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IOT BASED DC MOTOR CONTROL AND DIRECTION CONTROL

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ABSTRACT- The emergence of Internet of Things (IoT) technology has changed the way we interact with and operate the gadgets in our surroundings. This revolutionary trend also applies to the field of motor control, where IoT-based solutions provide creative ways to regulate DC motors with previously unheard-of flexibility and convenience. One such IoT-driven system is thoroughly examined in this study, with an emphasis on its implementation, design, and possible usesThe capacity to operate equipment remotely has grown in popularity in today's connected society, when smartphones and tablets are commonplace. This trend is demonstrated by the Blynk mobile application's integration of IoT technology, which allows users to remotely monitor and modify the speed and direction of DC motors from the comfort of their portable devices. This degree of simplicity and accessibility creates a plethora of opportunities for a wide range of applications, from industrial control systems to home automation. This Internet of Things-based motor control system is powered by a complex network of parts, each of which is essential to its operation. As the user's interaction with the system, the OLED display (SSD1306) offers real-time feedback on motor performance and settings. In the meanwhile, the Blynk app and the motor control hardware can communicate thanks to the ESP8266 microcontroller, which serves as the central processing unit. This configuration is enhanced by the L293D motor driver, which permits bidirectional control of the DC motor, guaranteeing accurate and seamless direction changes. This IoT-driven system has enormous potential for wider integration into other sectors, in addition to its immediate applications in remote motor control. For example, it might be a crucial part of smart home setups in the field of home automation, enabling users to automate chores like managing ventilation systems depending on ambient conditions or opening and shutting blindsThe technique may make it possible to remotely control robot motions in robotics, creating opportunities for teleoperation and remote monitoring in dangerous situations. Similarly, by facilitating centralized management and monitoring of machinery and equipment, it might simplify operations in industrial settings. The goal of

this research is to thoroughly examine the complexities of IoT-based motor control systems.

I. LITRATURE SURVY

"Modeling of Lithium-ion Battery for Charging/Discharging Characteristics Based on Circuit Model" by Zhai Haizhou The theory and charging/discharging properties of lithium-ion batteries are described in this work. Lithium-ion batteries with positive and negative materials of LiyMn2O4 and LixC6 were chosen as the study objects. The electrochemical activity of lithium-ion batteries is simulated using a mathematical model. The electrochemical cell model and the single RC cell model are proven to be based on the previously discussed. Voltage, current, temperature, SOC, and charging/discharging properties were all examined. The battery output's transient status is reflected in the dynamic model. This is a component of a lab setup designed to replicate electrochemical energy storage and evaluate an electric or hybrid vehicle's power system. The findings demonstrate that precise SOC monitoring and battery charging/discharging strategy control are possible.2*Bin Ye 1,†, Jingjing Jiang 2,3,†, Lixin Miao 1,*, Peng Yang 1, Ji Li 3 and Bo Shen 4 Feasibility Study of a "Solar-Powered Electric Vehicle Charging Station ModelThe transportation industry is the one with the quickest rate of growth in carbon emissions in China, while the power sector is now the biggest emitter. In order to address the growing power requirement of electric vehicles in the near future, this study suggests a concept of solar-powered charging stations for electric vehicles. In order to confirm the suggested model's technical and financial viability, this study applies it to Shenzhen City. According to modeling findings, the combined energy system's cost of energy is $0.098/kWh, and the entire net present value of a solar power charging station that satisfies the daily electricity requirement of 4500 kWh is $3,579,236. Additionally, compared to a conventional gasoline-fueled automobile, the solar powered electric vehicle model offers pollution reduction potentials of 99.8%, 99.7%, and 100% for carbon dioxide, sulfur dioxide, and nitrogen oxides, respectively. The findings of the sensitivity analysis showed that interest rates have a comparatively significant impact on COE (Cost of Energy). The COE rises from $0.027/kWh to $0.097/kWh when the interest rate is raised from 0% to 6%. Additionally, this research indicates that carbon pricing only encourages renewable energy when the price of carbon exceeds $20/t.

