VARICOSE VEINS PATIENT MONITORING AND AUTOMATED TREATMENT

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***Abstract*- Twisted, swollen veins are known as varicose veins. Varicose veins can develop in any superficial vein, but the veins in your legs are the most frequently affected. This is due to the fact that standing and walking upright causes your lower body's veins to become more compressed. Spider veins and varicose veins are both frequent; slight variations are only an aesthetic concern. Self-care techniques or medical procedures performed by your doctor to shut or eliminate veins may be used in treatment. Varicose veins affect 23% of persons in the US. When reticular veins and spider telangiectasia are taken into account, the frequency rises to 85% in women and 80% in males. In this research, we suggested keeping track of varicose patients and automatically administering treatment when necessary**.

I.Literature survey

Wearable Sensors for Remote Health Monitoring was the focus of 2017 research by Sumit Majumder, Tapas Mondal, and M. Jamal Deen. They have presented and contrasted a number of recent reports on low-cost, non-invasive health and activity monitoring systems. Also provided is a survey of textile-based sensors that may be employed in wearable technology. The compatibility of various communication technologies, as well as potential developments and research difficulties in remote monitoring systems, will be covered in the last section. The input Benefits: It is affordable and allows us to monitor our health at home. [2]This paper proposes a varicose vein recognition.

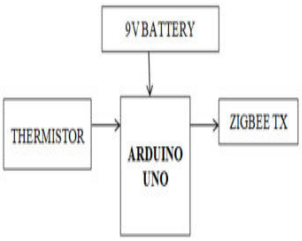
II-Existing system

In the current system, each person gets examined for disease, and then they receive therapy. When a patient needs medical attention, they require support. Ambulatory phlebectomy is an older but still popular treatment in which the problematic vein is removed with a device like a crochet hook through a tiny skin incision. Smaller veins are not treated with this technique; only larger veins are. Although there are currently invasive procedures like surgery, sclerotherapy, laser treatments, etc. that result in discomfort, skin discoloration, and the need for pressure stockings for the rest of one's life. The different ways of detecting varicose veins now in use rely on expensive techniques like thermal imaging and ultrasound detection, both of which only provide detection. Drawbacks of existing system It is an Very expensive .Not suitable for everyone, few are allergic to anesthesia and can lead to neurological complication.

III-Proposed system

The thermistor is utilised in this system to identify abnormalities and administer treatment. This procedure offers individuals with varicose veins a cure. The vibration increases collagen synthesis, which together with keratin gives skin its suppleness and strength. major component of connective tissues and provides bones with their elasticity, which increases their resistance to fracture. Additionally, collagen enhances venous return and strengthens blood vessels, both of which aid in preventing spider veins and the more dangerous varicose veins. Benefits of the Suggested System It is affordable, comfortable to wear everywhere you go, and doesn't require human assistance. Patients receive pain alleviation automatically from the device. [3] proposed a system in which the cross-diamond search algorithm employs two diamond search patterns (a large and small) and a halfway-stop technique. It finds small motion vectors with fewer search points than the DS algorithm while maintaining similar or even better search quality. The efficient Three Step Search (E3SS) algorithm requires less computation and performs better in terms of PSNR. Modified objected block-base vector search algorithm (MOBS) fully utilizes the correlations existing in motion vectors to reduce the computations. Fast Objected - Base Efficient (FOBE) Three Step Search algorithm combines E3SS and MOBS. By combining these two existing algorithms CDS and MOBS, a new algorithm is proposed with reduced computational complexity without degradation in quality.

