



TIME BASED AUTOMATIC INJECTION SYSTEM

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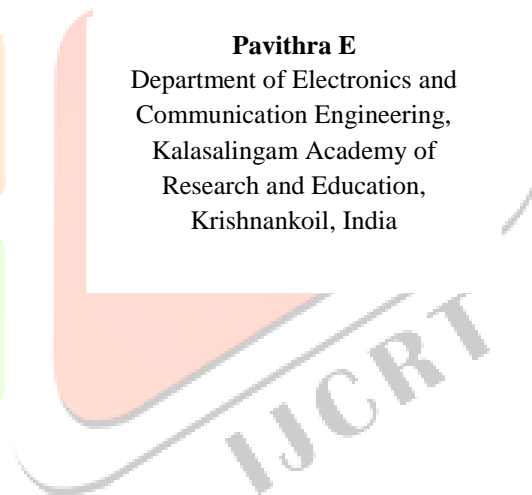
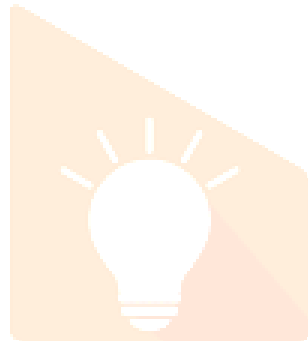
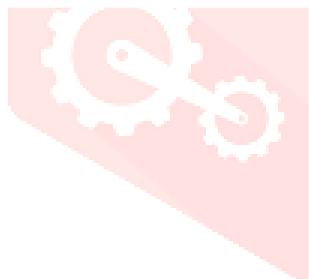
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Abstract – It is an innovative concept and very useful for hospitals. When a patient is in ICU, a lot of care, vital parameters monitoring and based medicine and injection feeding are carried on. If we fail to feed the medicine in the correct temperature, then the patient care in ICU also ends in failure. To avoid this type of critical condition, here we are going to design embedded based auto injection for ICU patients. By using this system, we can easily inject the medicine in the correct time and the correct quantity of medicine. This system consists of geared dc motor, big size syringe and microcontroller-based system.

We can't imagine our life without hands or legs, but in a defiance lab hospital it is a causal thing. Of course, this hospital is specially serving the people for ICU with over care and concentration. Due to unconscious state, there is no movement in their legs or hands or both in the ICU monitoring system. They always need support to give dosage to them.

Here we develop electronics-based systems to feed the insulin dosage to the people without getting any assistance from others. The sensor and digital IC based control circuit control all the options in this system. The temperature-based system sequence feeds the insulin to the patient in the ICU. There is no risk at all to monitor the people. This system totally avoids the confusion in giving medicinal dosage at a particular interval of the Temperature.

Keywords - LM35 sensor, GSM, MAX 232, 8051 Microcontroller.

INTRODUCTION:

We can't imagine our life without hands or legs, but in a defiance lab hospital it is a causal thing. Of course, this hospital is specially serving the people for ICU with over care and concentration. Due to unconscious state, there is no movement in their legs or hands or both in the ICU monitoring system. They always need support to give dosage to them.

Here we develop electronics-based systems to feed the insulin dosage to the people without getting any assistance from others. The sensor and digital IC based control circuit control all the options in this system. The temperature-based system sequence feeds the insulin to the patient in the ICU. There is no risk at all to monitor the people. This system totally avoids the confusion in giving medicinal dosage at a particular interval of the temperature.

PROBLEM STATEMENT:

When a patient is in ICU, a lot of care, vital parameters monitoring and based medicine and injection feeding are carried on. If we fail to feed the medicine in the correct temperature, then the patient care in ICU also ends in failure. To avoid this type of critical condition, here we are going to design embedded based auto injection for ICU patients. By using this system, we can easily inject the medicine in the correct time and the correct quantity of medicine. This system consists of geared dc motor, big size syringe and microcontroller-based system

LITERATURE SURVEY:

R. Hao, C. Jian, et.al.,[1] published a paper , better standardize the function of intelligent alarm in substation, it needs to be standardized to test it. The existing method of alarm data generation is to manually pick up points. According to the application scenarios of typical faults in substation, the corresponding serialization alarm signals are selected, and the sending order and time interval of the alarm signals are manually configured. This method not only wastes time and energy, but is also easy to make mistakes. In view of the above problems, this paper proposes an automatic generation and injection method for alarm test data in smart substation.

Tan Siyun, Zou Weijun,et.al.,[2] published a paper ,describing the development of electronic technology, the plastic injection molding machine controller which applied a single CPU core in the low-end plastic injection molding machines cannot meet the need. In order to resolve the problems of the current plastic injection molding machine controller, which include big volume, low integration, complexity hardware, low reliability, low price-performance ratio, and unsatisfactory control effect, a high level of integrated fully automatic plastic injection molding machine controller which based on multi-CPU will be researched. Multi-CPU is used for hardware design. The adaptive intelligent control algorithm is applied on software design in order to achieve accurate temperature control. At the same time, the output circuit detection technology is used to make the perfect combination of hardware and software. Practice has proved that the new utility model has improved the reliability and the accuracy of the injection molding machine controller, and the controller has the benefits of high integration of hardware system, simple structure, high performance-to-price ratio and so on.

G. Tong, W. Jing ,et.al.,[3] published a paper ,Layered water injection is a simple and effective way of secondary exploitation in oil fields. It can maintain the pressure of the oil layer and improve the effect of oilfield development, considered the basis for achieving stable and high production of crude oil. The traditional layered water injection method is inefficient and cannot meet the needs of mining. Therefore, this paper analyzes the current development of layered water injection technology and designs an automatic layered water injection system based on the Internet of Things. It is divided into perception recognition layer, network construction layer, and comprehensive application layer. Considering that the daily injection volume of water

injection wells does not meet the standard caused by the actual water injection process, an automatic injection strategy of layered water injection is designed based on the K-means algorithm. Experiments demonstrate that the actual flow value of each layer after the automatic injection adjustment is completed is within the allowable error range of 10%, which meets the requirements of the qualified rate of layered water injection.

Gold MS, Sainsbury R.,et.al.,[4] published a paper , Epinephrine for first aid use by parents and other caregivers and in the form of an autoinjector device (EpiPen, Center Laboratories) is often prescribed for children who have had previous anaphylactic reactions. It is not known whether the EpiPen device is used appropriately during subsequent reactions and whether its use is able to prevent the complications of anaphylaxis.