3*Gail Helen Broadbent 1,* , Graciela Metternicht 1 and Danielle Drozdzewski 2,* "An Analysis of Consumer Incentives in Support of Electric Vehicle Uptake: An Australian Case Study" Transitioning from internal combustion engine vehicles (ICEVs) to innovative technologies, including electric vehicles (EVs), can be a crucial pathway to reducing Greenhouse Gas (GHG) emissions and other negative externalities arising from fossil-fueled cars used for personal transport. In nations striving to increase EV acceptability, government intervention to address inadequate market incentives has been crucial; nevertheless, Australia has received little government help to yet to implement EV uptake. Through a survey of pro-environmental drivers and an experimental component to assess the effects of information availability on attitude change, this article examines the incentives and hurdles to EV adoption in Australia. The findings show that a variety of factors, including EVs, affect the choice of car. The lack of a complete recharge network and the expensive cost of buying an EV are the main obstacles to purchases. Affordable prices (56%), longer vehicle ranges (26%), and a sufficient recharge network (28%) were the most often cited factors promoting the adoption of fully electric vehicles (EVs); just 13% explicitly identified environmental considerations as relevant. Information on EVs reduced ambiguity about the technology and raised the possibility of favorable sentiments regarding EV purchases. The research's recommendations may be taken into consideration by lagging nations, such as Australia, that have not yet taken substantial steps to promote the switch to electric vehicles.

The European Union and U.S. models are the two main ideas for improving electric power interactions for utilities and their consumers that often drive smart grid development, according to the IEEE reference book "Reinventing the Electric Power System." While U.S. planning for the smart grid has been driven mostly by a need for reliability improvements, the European Union's ambition appears to be primarily driven by environmental concerns. In the United States, desirable characteristics of the smart grid include self-healing transmission and distribution power architectures that will be resistant to intentional attacks and natural disasters and very high power quality levels along a broad range of metrics that go well beyond outage statistics. One of the key goals of model smart grids, such as the one being developed by the Pecan Street Project in Austin, Texas, is to promote active customer participation and decision making and thus to create a new grid operational environment in which both utilities and electricity users influence each other

Fatemeh Jozi, Kazem mazlumi, Handi Hosseini Member IEEE ,” One of the major problems in the distribution system is the widespread usage of electric vehicles and the requirement to charge them. Additionally, by leveraging vehicle-to-grid (V2G) capabilities, these cars may function as energy-generating sources. Therefore, to make the most use of these energy storage resources, coordination of the charging and discharging process of electric car batteries is crucial. In light of vehicle power prices, parking restrictions for electric vehicles, and the random and unexpected character of quantities, such as the arrival and departure of electric vehicles from parking lots, several solutions for charging and discharging electric vehicles are suggested in this study. Since parking lots are in charge of charging and discharging electric vehicles, these tactics focus on the timing and condition of the vehicle's charge in order to boost the parking lot's profit.

Ravi, D.K.Jain,Preeti khasa,DCRUST , Since the car will coordinate with the distribution system to provide adequate power quality, murthal synchronization of EVs to the grid is getting interest. One of the main objectives in creating an environment that is more user-friendly for electric cars is to shorten the charging time. Fast DC charging is an intriguing option in this situation. In addition to developing a Simulink model of synchronized EV charging and discharging to the distribution grid, this study discusses two different converter techniques for V2G and G2V applications. The Simulink model includes DC-DC frame converter control for EV battery charging. This development will enable quick car charging, and the owner of the vehicle will get revenue from the EV battery being discharged to the grid, which will lower the total cost of vehicle charging. Additionally, two different DC-AC converter schemes for V2G and G2V applications are used to determine which is optimal based on current THD analysis, synchronization success, and charging-discharging control, which are displayed using load current, source (grid) current, and inverter current curves. A better converter system is employed for EV charging, and many elements of EV integration with the grid are assessed. The outcomes are displayed.