Block diagram of proposed system



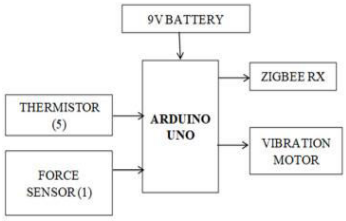


Fig.1. Arduino Uno Fig.2. Arduino Uno battery

V-Implementation

The ZIGBEE serves as a means of communication. Any time a thermistor detects an anomaly in the leg's location, ZIGBEE sends the information to the receiver. And the vibration motor will activate and massage the patient each time ZIGBEE receives data from the transmitter. a rise in the affected area's temperature above the body's usual range Indicating poor blood flow or reduced blood flow, this information is transmitted to the application and vibrations are automatically performed. In the application, vibrations can also be manually turned ON and OFF. All of the information is shown on an LCD screen.

IV- Arduino Uno

The UNO is the ideal board for beginners in coding and electronics. The UNO is the most durable board you may start playing with if this is your first time dabbling with the platform. Of the entire Arduino series, the UNO is the board that is used and documented the most.

The ATmega328P is the core of the Arduino Uno micro controller board. It has a USB port, a power jack, an ICSP header, a reset button, a 16 MHz quartz crystal, 6 analogue inputs, 14 digital input/output pins, and 6 of these can be used as PWM outputs. Everything required to support the micro controller is included; to begin, simply connect a USB cable, an AC-to-DC adapter, or a battery. You can experiment with your UNO without being overly concerned that you'll make a mistake; in the worst case, you can replace the chip for a few dollars and start over.The Italian word "uno," which denotes one, was chosen to signify the Arduino Software (IDE) 1.0 version.The Uno board with the Arduino Software (IDE) version 1.0 served as the foundation for later generations of Arduino. The Uno board is the first in a line of USB Arduino boards and serves as the platform's benchmark. For a comprehensive list of all previous, current, and out-of-date models, see the Arduino index of boards.

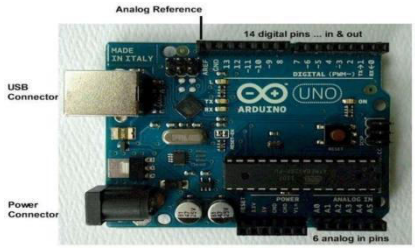


Fig.3.Arduino UnoBoard

A. Power

Both an external power supply and a USB connection are options for powering the Arduino Uno board. The power source is automatically chosen. Either a battery or an AC-to-DC adapter (wall wart) can provide external (non-USB) power. A 2.1mm center-positive plug can be used to connect the adapter by inserting it into the board's power connector. Battery leads may be placed into the POWER connector's GND and Vin pin headers. The board may run off of a 6 to 20 volt external source. The 5V pin, however, may deliver less than five, If less than 7V is given, the board may become unstable. If more than 12V is used, the voltage regulator risked overheating and damaging the board. The suggested range is between 7 and 12 volts.

B. Analog Pins

Each of the six analogue inputs on the Uno, designated A0 through A5, has a resolution of 10 bits (i.e. 1024 different values). The gauge voltage startS from zero volts by default, but the AREF pin and the analogue Reference() function allow you to adjust the upper limit of their range. There are a few additional pins on the AREF board. The analogue inputs' reference voltage. with analogue references ().Reset. For the microcontroller to be reset, bring this line LOW. Usually applied to shields that obstruct the board's reset button.

C. Technical Specification Thermistor

The resistance of thermistors is significantly more temperature-dependent than that of conventional resistors. The term is a fusion of the words resistance and thermal. Thermistors are often used as temperature sensors (generally of the negative temperature coefficient or NTC sort), inrush current limiters, self-resetting overcurrent protectors, and self-regulating heating components (positive temperature coefficient or PTC type typically). Depending on the type of probe, a thermistor's operational temperature range normally falls between 100 °C (148 °F) and 300 °C (572 °F).The materials used to make thermistors are divided into two categories:As temperature rises, NTC thermistors' resistance lowers, typically as a result of an increase in conduction electrons that have been thermally agitated from the valence band. A frequent application for an NTC is as a temperature sensor or as an inrush current limiter when connected in series with a circuit.The resistance of PTC thermistors grows with temperature, typically as a result of increasing thermal lattice agitations, particularly those caused by impurities and defects. PTC thermistors are frequently used as resettable fuses to protect against overcurrent conditions. They are connected in series with a circuit. Metal oxide powder is typically used to make thermistors.[2] NTC thermistors can now attain accuracy over broad temperature ranges of 0.1 °C or 0.2 °C from 0 °C to 70 °C with great long-term stability thanks to significantly improved formulations and procedures over the past 20 years[when?]. NTC thermistor elements are available in a variety of shapes and sizes including axial-leaded glass-encapsulated (DO-35, DO-34, and DO-41 diodes), glass-coated chips, epoxy-coated with bare or insulated leadwire, surface-mount, as well as rods and discs. The average functioning range of a thermistor is between 55 °C and +150 °C, while certain glass-body thermistors may withstand temperatures as high as +300 °C.