Song TT, Worm M,et.al.,[5] published a paper describing Anaphylaxis is a life-threatening condition that is increasing in prevalence in the developed world. There is universal expert agreement that rapid intramuscular injection of adrenaline is life-saving and constitutes the first-line treatment of anaphylaxis. The unpredictable nature of anaphylaxis and its rapid progression makes necessary the availability of a portable emergency treatment suitable for self-administration. Thus, anaphylaxis treatment guidelines recommend that at-risk patients are provided with adrenaline auto-injectors (AAIs). Despite these clear recommendations, current emergency treatment of anaphylaxis continues to be inadequate in many cases. The aim of this review is to highlight the barriers that exist to the use and availability of AAIs and that prevent proper management of anaphylaxis. In addition, we review the characteristics of all AAIs that are presently available in Europe and the USA and discuss the need for regulatory requirements to establish the performance characteristics of these devices.

Fang L, Shi GH,et.al.,[6] published a paper describing the surging interest in developing prefilled syringe and autoinjector combination products, investment in an early compatibility assessment is critical to prevent unwarranted drug/container closure interactions and avoid potential reformulation during late stages of drug development. In addition to the standard evaluation of drug stability, it is important to consider container closure functionality and overall device performance changes over time because of drug-container closure component interaction. This study elucidated the mechanisms that cause changes in syringe glide force over time and the impact on the injection duration. It was an expansion of the previous work, which

indicated that drug formulation variables such as formulation excipients and pH affect syringe functionality over time. The current study described an investigative process for troubleshooting prolonged and variable auto injector injection time caused by an increased syringe glide force variability over time.

Yi, T. KokKiong and S.Huang,et.al.,[7] published a paper Recent developments in nuclear reprogramming and intracytoplasmic sperm injection reflect an increasing need for more advanced and automatic micromanipulation technologies. In this paper, we present an automatic cell injection system, which is capable of visually monitoring the injecting process and controlling the microactuators. Traditionally, cell injection was manually operated. However, it was laborious, time consuming, of low accuracy, and prone to contamination due to the handling requirement. An automatic and efficient strategy is required to eliminate all these drawbacks. In our system, the whole injection process is monitored and controlled by software. The precision achieved is physically proven to be within a good tolerance range.

P. Sassi, P. Tripicchio,et.al.,[8] published a paper introducing an intelligent system able to perform quality control assessment in an industrial production line. Deep learning techniques are employed and proved successful in a real application for the inspection of welding defects on an assembly line of fuel injectors. Starting from state-of-the-art deep architectures and using the transfer learning technique, it is possible to train a network with about 7 million parameters using a reduced number of injector's images, obtaining an accuracy of 97.22%. The system is also configured in order to exploit new data, collected during operation, to extend the existing dataset and to improve further its performance. The developed system shows that deep neural networks can successfully perform quality inspection tasks that are usually demanded to humans.

S. Jeyapriya and R. Ramalakshmi,et.al.,[9] published a paper on embedded systems which is the combination of both software and hardware components. The components of embedded systems are Real Time Operating System (RTOS), hardware and application software. The embedded system is widely used in many applications such as, home appliance, office automation, security, automobiles and telecommunication. The glucose monitoring system is classified into two types such as Non-invasive Glucose Monitoring (NGM), Continuous Glucose Monitoring System (CGMS). It is used to avoid the complications of diabetes patients. The glucose sensor is used to sense the level of the glucose in the blood of the human body. The

disadvantages of the glucose sensor are, it does not eliminate the finger stick blood glucose monitoring. To overcome the problem, the continuous glucose monitoring system for the human body is proposed. The CGM system is providing the real time glucose readings and the information about the glucose level. It monitors the glucose level at regular intervals. The proposed system is for preventing the high blood sugar and wide glucose fluctuations. The main advantage of this system is instant reporting of blood glucose level whether the glucose level is falling or rising. The system provides an accurate result. The patient's data is also updated in the cloud every day.

D. Zeng, Z. Wang, et al., [10] published a paper based on synthetic biology which is a promising research field. As many operations in the laboratory are still manual or semi automatic, experimenters spend a considerable amount of time supervising or advancing experimental procedures. In addition, manual operation also comes with an increased risk of contamination and human error. Research into automatic experiments is therefore important to increase efficiency and speed of Biological experiments. Fluid handling is a common procedure in synthetic biological experiments, e.g. when adding a reagent to a cell culture. This paper proposes an automatic system based on micro-pump and pneumatic microvalve designed for a flexible modular system. Scientists can set up experimental procedures in software, and the system will add reagents automatically and accurately. The system's micro-injection pump is controlled by a stepper motor and achieves high accuracy by using feedback from an angular encoder. Micro pneumatic valves with elastic membranes operated by pressurized air are used to route fluid from the pump to different locations in the system. Experiments showed that the system can dispense liquids within less than $\pm 2\%$ of the target volume. By comparison, the manually operated precision pipette was within $\pm 3\%$ of the target volume. The system has thus proven suitable for automated biological experiments.

T. Ahmed, et al., [11] published a paper During conflicts such as climatic catastrophe, war etc. in various countries, including underdeveloped countries, there has been a lack of experienced medical personnel leading to a significant rise in the death toll. To overcome this crisis, a real time automatic injecting device (AID) with robust vein detection is presented in this paper. This device is capable of automatically injecting medicines as well as withdrawing blood reducing the need for skilled nurses or doctors in these conflicted areas. Vein detection is a basic step for blood withdrawal. It has been a major problem for medical services such that even experienced doctors often have difficulty determining the best possible vein for

intravenous drug delivery especially for children obese, patriarch. Improper detection of veins may lead to severe problems, starting off with blood clot, rashes, bruises etc. to amputation in worst case scenario. The procedure used for vein detection in this paper involves the use of a modified near IR camera to capture the image, from which, via image processing, the vein position for injecting can be determined with high precision. Live video feedback is included to ensure the perfect alignment of the needle and the determined vein position for injecting. A mechanical structure is developed to perform all the necessary hardware setup.

Tan Siyun, Zou Weijun, et al., [12] published a paper With the development of electronic technology, the plastic injection molding machine controller which applied a single CPU core in the low-end plastic injection molding machines cannot meet the need. In order to resolve the problems of the current plastic injection molding machine controller, which include big volume, low integration, complexity hardware, low reliability, low price-performance ratio, and unsatisfactory control effect, a high level of integrated fully automatic plastic injection molding machine controller which based on multi-CPU will be researched. Multi-CPU is used for hardware design. The adaptive intelligent control algorithm is applied on software design in order to achieve accurate temperature control. At the same time, the output circuit detection technology is used to make the perfect combination of hardware and software. Practice has proved that the new utility model has improved the reliability and the accuracy of the injection molding machine controller, and the controller has the benefits of high integration of hardware system, simple structure, high performance-to-price ratio and so on.

