic device that converts direct current (DC) to alternating current (AC). A key component of a modern inverter, especially those designed to produce a pure sine wave output, is the control system that generates the precise switching pulses for the power electronic switches (like MOSFETs or IGBTs). This is where a microcontroller like the Arduino comes in, serving as a low-cost, flexible, and powerful pulse generator. The most common technique used for this purpose is Pulse Width Modulation (PWM).

1. The Role of the Arduino Microcontroller

The Arduino board, with its microcontroller (e.g., the ATmega328P on the Uno), is an excellent platform for generating the complex pulse patterns required by an inverter. Unlike older, dedicated integrated circuits (ICs), an Arduino can be programmed to generate highly customized and flexible waveforms. This allows for the creation of inverters that can produce not just square waves, but also more desirable modified sine waves and pure sine waves.

Key functions of the Arduino in this application include:

Pulse Generation: Creating the timed ON and OFF signals.

Modulation: Varying the width of the pulses to shape the output waveform.

Control and Safety: Implementing features like dead time and over-current protection.

2. Pulse Generation Technique: Sinusoidal Pulse Width Modulation (SPWM)

For a pure sine wave inverter, the most effective method is Sinusoidal Pulse Width Modulation (SPWM). This technique creates a series of pulses with varying widths. The width of each pulse is proportional to the amplitude of a sine wave at that specific point in time. When these pulses are filtered through an LC (inductor-capacitor) filter, they synthesize a smooth, high-quality sine wave.

3. Arduino Programming and Code Structure

The Arduino code for a pure sine wave inverter is typically structured to perform the following tasks:



Setup Function (setup()):

Initialize the required digital pins as outputs for the H-bridge switches.

Configure the hardware timers to generate PWM signals at a specific frequency (e.g., 20 kHz for the carrier wave).

Lookup Table: A pre-calculated array of integer values (ranging from 0 to 255 for an 8-bit timer) is stored in the program memory. Each value in the array represents the duty cycle of a single PWM pulse and is a sample of a sine wave.

Conclusion

The Arduino microcontroller provides a robust and accessible platform for generating the complex pulse patterns required by an inverter. By utilizing hardware timers and the Sinusoidal Pulse Width Modulation (SPWM) technique, it is possible to create a high-quality AC sine wave output from a DC source. While the Arduino serves as the "brain" of the inverter, it must be paired with appropriate power electronics and filter circuits to handle the high voltages and currents. This combination offers a powerful and cost-effective solution for both educational projects and practical applications in renewable energy, power backup systems, and custom electronics.

**Inverter Pulse Generation using Arduino
Attendance Sheet**

Date: 16.09.2023

Sl.No	Student Name	Present/Absent
1.	ABDUL HAFREED H	Present
2.	ARCHANA R	Present
3.	DEVANATHAN A	Present
4.	DHIVYASHREE M	Present
5.	DINESH R S	Present
6.	ELAMPARUTHI K	Present
7.	GANDHAM NAGENDRA KARTHIK	Present
8.	GAYATHRY G	Present
9.	GLADSON JOSHUA PAULRAJ I	Present
10.	GUNAPRIYA S	Present
11.	GURUDEVAN L	Present
12.	HEMANATHAN D	Present
13.	JAYAKUMAR D	Present
14.	JEEVASUDHAN G	Present
15.	JOTHIKRISHNAN.K	Present
16.	KALAIYARASSI M	Present
17.	KARTHIKEYAN P	Present
18.	KARTHIKRAJA S.D	Present
19.	KASTHURI C	Present
20.	KAVEEYA K	Present
21.	KAVIARASAN M	Present
22.	KAVIYA S	Present
23.	KEERTHIRAJ. V	Present
24.	LOGESH.S	Present
25.	LOKESH N	Present
26.	LOKESHWARI D	Present
27.	MAHEYNDIRAN.S	Present
28.	MOHAN LAL S	Present
29.	MURUGAN.S	Present
30.	NIRMAL D	Present