The material utilised in a thermistor is typically ceramic or a polymer, as opposed to pure metals in resistance temperature detectors (RTDs), which is how thermistors vary from RTDs. RTDs are effective throughout wider temperature ranges, although thermistors often attain a greater degree of precision within a narrow temperature range, typically between 90 and 130 °C. [4]

This device, unlike the BaTiO3 thermistor, has a highly nonlinear resistance/temperature response that can be used for thermal or circuit control rather than temperature monitoring. Self-limiting heaters can be made in the form of current-controlling circuit components as well as heat-tracing wires or strips. When heated, PTC thermistors "latch" into a hot, high resistance state and don't begin to cool until they reach that state. By connecting two PTC thermistors in series, one of which should be cool and the other hot, the effect can be employed as a simple latch/memory circuit. The PTC thermistor is represented by a "+t°" under the rectangle in the IEC standard symbol.

D.Zigbee

To meet the special requirements of cheap, low-power wireless sensor networks, ZigBee is a wireless technology that was designed as an open, international standard. The standard operates at the following frequencies: 2.400-2.484 GHz, 902- 928 MHz, and 868.0-868.6 MHz in unlicensed

bands all across the world. It fully utilises the IEEE 802.15.4 physical radio specification. the power levels needed to power the zigbee module (down from 5v to 3.3v).

PRODUCT	THERMISTOR SENSOR WITH PROCESS CONNECTION
Type(R25Ω)	10K NTC THERMISTOR
Temp Range	-50to150 c
Beta(B25/85)	3977Ω
Accuracy	±0.2 (OVER 0-70 C)
Length	50, 100&150 as standard
Diameter	6mm
Connection	½ BSPP and ¼ BSPP
Lead wires	1meter PFA insulated
Material	316 stainless steel
Part number	NFTHR

The TX, RX, DIN, and DOUT communication lines to the proper voltages. In order to build personal area networks with small, low-power digital radios, such as for home automation, medical device data collection, and other low-power, low-bandwidth needs, Zigbee is an IEEE 802.15.4-based specification. It was created for small-scale projects that require wireless connection. Therefore, Zigbee is a wireless ad hoc network with low power, low data rate, and near proximity (i.e., personal area). Both a transmitter and a receiver are built into the Zigbee module. The ZIGBEE's Tx and Rx pins are connected to the microcontroller's Tx and Rx, respectively. The UART port is used by the microcontroller to serially communicate data to the Zigbee module. The data is then sent from one Zigbee to another. The data's from Zigbee transmitted from Dout pin. The Zigbee from other side receives the data via Din pin. [5] proposed a system in which this study presented the implementation of two fully automatic liver and tumors segmentation techniques and their comparative assessment. The described adaptive initialization method enabled fully automatic liver surface segmentation with both GVF active contour and graph-cut techniques, demonstrating the feasibility of two different approaches. The comparative assessment showed that the graph-cut method provided superior results in terms of accuracy and did not present the described main limitations related to the GVF method. The proposed image processing method will improve computerized CT-based 3-D visualizations enabling noninvasive diagnosis of hepatic tumors. The described imaging approach might be valuable also for monitoring of postoperative outcomes through CT-volumetric assessments. Processing time is an important feature for any computer-aided diagnosis system, especially in the intra-operative phase.