C. A. Jung and S. J. Lee, et al., [13] published a paper on Diabetes which is a chronic disease that causes critical health problems, and eventually leads to damage to major organs. The number of people with diabetes keeps increasing over the next decade. Diabetes requires lifetime treatment in patients' daily life. Although many patients already know that tight glucose control is a critical factor of success for the quality of life, they still fail to monitor their blood glucose level in actual clinical practice because of the frequent and painful finger stick tests. The main aim of this research is to design an automatic insulin injection system with Continuous Glucose Monitoring (CGM) signals. This system controls the insulin dosage automatically according to the real-time glucose level, so that it can improve the quality of life for those who are suffering from diabetes. The current system we developed can also provide real time glucose data to the end user to manage the diabetes.

D. Yang, et al., [14] published a paper presenting an automatic place-and-routed two-stage fractional-N injection-locked PLL (IL-PLL) using soft injection technique for on-chip clock generation. Fabricated in a 65nm CMOS process, this prototype demonstrates a 3.6-ps integrated jitter at 1.5222 GHz and consumes 3mW leading to an FoM of -224.6 dB while only occupying an area of 0.048 mm². It realizes the first fully synthesized fractional-N injection-locked PLL up-to-date.

Song TT, Nelson MR, et al., [15] published a paper on Epinephrine injected by an autoinjector in the anterolateral aspect of the thigh is the standard of care in the emergency self-treatment of anaphylaxis. In the United States, the auto injector EpiPen is widely used for the self-treatment of anaphylaxis.

D. Jia, X. Pei, et al., [16] authorized this paper on During waterflooding development, zonal water injection is facing production conflicts such as complex injection-production relationship and dynamic changes in the flooded field, and results in serious interlayer interference during interval adjustment. In this paper, based on real-time monitoring and automatic control in the whole process of zonal water injection with preset cable, an intelligent control strategy for zonal water injection into all well sections is proposed, which is based on the expert system. In other words, using expert knowledge and control experience, predictive values for adjusting the opening of the plugs in various intervals are established on a BP neural network prediction model; as a result, the accuracy of injection distribution into every interval can be controlled within 10%. The optimal openings of the plugs can improve the automatic adjustment efficiency in all well sections, reducing the driving load of the high-pressure and dynamically sealing mechanism of the electric control system of the downhole water distributor, making it stable and durable. Field experiments have been carried out on 6 wells, and the results show that, compared with traditional automatic interval adjustment method, this control strategy can increase waterflooding efficiency by more than 50% on average. The more layers are injected and controlled, the more effective the result will be.

Z. Segall, et al., [17] authorized a paper on an automated real-time distributed accelerated fault injection environment (FIAT) is presented as an attempt to provide suitable tools for the validation process. The authors present the concepts and design, as well as the implementation and evaluation of the FIAT environment. As this system has been built, evaluated and is currently in use, an example of

fault tolerant systems such as checkpointing and duplicate and match is used to show its usefulness

Bernstein D, Pavord ID, et al., [18] published a paper to evaluate usability of mepolizumab as a liquid drug product self-administered via a single-use prefilled autoinjector (AI) by patients with severe eosinophilic asthma (SEA), or their caregivers, in-clinic and at home. This open-label, single-arm, Phase IIIa study included patients aged ≥ 12 years with SEA who were either receiving mepolizumab (100 mg subcutaneously [SC]) every 4 weeks (Q4W) for ≥ 12 weeks before screening or not receiving mepolizumab but met criteria indicative of SEA. Patients/caregivers self-administered mepolizumab (100 mg SC) via an AI Q4W for 12 weeks. The first (Week 0) and third (Week 8) doses were observed in-clinic; the second dose (Week 4) was administered unobserved at home. Primary and secondary endpoints were the proportion of patients who successfully self-administered their third and second doses, respectively (determined by investigator/site staff). Patient experience, mepolizumab trough concentrations, blood eosinophil count (BEC), and safety were also assessed.

Bel EH, I Bernstein D, et al., [19] published a paper on a liquid mepolizumab formulation in a single-use prefilled syringe (PFS) is under development. We evaluated the usability of mepolizumab self-injected via PFS by patients with severe eosinophilic asthma (SEA), or their caregivers, in clinic and at home.

Stauffer VL, Sides R, et al., [20] authorized a paper on to compare the usability and patient-rated experiences of an autoinjector with a prefilled syringe in patients with migraine, who self-administered galcanezumab, and to compare pharmacokinetic parameters between these devices.

R. Tan et al., [21] this paper studies false data injection attacks against automatic generation control (AGC), a fundamental control system used in all power grids to maintain the grid frequency at a nominal value. Attacks on the sensor measurements for AGC can cause frequency excursion that triggers remedial actions such as disconnecting customer loads or generators, leading to blackouts and potentially costly equipment damage. We derive an attack impact model and analyze an optimal attack, consisting of a series of false data injections, that minimizes the remaining time until the onset of remedial actions, leaving the shortest time for the grid to counteract. We show that, based on eavesdropped sensor data and a few feasible-to-obtain system constants, the attacker can learn the attack impact

model and achieve the optimal attack in practice. This paper provides essential understanding on the limits of physical impact of false data injections on power grids, and provides an analysis framework to guide the protection of sensor data links. Our analysis and algorithms are validated by experiments on a physical 16-bus power system testbed and extensive simulations based on a 37-bus power system model.

W. H. Wang, M. M. Alkaisi, et al., [22] published a paper on microinjection of DNA/mRNA/morpholinos is a critical technology for molecular biology and drug discovery. When dealing with suspended cells, state-of-the-art manual injection involves a time-consuming and tedious sample preparation procedure, to accurately align cells. To enable automatic microrobotic cell injection, this paper reports on two inexpensive, reusable, biocompatible, and easy-to-make devices that are capable of patterning a large number of cells in 10-30 seconds. One device is based on negative air pressure and made of polycarbonate using a conventional micromachining process. It is particularly suitable for cells larger than 100 μm , such as the zebrafish embryo patterning and successful gene 'knock-down' products of the morpholino-injected embryos. The other device is based on dielectrophoresis and suitable for cells smaller than 100 μm , demonstrated by successful trapping of pituitary cells. These devices offer a complete solution for suspended cells in all size spectrums to be prepared up to 10 times faster than manual human preparation. Furthermore, this approach can facilitate high-throughput automatic microrobotic cell injection, for injection applications such as the injection of zebrafish embryos, mouse oocytes/embryos, *Drosophila* embryos, and other types of suspended cells.

