



DETERMINATION OF VARICOSE VEINS PROBLEMS USING CONCURRENT SENSOR NETWORK

Sridevi.R^[1], Arunachalam.P^[2], Arunkumar.S^[3], Arunraj.K^[4], Gokulram.S R^[5]

Assistant Professor^[1], UG Students^[2-5]

dsdevisri28@gmail.com^[1], gokulrams3@gmail.com^[2]

Department Of Biomedical Engineering^[1],

Dhanalakshmi Srinivasan Engineering College^[1], Perambalur, India.

ABSTRACT:

In Varicose vein is a chronic disease which occurs when leg vein blood circulation is not working properly. This cause problem in the blood circulation from leg to heart. Nearly 10 million people in India were affected by varicose vein. In India, number of varicose vein cases are increasing rapidly. 12.5% cases occur due to heredity. Varicose veins occur in person who stands and squats for long time. This occurs because of blood get collected in the leg veins and this condition is said to as stasis which leads blood to drop backward and damage the valve. Prolong standing or sitting, aging, lack of mobility are some of the main reason for this chronic disease. Early detection of this problem can be treated easily and help the patient relief from pain and stress. Varicose veins are inflammatory lesions on veins that occurs mostly on legs. When the veins expand, the valves become weaker, lesser flexible and starts to flow in opposite direction. The cost for treatment is also too high. Mostly the treatment for varicose vein is by invasive methods such as surgery, laser therapy, RF endovenous therapy and sclerotherapy. To solve this problem, IoT-based system is to provide an efficient and non-invasive method for detecting varicose veins and providing therapeutic treatment. The system aims to provide an accurate and early diagnosis of varicose veins, which can help prevent further complications and improve the patient's quality of life. The system uses three sensors - SpO2 sensor, accelerometer sensor, and force sensor to detect varicose veins by measuring the oxygen saturation level, movement and vibration of the leg, and pressure applied to the leg, respectively. By using IoT technology, the system can provide real-time monitoring and analysis of the data collected from the sensors, which can help doctors and healthcare professionals make informed decisions regarding the treatment of varicose veins. The therapeutic treatment provided by the system, which includes a Peltier crystal, aims to alleviate pain and discomfort associated with varicose veins. The Peltier crystal can cool or heat the skin's surface, which can help reduce inflammation and improve blood circulation.

I.INTRODUCTION:

Inflamed veins that are visible beneath the skin's surface are known as varicose veins. Although they can form anywhere, most often in the legs where the veins must work harder to support the weight of the torso. They may also result in skin sores, slight pain, blood clots, and itching. Varicose veins are superficial, cylindrical, or vascular veins, according to the World Health Organisation (WHO). They can be brought on by a number of things, including a sedentary lifestyle, pregnancy, heat exposure, being overweight, wearing tight clothing and shoes, etc. Its primary purpose is to stop blood from constantly returning to the heart, which causes the body's veins to deteriorate and worsen if a person leads an inactive lifestyle. the legs are the most often affected areas. The World Health Organisation reports that varicose veins affect almost 10% of the global population, with a higher incidence in women. In addition, the risk of developing varicose veins rises with age, accounting for 35% of cases in active individuals and rising to 50–60% in sedentary lifestyles. Varicose veins are categorised into grades I through IV. They typically start out as an aesthetic issue with thin turquoise blue lines that cause itching, heaviness, and fatigue. As the grade increases, varicose veins can be seen on the skin's surface with small swellings. Lastly, if the damaging factors associated with varicose veins are not addressed in a timely manner, they can result in ulcers, internal circulation problems, and inflammations affecting large areas of the leg. Even though varicose vein disease is a slowly progressing medical illness, it can be prevented by detecting suspected cases of the veins in the legs as soon as possible. Symptoms of early varices include itching, cramping, and other discomforts. Ulcers, swelling and inflammation, bleeding from veins close to the skin, and finally leg sensitivity are the symptoms that occur if an early identification and healing process is not followed.

II.METHODOLOGY

EXISTING SYSTEM

Buses and autos are common modes of transportation in Indian cities. Jerks from vehicles are transmitted to the driver's coccyx and lumbar vertebrae, leading to serious spinal issues, wear of the gristle pad between vertebrae, and insufficient cerebrospinal fluid circulation. Slow movement of blood to the lower extremities causes problems such as varicose veins and deep vein thrombosis. Studies suggest that drivers need various activities for proper

blood circulation after long sitting hours, which is challenging for commercial vehicle drivers. They have proposed a solution involves moving vehicle seats to counter sudden jerks due to bumpy roads..

PROPOSED SYSTEM

In the proposed system, various sensors, including SPO2, force sensor, accelerometer sensor, and tilt sensor, work collectively to monitor essential health parameters and the duration of standing. The collected data is then processed by a PIC microcontroller, which acts as the central processing unit for the system. The processed information is sent to an app/webpage through an ESP 8266 – 12E Node MCU module, ensuring real-time updates. The real-time information is presented on an LCD display, providing immediate feedback to the user about their health status. Cool & heat energy based therapies can be applied to tissues throughout the body to achieve numerous therapeutic results. It achieves a desired treatment effect, reaching a temperature to the target tissue of at least about 50°C. We would like to use the Peltier crystal to treat the varicose vein non-invasively and increase blood flow inside veins. This alerting mechanism ensures that individuals are promptly notified about potential health issues, allowing for timely intervention and management. This comprehensive approach combines monitoring, processing, display, and alerting functionalities for effective health monitoring and management.