EEE CLUB

1.	NIVEDHA G	Present
2.	PRANAV B	Present
3.	PRIYADHARSHINI A	Present
4.	RAGHUL R	Present
5.	RAHUL T	Present
6.	RAMANAKRISHNAN S	Present
7.	ROSHAN ARVIND. V	Present
8.	SABARIGIREESANE J	Present
9.	SABARISH R	Present
10.	SAI SIDDARTH T S	Present
11.	SANJAI S	Present
12.	SANTHANA KRISHNAN E	Present
13.	SATHISH FRANCIS XAVIER R	Present
14.	SIVAGANESH M	Present
15.	SONIYA V	Present
16.	SOWMYA.S	Present
17.	SREE VARDNI P	Present
18.	SRIDHASAN NAMBI	Present
19.	SRINIVASAN S	Present
20.	SUSANGATI SAMANTARAY	Present
21.	SWETHA S	Present
22.	THAMIZHARASAN. S	Present
23.	THILAK BASKARAN C M	Present
24.	TOM TIJO EDATTUKARAN	Present
25.	VENKATESHWARAN R	Present
26.	VIGNESHWARAN V	Present
27.	VIJAYALAKSHMI S	Present
28.	VINISHA LAXMI G	Present
29.	YOGARAJAN R	Present
30.	YOGESH .R	Present



HGD/EEE

(Dr.P.Jamuna)



Dean Academics
(Dr.S.Abumalar)



Director cum Principal
(Dr.V.S.K.Venkatachalapathy)

Recent Technology in Electric Vehicles Report

Date: 29.09.2023

Venue: Lecture Hall, EEE Department

Here is a report on recent technology in electric vehicles, covering key innovations in batteries, motors, and charging infrastructure.

1. Battery Technology:

The core of an electric vehicle's performance is its battery, and this is an area of rapid innovation.

Solid-State Batteries: This is one of the most significant advancements on the horizon. Unlike traditional lithium-ion batteries that use a liquid electrolyte, solid-state batteries use a solid electrolyte. This promises several advantages, including enhanced energy density, faster charging times, and improved safety due to a reduced risk of thermal runaway and fire hazards.

Improved Lithium-Ion Chemistries: While solid-state technology is maturing, current lithium-ion batteries are also being improved.

Lithium Iron Phosphate (LFP): LFP batteries are gaining popularity, especially in China. They are cheaper and safer than nickel-manganese-cobalt (NMC) batteries, though they have a slightly lower energy density, which can result in a shorter range.

High-Nickel and Manganese-Rich Cathodes: Manufacturers are developing new chemistries that use a higher proportion of nickel or manganese to increase energy density and reduce reliance on expensive and ethically problematic cobalt.

Sodium-Ion Batteries: These batteries are emerging as a potentially cost-effective alternative to lithium-ion, as they do not rely on critical minerals. They are particularly suitable for smaller EVs and e-bikes.

Advanced Battery Management Systems (BMS): Sophisticated software and hardware systems are being developed to monitor and control battery health, temperature, and charging/discharging cycles. This helps to extend battery life, prevent damage, and optimize performance.

2. Electric Motor Technology

Electric motors are becoming more efficient, powerful, and compact.

Axial Flux Motors: This type of motor is gaining attention for its "pancake-like" shape, which makes it significantly more compact and lighter than traditional radial flux motors. They also offer higher torque density and efficiency, making them ideal for high-performance applications.

Permanent Magnet Synchronous Motors (PMSMs): These motors are the most widely used type in modern EVs due to their high efficiency and power density. Ongoing advancements are focused on reducing their reliance on rare-earth magnets, which can be expensive and difficult to source.

**Conclusion:**

The innovations across battery, motor, and charging technologies are collectively addressing the key barriers to mass EV adoption: range anxiety, charging time, and cost. Improved battery chemistries and the promise of solid-state technology are delivering greater energy density and enhanced safety. Simultaneously, more efficient and compact motor designs are boosting performance and reducing the reliance on rare-earth materials. The expansion of ultra-fast charging networks, coupled with the introduction of wireless and bidirectional (V2G) charging, is transforming the refueling experience and integrating EVs into the broader energy ecosystem.


**Recent Technology in Electric Vehicles
Attendance Sheet**


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