Haig KM, Sutton S, et al., [23] authorized a paper on the importance of sharing a common mental model in communication that prompted efforts to spread the use of the SBAR (Situation, Background, Assessment, and Recommendation) tool at OSF St. Joseph Medical Center, Bloomington, Illinois. An elderly patient was on warfarin sodium (Coumadin) 2.5 mg daily. The nurse received a call from the lab regarding an elevated international normalized ratio (INR) but did not write down the results (she was providing care to another patient). On the basis of the previous lab cumulative summary, the physician increased the warfarin dose for the patient; a dangerously high INR resulted.

Nedoszytko M, Bonadonna P, et al., [24] published a paper on Hymenoptera venom allergy which is a typical IgE-mediated reaction caused by sensitization to 1 or more allergens of the venom, and

accounts for 1.5% to 34% of all cases of anaphylaxis. Patients suffering from masticatories are more susceptible to the anaphylactic reactions to an insect sting. This article aims to answer the most important clinical questions raised by the diagnosis and treatment of insect venom allergy in masticatories patients. Total avoidance of Hymenoptera is not feasible, and there is no preventive pharmacologic treatment available, although venom immunotherapy reduces the risk of subsequent systemic reactions.

Biló BM, Rueff F, et al., [25] authorized a paper on the purpose of diagnostic procedure is to classify a sting reaction by history, identify the underlying pathogenetic mechanism, and identify the offending insect. Diagnosis of Hymenoptera venom allergy thus forms the basis for the treatment. In the central and northern Europe vespid (mainly *Vespula* spp.) and honeybee stings are the most prevalent, whereas in the Mediterranean area stings from *Polistes* and *Vespula* are more frequent than honeybee stings; bumblebee stings are rare throughout Europe and more of an occupational hazard. Several major allergens, usually glycoproteins with a molecular weight of 10-50 kDa, have been identified in venoms of bees, vespids, and ants

J. Grinschgl, A. Krieg, et al., [26] published a paper on the increasing level of integration and decreasing size of circuit elements leads to greater probabilities of operational faults. More sensible electronic devices are also more prone to external influences by energizing radiation. Additionally not only natural causes of faults are a concern of today's chip designers. Especially smart cards are exposed to complex attacks through which an adversary tries to extract knowledge from a secured system by putting it into an undefined state. These problems make it increasingly necessary to test a new design for its fault robustness. Several previous publications propose the usage of single bit injection platforms, but the limited impact of these campaigns might not be the right choice to provide a wide fault attack coverage. This paper first introduces a new in-system fault injection strategy for automatic test pattern injection. Secondly, an approach is presented that provides an abstraction of the internal fault injection structures to a more generic high level view. Through this abstraction it is possible to support the task separation of design and test-engineers and to enable the emulation of physical attacks on circuit level. The controller's generalized interface provides the ability to use the developed controller on different systems using the same bus system. The high level of abstraction is combinable with the advantage of high performance autonomous emulations on high end FPGA-platforms.

T. Jiang and Y. Man,et,al.,[27] authorized a paper on the change of people's living environment, the incidence of various accidents has increased significantly. Many people lose the best time to rescue because they can't get timely and effective treatment. Therefore, the emergency rescue capability of the Chinese people needs to be improved. For college students, they have a higher willingness to participate in emergency rescue and have a strong ability to accept new things. Therefore, this paper studies the current situation of pre hospital first aid knowledge training for college students. This study takes all college students in this city as the survey objects, and conducts a sampling survey on them by means of questionnaire survey. The results showed that the first aid ability of local college students was generally low, and the learning methods of first aid knowledge were limited, but they were generally interested in learning first aid knowledge. Based on the above survey results, this paper proposes to establish a unified and standardized assessment system of first aid training in Colleges and universities; formulate training courses, syllabus and teaching materials for college students' first-aid skills; and establish teachers and assessment training for college students' first-aid skills.

S. Pavlopoulos, E. Kyriacou,et,al.,[28] published a paper on Recent studies which conclude that early and specialized prehospital management contributes to emergency case survival. Ambulance personnel, who usually are the first to handle emergency situations, do not have the required theoretical knowledge and experience. Financial and practical reasons do not allow the participation of specialized physicians on ambulance vehicles. Within the framework of the health telematics programme, we have developed a portable medical device that allows teleradiology, long distance support and teleconsultation of mobile health care providers by specialized physicians. The device allows the transmission of vital biosignals and still images of the patient from the incident place to the hospital. The transmission is performed through the GSM mobile telephony network. The device can telematically "bring" a specialist doctor to the site of the medical emergency, allow him to evaluate patient data and issue directions to the emergency personnel on treatment procedures until the patient is brought to hospital. Due to the need for storing and archiving data being interchanged during the telemedicine sessions, we have equipped the consultation site with a multimedia database able to store and manage the data collected by the "AMBULANCE" system. The performance of the system has been validated in four different countries using a controlled medical protocol.

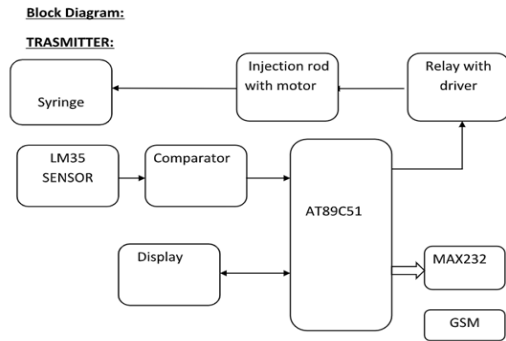
Puglisi G,et,al.,[29] authorized a paper on Anaphylaxis which is a severe, potentially fatal allergic reaction that can occur rapidly after exposure to a specific allergen.1 Typically affecting two or more organ systems (e.g., skin, respiratory, gastro-intestinal), anaphylaxis is characterized clinically by symptoms that may include flushing, itching, swelling, tightness of the throat and chest, and abdominal pain.