II. SYSTEM DESCRIPTION

2.1 Circuit Description:

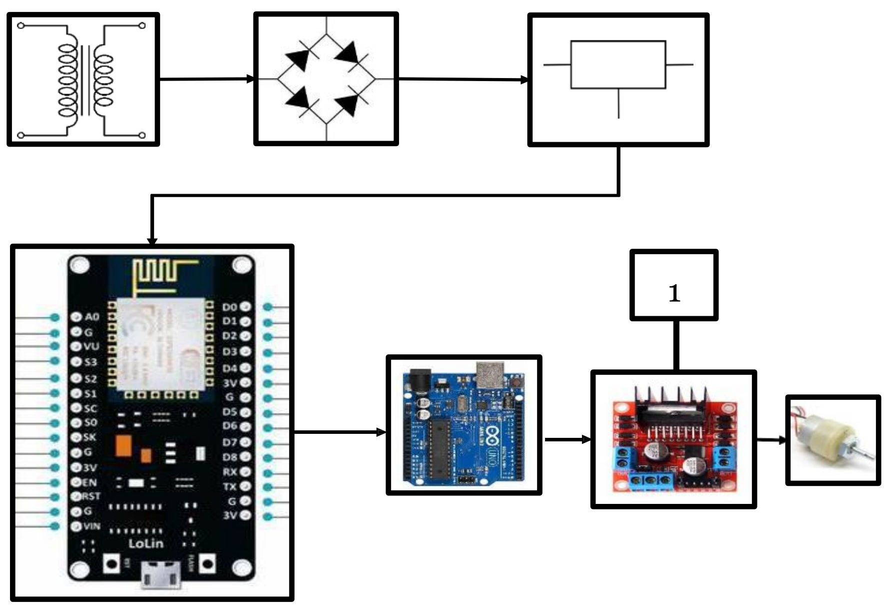

Fig.1- Block diagram

In this fig we show the complete interfacing diagram of DC Motor and ESP8266

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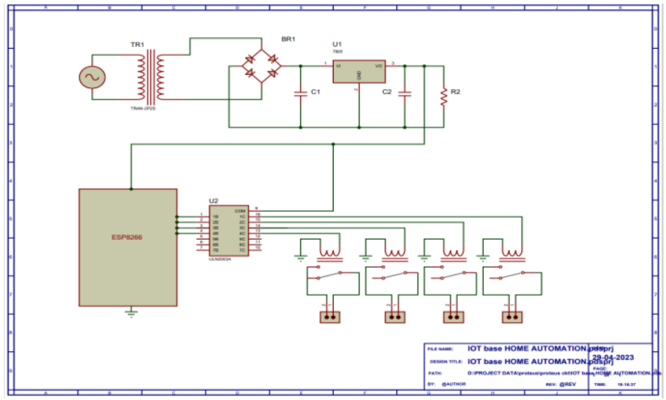

Fig.2- Block diagram for relay switching with controller & EV interfacing

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III. CALCULATION

3.1 Power supply design

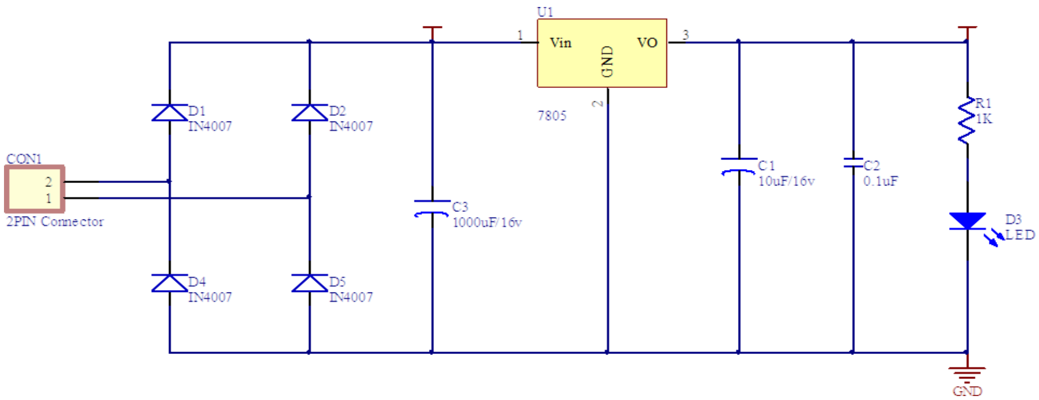


Fig.3 - Power Supply

The TO-220 packaging and several preset output voltages of the LM78XX family of three-terminal positive regulators make them handy in a variety of applications. Each kind uses safe working area protection, thermal shutdown, and internal current limitation. They can give an output current of more than 1A if sufficient heat sinking is available. These devices can be utilized with external components for changeable voltages and currents, even though their primary purpose is to regulate fixed voltages.