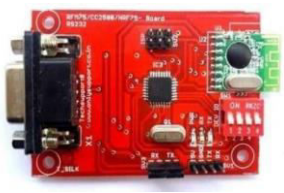


FIG.5.ZIGBEE

Zigbee specification

Parameter	Range
Transmission Range (meters)	1 - 100
Battery Life (days)	100 - 1,000
Network Size (# of nodes)	>64,000
Throughput(kb/s)	20 - 250
Topology	Mesh
Maximum Child	254
Wakeup Delay	15ms
Data rate	250 Kbps (at 2.4 GHz)

E . Force sensor

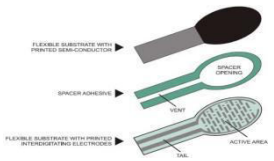


Fig.6. Force Sensors

The resistance of Force Sensing Resistors (FSR), a polymer thick film (PTF) device, decreases as the force applied to the active surface increases. Its force sensitivity is designed for use in touch-sensitive electronic device control by humans. Despite having characteristics comparable to load cells and strain gauges, FSRs are not either. For precise measurements, FSRs are inappropriate.

F. Size and shape

The sensing area of the majority of FSRs is either circular or rectangular. The smaller circular sensors can provide better accuracy to the spot being sensed, whilst the square FSR is suitable for wide-area sensing.

A long 0.25 x 24" strip and a somewhat modest square sensor measuring 1.75 x 1.75" are included in the rectangular FSRs.

G. Sensing Range

The FSR's rated sensing range, which specifies the minimum and maximum pressure ranges the sensor can distinguish between, is another important feature. Your FSR hookup could be more sensitive the lower the force rating is. But! Any pressure above the maximum allowable limit of the sensor will not be measured (and may damage the component). The little 1kg-rated FSR will give more accurate readings between 0 and 1kg but won't be able to distinguish between a 2kg and 10kg weight.

H. Force vs. Resistance

The performance of evaluation part # 402 (circular active area, 0.5" [12.7 mm] in diameter). The FSR device was actuated by a stainless steel actuator with a 0.4" [10.0 mm] diameter hemispherical tip of 60 durometer polyurethane

rubber. Generally speaking, the FSR response essentially exhibits an inverted power-law characteristic (about 1/R). A switchlike response is visible at the low force end of the force-resistance characteristic, as shown in the following Figure. The substrate and overlay thickness and flexibility, size and shape of the actuator, and thickness of the spacer-adhesive depend on the turn-on threshold, or "break force," that shifts the resistance from greater than 100 k to approximately 10 k (the start of the dynamic range that follows a power-law) (the gap between the facing conductive elements).

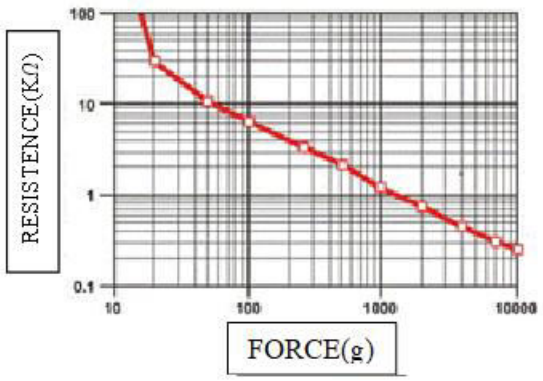


Fig.7.force and resistance

I. Using an FSR Analog Voltage

Reading Approach Connecting one end of a resistive sensor to power and the other to a pull-down resistor to ground is the simplest way to measure it. The analogue input of a microcontroller like an Arduino is connected to the point between the fixed pulldown resistor and the variable FSR resistor.