S. Neethirajan, X. Weng,et,al.,[30] authorized a paper on Food allergies which are a type I hypersensitivity immune responses that can be life threatening. While exposure therapy and urgent care interventions can limit the damage of an allergic episode, there is currently no cure for food hypersensitivities. Many patients will experience an accidental exposure to a known allergen due to the complexity of food preparation methods in the modern diet. One method of avoidance is to monitor food with point of care (POC) biosensors that can detect known allergens. These detectors are categorized according to their sensor mechanism, such as optical, electromechanical, and electrochemical sensors. More innovations that are recent combine biosensors with genosensors and cell assays. Major challenges to allergen monitoring include the introduction of new allergens into modern diets, the rising incidence hypersensitivities, lack of clinical understanding of the types and causes of food allergies, limited commercial availability of biosensors, and the lack of international standards or agreement on threshold detection levels. Public health leaders are taking on these challenges, and their efforts will reduce the incidence of preventable exposures and improve overall food safety management

PROPOSED WORK:

BLOCK DIAGRAM

This block consists of a microcontroller AT89C51 based circuit. Here it acts as the heart of the system. In microcontrollers, Port1 and port2 are defined as input and output parts respectively. In input port1, sensing status and limit switches are connected. The relay is connected at the output port to the drive tracking motor



HARDWARE REQUIREMENTS

8051mcu
GSM
LM35 sensor
MAX232
Comparator
Voltage regulator
Relay and Display unit

Microcontroller Circuit:

This consists of a microcontroller AT89C51 based circuit. Here it acts as the heart of the system. In microcontrollers, Port1 and port2 are defined as input and output parts respectively. In input port1, sensing status and limit switches are connected. The relay is connected at the output port to the drive tracking motor.

The AT89C51 is an 8-bit in from the Atmel family that has been around for a long time. It uses the famous 8051 architecture, which is why most beginners use it today. It's a 40-pin IC with a 4-kilobyte flash memory. It has four ports that include a total of 32 programmable GPIO pins. It has no built-in ADC module and only supports USART communication. Although it can be connected to external devices.

Atmel does not support new designs since the AT89C51 is no longer in production. For new applications, the AT89S51 is recommended instead. However, since the AT89C51 has a wide community, it may still be a good option if your goal is to learn embedded.

Relay Driver:

To drive the relay, this block contains a ULN2003-based relay driver unit. Seven Darlington pairs are used to drive seven individual relays on this IC. When we want to use a low voltage circuit to turn on and off a light bulb that is connected to a 220V mains supply, we'll use an electro-magnetic switch. The current needed to run the relay coil is greater than what can be provided by various integrated circuits such as Op-Amps. Relays have special properties and are being phased out in favour of solid-state switches, which are more robust than solid-state machines.

Relays are components that allow a low-power circuit to control signals or turn high current ON and OFF while keeping the controlling circuit electrically isolated. The Key Elements are 9V Battery or DC Power Supply 2N2222 Zener Diode 6-9V Relay Second Input Voltage Source Transistor 1K Ohm Resistor.

Relay:

The disc and spoon control motors are switched by a 12V/300 relay in this block. Forward and reverse operations are carried out using relay logic.

The electromagnetic induction principle governs the operation of a relay. When a current is applied to an electromagnet, it creates a magnetic field around it. The relay is shown in action in the image above. To apply DC current to the load, a switch is used.

A relay allows electrical equipment to switch circuits: for example, a timer circuit with a relay might switch power at a predetermined time. Relays were the traditional method of regulating industrial electronic systems for many years.

In circuits, relays are sometimes used to minimise the current flowing through the primary control switch. To turn a much higher capacity relay on and off, a low amperage switch, timer, or sensor can be used. Relays are also useful when converting an older car's headlights to halogen.

Disk and Spoon Motor:

A 12V/300 relay in this block controls the disc and spoon drive motors. Relay logic is used to execute forward and reverse operations.

LED :

The LED has become incredibly user-friendly. The LED, as well as the requisite controls (LED Controller) and mounting capabilities, are

all included in the module. The LED controller is in charge of all of the LED's requirements. The LED module is made up of two parts: an LED and a controller (LED controller). Display Data RAM (DDRAM), Character Generator ROM (CGROM), and Instruction Register (IR) are all included in the LED controller. IN ADDITION TO THE ADDRESS COUNT (AC). The display data is stored in DRAM, which has an 80-byte space. The show data is briefly stored in the DR register before being written to DDRAM. The DDRAM can be read and written to. CHROME has a power of 9920 bits for 240 characters. Every ASCII Character's pixel information is stored in two formats: 5 x 8 dots and 5 x 10 dots. The LED controller receives information from the DRAM, which is a character's ASCII value, and reads the CGRAM's equivalent display data and sends it to the LED for display. The IR and DR registers are used to communicate with the LED module. Instruction codes such as simple view, cursor shift, and so on are stored in the IR register. When you write an address into IR, it goes to the Address Counter (AC), which is one of the most popular displays. The LED device, which is capable of producing alpha numeric output. LEDs are being phased out in favour of LCDs. The following are some of the explanations.

1. LED module is inexpensive.
2. The ability to view data in the form of numbers, characters, and graphics.
3. Character and graphics programming is easy.

GSM module:

GSM stands for Global System for Mobile Communication and is a wireless mobile network used mainly in Europe and other parts of the world for mobile phones. Different time division multiple access techniques are used in this technique (TDMA).

A GSM modem, also known as a GSM module, is a hardware unit that connects to a remote network using GSM cell phone technology. They are virtually similar to an ordinary cell phone in the eyes of the mobile phone network, including the need for a SIM to mark themselves to the network.

A GSM modem is a type of wireless modem that connects to a GSM network. The key distinction is that a dial-up modem transmits and receives data over a fixed telephone line, while a wireless modem transmits and receives data over radio waves. A GSM modem may be a PC Card / PCMCIA Card or an external computer.

GSM is a second-generation (2G) cellular phone technology. One of the key objectives was to build a device that could reach higher

capacity than previous first-generation analogue systems. GSM accomplished this by using a digital TDMA system (time division multiple access approach).

The Global System for Mobile Communication (GSM) network is a scalable cellular telecommunications network that meets the ETSI GSM 900/GSM 1800 standard. Siemens' implementation is the D'900/1800/1900 wireless cellular mobile communication system, which uses cutting-edge technology to meet all of the standard's requirements.