- Output Current up to 1 A
- Output Voltages: 5, 6, 8, 9, 10, 12, 15, 18, 24 V
- Thermal Overload Protection
- Short-Circuit Protection
- Output Transistor Safe Operating Area Protection

7805 IC Rating

- Input voltage range 7V- 35V
- Current rating $I_C = 1A$
- Output voltage range $V_{Max} = 5.2V$, $V_{Min} = 4.8V$

3.1.1 Determination Of The Transistor (Mosfet) Switching Current:

The MOSFET used is the IRF260 in the power switching circuit due to high switching speed. By using 3.67volts supplied by the two NPN and the two PNP transistors, the switching time (T) is determined from the oscillating frequency as well as the gate switching current I_G.

$T = 1/f = 1/50Hz$
$T = 0.02sec$
$I_G = Cdv/dt = 90*10^{-6}*3.67/0.02 =$
$183.5\ I_G = 917.5\eta A$

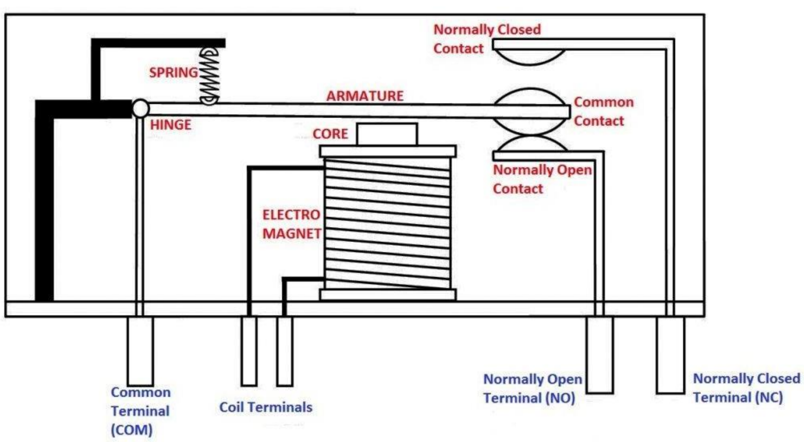
3.1.2 Power Switch Circuit for Construction of Power Inverter

Inverter power output (P) = 90Watts
Output voltage, V = 220V
Inverter Input = battery output voltage =12V
Frequency = 50Hz
Power factor = 0.8

Apparent power= Real Power/P.F = 90/0.8 = 112.5VA

3.2 Relay

Relays that function on the basis of electromagnetic attraction are known as electromagnetic relays. This kind of magnetic switch generates a magnetic field by use of a magnet.



The mechanical action and the opening and shutting of the switch are then carried out by the magnetic field.

The diagram above illustrates how a relay is constructed and operates. The electromagnet is the primary component of a relay. A coil of wire around a soft iron core, which offers a low resistance channel for magnetic flux, makes up an electromagnet. It also has one or more sets of contacts and a moveable iron armature. As seen in the diagram above, a spring holds them in place. An SPDT relay typically has five terminals. The electromagnet is powered by two of them, and the other three are COM, NO, and NC. Common is represented by COM, Normally Open by NO, and Normally Closed by NC. The armature will be attached to the NC contact while the electromagnet is not activated. As a result, COM and NC will be linked. The iron

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IV. CONCLUSION

In conclusion, our study effectively developed an Internet of Things-based system that uses the Blynk app, ESP8266 microcontroller, 300 RPM DC motor, and L293D motor driver to control the speed and direction of a DC motor. Users were able to remotely operate the DC motor using the user-friendly Blynk app interface, which improved simplicity and flexibility in a variety of applications, from robotics to home automation.

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