Force Sensor Specification

SPECIFICATION	VALUE
Sensitivity	(±15%) 2248mV/kN
Measuring Range	2224kN
Maximum Statical Force	1334kN
Broadband Resolution	0.0488N-rms
Low Frequency Response	0.0003 Hz
High Frequency Limit	90KHz

J. Vibration Motor

Precision Micro Drives presently produces coin vibration motors, also known as shaftless or pancake vibrator motors, for our Pico Vibe line, typically in diameters between 8 and 12 mm. Pancake motors are small and easy to operate. Since they don't contain any external moving parts, they may be set in place using a sturdy, long-lasting self-adhesive mounting solution.Our shaftless vibration motors come in coin form, which is easily moldable into enclosures. We provide versions of the coin motor that are spring & pad mountable and leaded. As with all of our vibration motors, we are happy to provide quotations for changes to the basic design, such as modifying the lead length and connectors. The motor vibrates because the eccentric mass is out of centre.

L. General Layout and Operation

Eccentric Rotating Mass (ERM) motors are what all of our coin or pancake vibrating motors use. They can therefore be operated in the same way as their pager motor equivalents. They have the same active braking H-bridge circuitry motor drive principles. In the middle of a flat PCB, the 3-pole commutation circuit for brushed coin vibration motors is organised around an internal shaft. A flat plastic disc with a bearing in the centre that rests on a shaft, two "voice coils," and a little mass make up the vibration motor rotor. The voice coils, which produce a magnetic field, are powered by two brushes on the underside of the plastic disc that come into touch with the PCB commutation pads. This field interacts with the flux generated by a disc magnet that is attached to the motor chassis.

The N-S pole pairs integrated into the neodymium magnet are affected by the commutation circuit, which changes the field's direction through the voice coils. The disc spins and, thanks to the included Six segments joined to two coils make up the commentator. On the right, the comparable circuit is displayed. This contraption functionally has 6 poles because there are 6 alternative ways to magnetise the coils. This commutation design's uniqueness, though, is that the resistance via the brushes varies throughout one spin. The brushes "see" the two coils in series for a third of the revolution rather than just onebecause of particular orientations, a circuit will see double the resistance and, as a result, half the rated start current. The worst case current draw, or the circumstance when the brushes only view one coil, is represented by the current figures in the Conformity Limits Specifications sections of datasheets.

M. Mounting

Coin vibration motors are made to be simple to install. They either come with spring PCB connectors or a self-adhesive backing sheet that is already affixed to the chassis' underside. The adhesive makes production installation quick and easy and enables secure mounting of the vibration motor to a variety of surfaces, including PCBs or flat interior surfaces of the enclosure.

Our coin vibrator motors normally use one of three adhesive brands, depending on supply.

3M VHB 9448, Sony 4000T, and Nitto 5000NS. These 0.16mm thick adhesive tapes typically have tensile strengths of roughly 20N/10mm and 180 deg peeling strengths of 15N/20mm. The majority of solvents, UV radiation, moisture, and temperature extremes are thought to be resistant to the acrylic adhesive. The final bond strength depends on how clean the mating surface is, as it does with all adhesives. It is advised that this mating surface be free of debris, dry, and provide a snug fit for the motor backing plate (on which the self-adhesive pad is stuck).

The fingers on spring-loaded PCB vibrator motors are spring-loaded and mat with pads on the PCB. The resistance perceived by a circuit approach is frequently employed in mobile phones to ensure that the maximum amount of vibration is passed through the casing, which simplifies assembly for situations where it is desired to rotate.

K. Vibration Motor Applications

Coin vibrating motors are a common option for numerous applications due to their tiny size and enclosed vibration mechanism. They work well for haptics, especially in portable devices where space can be limited: Mobile phones, RFID scanners, portable instruments, industrial tool or equipment user interfaces, and medical applications

V-Conclusion

This System is used to monitor the varicose veins patients and give the treatment. In this Arduino uno acts as brain of the system which stores the data. Thermistor detect the temperature abnormality and force sensor detects the pressure in the affected area then Zigbee transfers the data and vibration motor will give massage to the affected area.

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