ADC:

The ADC0808 and ADC0809 data acquisition components are monolithic CMOS devices with an 8-bit analog-to-digital converter, an 8-channel multiplexer, and control logic compatible with microprocessors. The conversion technique used by the 8-bit A/D converter is successive approximation. A high impedance chopper balanced comparator and a 256R voltage divider with analogue switch tree are included in the converter and a register for successive approximation. Any of the 8 single-ended analogue signals can be accessed directly by the 8-channel multiplexer. External zero and full-scale changes are no longer needed with this unit. The latched and decoded multiplexer address inputs and latched TTL TRI-STATE® outputs make it easy to interface with microprocessors. The ADC0808 and ADC0809 were designed with the most desirable aspects of multiple A/D conversion techniques in mind. Fast speed, high precision, minimal temperature dependence, excellent long-term accuracy and repeatability, and low power consumption are all features of the ADC0808 and ADC0809. These characteristics make this system suitable for a range of applications, including process and machine control to consumer and automotive applications. See the ADC0816 datasheet for a 16-channel multiplexer with a standard output (sample/hold port). (For more information, see AN-247.)

Max 232:

The MAX232 is an integrated circuit from Maxim Integrated Products that converts signals from a TIA-232 serial port into signals that can be used in TTL-compatible digital logic circuits. In 1987, it was first introduced. The MAX232 is a dual transmitter/receiver with RX, TX, CTS, and RTS signals.

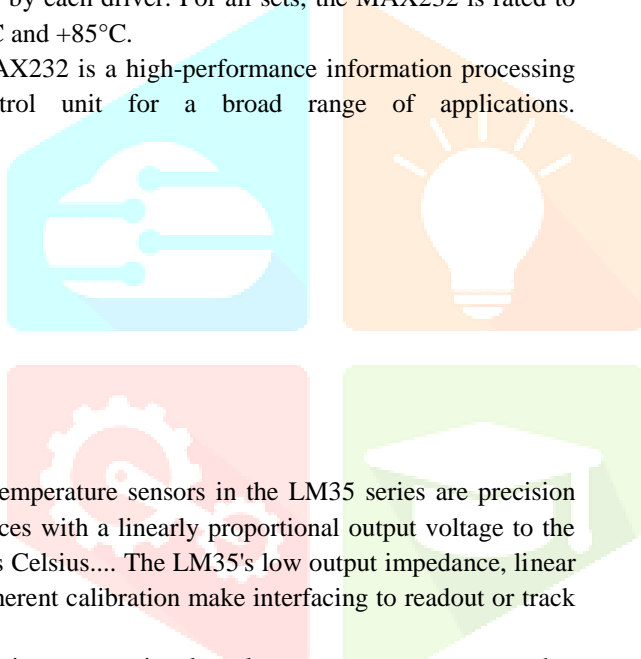
Usually, the MAX-232 IC is used in the RS232 communication scheme to convert voltage levels on TTL devices linked to the PC serial port and the Microcontroller. As a hardware layer adapter, this IC is used to communicate two devices at the same time.

Checking Procedures:

1. Make sure the tester is turned off.
2. Place the MAX232 chip in the ZIF socket.
3. Press SW1 to turn on the battery.
4. Press the test button to check the green LED.
5. Check the serial data stream with a COM port tester.
6. Press SW1 to turn off the gas.
7. Take out the chip.

MAX232 is a dual-transceiver system that is compliant with the RS-232 format. TIA/EIA-232-E levels are translated to 5V TTL/CMOS levels by each receiver. TTL/CMOS levels are converted into TIA/EIA-232-E levels by each driver. For all sets, the MAX232 is rated to operate between -40°C and $+85^{\circ}\text{C}$.

MAX232 is a high-performance information processing system and a control unit for a broad range of applications.

**LM35 SENSOR:**

The temperature sensors in the LM35 series are precision integrated-circuit devices with a linearly proportional output voltage to the temperature in degrees Celsius.... The LM35's low output impedance, linear output, and precise inherent calibration make interfacing to readout or track circuitry a breeze.

The LM35 is a proportional analogue temperature sensor that responds to current temperature with a proportional analogue signal. It's easy to translate the output voltage to a temperature reading in Celsius. The LM35 has an advantage over a thermistor in that it does not need external calibration.

For every 1 increase in output voltage of 10mV, the LM35 temperature sensor output voltage linear relationship between the Celsius temperature scale, 0°C , output is 0V. The temperature sensor side of the experimental cartridge is flat, while the other side is semicircular. The leftmost VCC pin (connected to +5 v), the middle GND pin VOUT (voltage value output pin, then the analogue pins on the board), and the rightmost pin VOUT (voltage value output pin, then the analogue pins on the board) are all connected to +5 v. (connected board GND). Then you'll be able to use three

sticks in all. As the temperature of the LM35 temperature sensor rises by 1 degree Celsius, the output voltage rises by 10 volts. Since the analogue port reads a voltage value between 0 and 1023, this principle reads out the analogue voltage value of 0 in real time. This principle reads out the analogue voltage value of 0 in real time since the analogue port reads a voltage value from 0 to 1023, i.e. 0V corresponds to 0,5 V corresponds to 1023. Only the LM35 module is needed for this application.

COMPARATOR:

A comparator is an electronic system that compares two voltages or currents and generates a digital signal that indicates which is greater. This machine has two analogue inputs and a binary digital output.

A comparator circuit outputs a 1 (the voltage on the plus side; VDD in the illustration) or a 0 (the voltage on the negative side) to display which is greater when two voltages are compared. Comparators are sometimes used to see whether an input has achieved a predetermined value..

A comparator's most significant function is the speed at which it operates. with care

Adaptability of production

1. Time to process:

The comparator's output must quickly switch between saturation levels (+vsat or -Vsat) and respond to any change in the input's state.

The op-bandwidth amps should be set to a very high value because the wider the bandwidth, the faster the operation.

2. Observant:

It's the smallest voltage difference between the comparator's inputs required to change the output state.

Millivolts is the unit of measurement (mv). The accuracy of a system is affected by voltage gain, common-mode rejection ratio (CMRR), input offset voltage, and thermal drifts.

3. Compatibility in terms of results

The comparator is an analogue to digital converter whose output must swing between two logic levels that are suitable for a particular logic family, such as transistor logic (TTL).

Liquid crystal display(LCD);

Monitors with a liquid crystal display (LCD) One of the most innovative technologies available today is the LCD display. A layer of colour or monochrome pixels is usually arranged schematically between two transparent electrodes and two polarising filters. The optical effect is accomplished by polarising light in various quantities and moving it through a liquid crystal layer.