III. BLOCK DIAGRAM

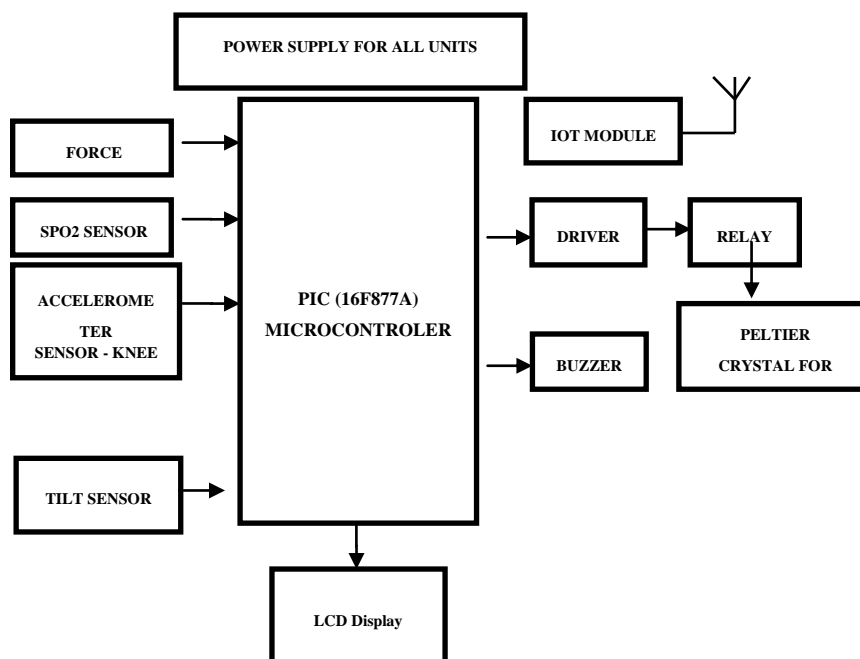


FIG NO : 4.1 BLOCK DIAGRAM

IV. WORKING MODEL AND EXPLANATION

Varicose veins are a chronic condition caused by improper blood circulation in leg veins, affecting millions in India. Early detection is key to effective treatment, which can be costly and invasive. To address this, an IoT-based system is proposed for non-invasive detection and therapeutic treatment of varicose veins. The system employs three sensors: an SpO2 sensor to measure oxygen saturation, an accelerometer to track leg movement and vibration, and a force sensor to gauge pressure on the leg. These sensors provide real-time data for accurate diagnosis, helping healthcare professionals make informed decisions. Additionally, a Peltier crystal in the system offers therapeutic relief by cooling or heating the skin to reduce inflammation and enhance blood circulation. This innovative approach aims to improve the quality of life for varicose vein patients through efficient monitoring and treatment.

V. RESULT AND DISCUSSION

RESULT

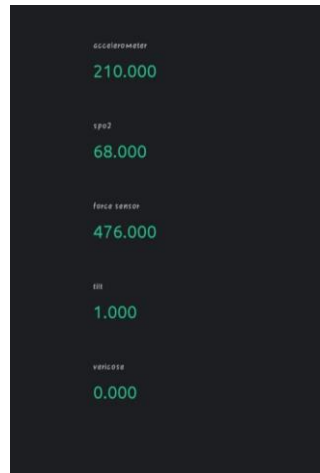
The implementation of the proposed system results in improved health monitoring through real-time tracking of essential parameters, enhanced treatment efficacy with non-invasive cool and heat energy therapies for varicose veins, increased safety with prompt alerts for abnormalities, versatile

therapeutic options including thermal and comprehensive health management integrating monitoring, processing, display, and alerting functionalities across various healthcare settings and home care environments.

CONCLUSION

The proposed system presents a comprehensive solution for health monitoring and management, offering real-time tracking of vital parameters, versatile therapeutic options for conditions like varicose veins, and prompt alerts for abnormalities. By integrating various sensors, a PIC microcontroller, ESP8266-12E Node MCU module, the system enables seamless communication and data processing, enhancing both patient care and user experience. Overall, this innovative approach signifies a significant step towards personalized, efficient, and accessible healthcare solutions in the modern era.

OUTPUT



VI. FUTURE ENHANCEMENT

This system could involve advanced sensor integration for capturing more comprehensive health data, implementing machine learning algorithms for personalized insights, extending functionality to support remote monitoring and telemedicine, conducting clinical trials for validation, optimizing user interface and experience, ensuring scalability and deployment readiness, and integrating with electronic health records for seamless data sharing, aiming to further enhance patient care, treatment outcomes, and healthcare service delivery in diverse settings.

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