The active matrix TFT and the passive matrix TFT are the two forms of LCD technology available. TFT produces higher-quality images and is more stable and reliable. On the other hand, passive matrix has a sluggish response time and is quickly becoming redundant.

LCD monitors have the advantage of being lightweight due to their small scale. They often use less energy than CRT. These monitors relay images that are not geometrically distorted and have no flicker. However, this type of monitor has drawbacks, including a relatively high price, image quality that varies when viewed from different angles, and monitor resolution that isn't always constant, meaning that any changes can result in decreased efficiency. RT monitors and can be powered by batteries, making them suitable for laptops.

LCD benefits and drawbacks (liquid crystal display);

The LCD can be rendered in large sizes, up to 60 inches or 150 centimetres in diagonal.

There is no geometric distortion in it.

CRT displays are very small, tiny, and bright.

Magnetic fields have no impact on it.

Due to the low power consumption, only a small amount of heat is generated during operation.

A CRT (cathode ray tube) display is much thicker.

Power supply:

A power supply is an electrical system that provides energy to a load. A power supply's primary role is to transform electric current from a source into the voltage, current, and frequency needed to power a load. Power supplies are often referred to as electric power converters as a result of this. Some power supplies are self-contained, while others are integrated into the

appliances they support. As examples of the above, power supplies are used in personal computers and consumer electronics products.

Other functions of power supplies include: limiting the current drawn by the load to safe levels, shutting off the current in the event of an electrical fault, power conditioning to prevent electrical noise or voltage spikes on the input from reaching the load, power-factor correction, and energy storage so that the load can be powered even if the incoming power is temporarily interrupted (uninterruptible power supply).

ALTERNATIVE CURRENT :

An alternating current (AC) motor is a type of electric motor. The AC motor is made up of two basic components: an outside stator with alternating current coils that generate a rotating magnetic field, and an inside rotor connected to the output shaft that produces a second rotating magnetic field.

Due to their versatility, reliability, and quiet operation, AC motors are a viable power source for a variety of applications. Pumps, water heaters, lawn and garden equipment, ovens, and off-road motorised equipment are all popular uses for AC motors.

DC MOTOR :

Electromagnetic induction is used by electric motors to convert energy into motion. Below is an example of a basic direct current (DC) motor. A permanent horseshoe magnet (called the stator because it is fixed in place) and a turning coil of wire (called the armature) are used in the motor (or rotor, because it rotates).

The DC motor is the motor which converts the direct current into the mechanical work. It works on the principle of Lorentz Law, which states that "the current carrying conductor placed in a magnetic and electric field experiences a force". The Lorentz power is that force.

The following are some of the benefits of DC motors to consider:

- 1.Excellent regulation of rpm. DC motors have a high degree of speed control.
- 2.Torque is strong.
- 3.Effortless operation
- 4.Harmonics are absent.

STEP DOWN TRANSFORMER :

The main side of a step-down transformer has more windings than the secondary side. The second coil in a step-down transformer has less windings than the first, allowing the voltage in the existing electrical stream to be reduced. The primary winding, or first set of coils, is connected to an alternating-current voltage source, also known as the primary voltage inflow. The secondary coil is connected to the load, or secondary voltage outflow, and is responsible for distributing electrical power away from the transformer.

An alternating magnetic flux is generated by alternating current flowing in at the primary voltage. This creates a secondary voltage by inducing a similar current in the secondary coil. The secondary coil's reduced number of windings essentially lowers the resulting voltage, effectively "stepping down" the voltage to a lower value while retaining a constant frequency.

For the frequency to stay stable, the current must rise as the voltage decreases. As a result, the secondary coil in step-down transformers usually has a larger-gauge wire than the primary coil. Since the primary voltage current is minimal, the primary coil wiring does not need a very thick wire.

The increased current flowing through the secondary coil, on the other hand, necessitates a thickening of the wire. Because of the resistive heat build-up, if the wire in the secondary coil is too thin, it melts, resulting in catastrophic failure. Changing the Direction of Flow

Both step-up and step-down transformers can be used in reverse. The direction of the electrical stream is reversed by switching the inflow and outflow. A step-up transformer can perform the work of a step-down transformer in this manner, and vice versa.

Considerations of Manufacturing Transformers are a costly but essential part of the electricity distribution system. Transformers need a significant amount of capital investment, but

they are expected to last for the entire projected lifetime. However, in fact, these transformers typically fail halfway through their planned lifespan. ill-fitting windings, tap changers, and bushings in ill repair are often the primary cause.

Inadequate maintenance plans, however, are not exclusively to blame. Transformers are often mismatched to their intended use conditions, putting the unit under undue pressure while in operation. The force of the current flowing through the wire coils creates wear on the coils themselves, despite the fact that transformers are completely static and have no moving parts.

The tap changers and bushings are in the same boat. The integrity of these products deteriorates over time, failing moderately or catastrophically. Transformers must be listed carefully to avoid premature failure. Commissioning should be performed with caution once the system has been installed. The operating environment must be meticulously monitored, and maintenance plans must be implemented on a regular basis. With these precautions in place, transformers are likely to work at their best for the remainder of their projected lifetime.

The fundamentals; Also, when selecting the grade of material for the transformer core, use caution. Higher-grade materials are typically more costly, but they have a longer projected lifetime. Match the material grade to the transformer's intended lifetime and standard operating conditions.

WINDINGS:

Carefully choose the type of metal for the transformer's windings. The aim here is to reduce wire resistance while increasing electrical conduction. In this case, copper is usually the best option, though it is more expensive than aluminium,

Copper is the most cost-effective alternative in the long run because it has less resistance to electrical current than the other materials. As a result of the lower resistance, there are less energy losses, increasing the equipment's long-term performance. Since electrical resistance produces heat by using alternative power sources, there is less heat build-up in the device. is an alternative.

It's critical to comprehend the coils' physical arrangement. This configuration should conform to the planned operating conditions.

Insulation is a concept used to characterise the method: Insulation is important for a transformer's proper operation as well as the protection of workers on-site. Match this to the anticipated operating

conditions to ensure that the best insulating material and configuration are selected.

Transformers are required for the national power grid to operate properly. These devices transform electrical power to the proper voltage to current ratios for long-distance transmission and local distribution. Transformers should be selected with caution due to their high cost. The transformer unit's projected lifetime is extended by proper operation and maintenance.

BRIDGE RECTIFIER:

A bridge rectifier is a device that converts an alternating-current (AC) input to a direct-current (DC) output in its most common use. As compared to a rectifier with a 3-wire input from a transformer with a center-tapped secondary winding, a bridge rectifier offers full-wave rectification from a two-wire AC input, resulting in lower cost and weight.

A diode bridge's most important function is that the output polarity remains constant regardless of the polarity at the input. Karol Pollak, a Polish electrotechnician, invented the diode bridge circuit, which was patented in December 1895 in the United Kingdom and January 1896 in Germany. Leo Graetz, a German physicist, independently invented and published a similar circuit in 1897. Nowadays, the circuit is known as a Graetz circuit or Graetz bridge.

A bridge rectifier was made up of "discrete elements," or separate diodes, before integrated circuits were available. Since around 1950, a single four-terminal component containing four diodes connected in a bridge configuration has become a common commercial component, with various voltage and current ratings now available. As voltage multipliers, diodes and capacitors are used in bridge topologies.

FILTERS:

Electronic filters are signal processing filters that are implemented as electrical circuits. In comparison to distributed-element filters, this article addresses filters made up of lumped electronic components. That is, components and interconnections that can be considered to occur at a single point during study. These components may be packaged individually or as part of a larger integrated circuit.

A high-pass filter (left) and a low-pass filter (right) are used to divide a television signal (right). To the left of centre, the antenna is attached to the screw terminals.

Electronic filters may be used to eliminate unwanted frequency components from a signal, boost desired ones, or do both.

They can be:

High-pass, low-pass, band-pass, band-stop (band-rejection; notch), and all-pass filters may be passive or active analogue or digital high-pass, low-pass, band-pass, band-stop (band-rejection; notch), or all-pass filters.

Finite impulse response (IIR type) or discrete-time (sampled) linear or non-linear infinite impulse response (IIR type) (FIR type).

Regardless of other aspects of their architecture, linear filters are the most popular types of electronic filters. For more information on the nature and study of linear filters, see the article on linear filters.

VOLTAGE REGULATORS :

A voltage regulator is a device that maintains a steady voltage automatically. Negative feedback or a basic feed-forward configuration may be used in a voltage regulator. An electromechanical device or electronic components may be used. A voltage regulator produces a reset output voltage that remains constant regardless of changes in the input voltage or load conditions.

Voltage regulators are divided into two categories: linear and switching. Any electrical or electronic device that holds the voltage of a power source within appropriate limits is known as a voltage regulator. The voltage regulator is needed to keep voltages within the acceptable range for electrical equipment that uses that voltage.

PROGRAM

Processor AT89S51 at 10MHz

Inputs:

```
Input1=P1.0; //Input switch
Input2=P1.1; //Reset input connected to +Vcc
```

Outputs:

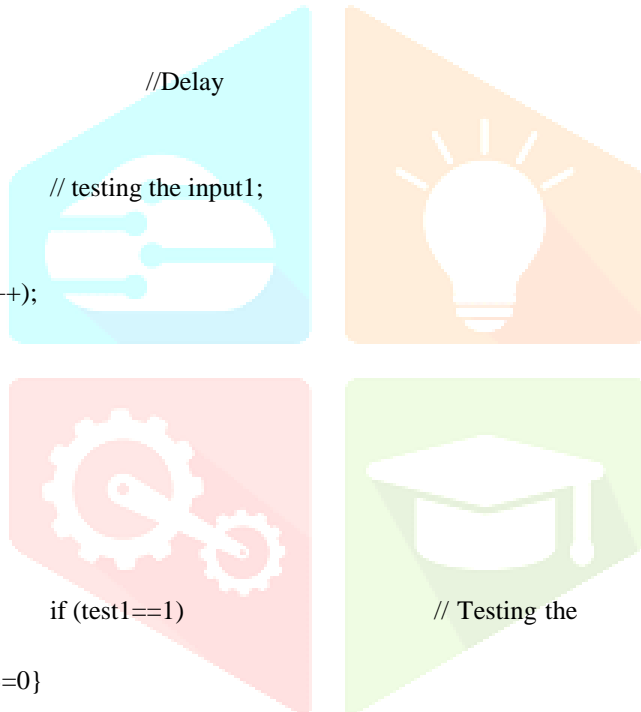
```
Output1=P2.0 Output2=P2.1 Output3=P2.2
```

Program - Processor definitions

```

#include<reg51.h>//Header file
sbit test=P1^0;//Input declarations
sbit test1=P1^1;
sbit out1=P2^0;//Outputs
sbit out2=P2^1; sbit out3=P2^2; int i, del, n=1;
void main ()//Main function
{
P=20x00;
L1:   if (test==1)
{
out1=1;
for (i=0;i<32000;i++)
{
//Delay
// testing the input1;
if (test==0)
{out1=0; goto L1;
}
for (del=0;del<25;del++);
}
if (test==1)
{out2=1; out3=1;
}
else
{
out1=0
}
if (test1==1)
// Testing the
reset input;
{out1=0; out2=0; out3=0}
else
{goto L1;
goto L1;
//
unconditional jump to loop1;
}
}

```

**ADVANTAGES & APPLICATIONS:**

This system is a very useful system for physically challenged people.

With the help of this system, anybody gets fed without the help of others.

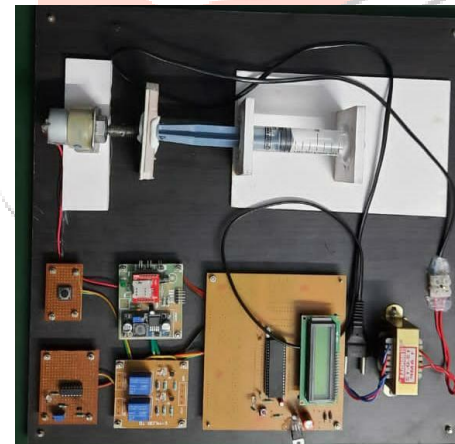
The multi bowel system helps to take a variety of food in a normal way.

The timing unit provides enough time between sequences of process.

The operation and installation is also very easy.

CONCLUSION

The project named “The Automatic Injection Feeding System for ICU People” is a very useful project for people who cannot be GSM at temperature. The circuit works very satisfactorily without any problem. During the mechanical construction, we met a lot of problems and finally it was solved by proper solutions. This control system is designed using discrete digital IC, so the circuit space and wiring may be required more. To eliminate this problem, we may use microcontroller-based control circuits. Otherwise, no problems at all.



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