

Premonition of Abdominal Aortic Aneurysm by Positioning Ultrasonic Transducer Sensor

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Abstract:

Abdominal Aortic Aneurysm (AAA) is a dilatation of aorta at the stomach level, conveying a considerable danger of development, tearing or dismemberment inside the aortic divider which is the perilous difficulty. The most widely recognized area for an aortic aneurysm is the infrarenal section where a distance across that surpasses 3cm. The elements related with the advancement of AAA are matured individuals, coronary illness, elevated cholesterol level, hypertension, smoking and so on., Often an AAA is analyzed by utilizing CT, MRI, PET and so forth., To dispose of the radiation introduction, AAA can be distinguished utilizing ultrasonic transducer sensor. As of now, the aortic measurement is the main component that is utilized to foresee the danger of break.

Keywords: Abdominal Aortic Aneurysm (AAA), infrarenal segment, radiation exposure, ultrasonic transducer sensor

I. INTRODUCTION

The aorta is the largest artery in the body, carrying oxygenated blood from the heart and eventually to all parts of the body through systemic circulation. ^[2]The abdominal portion of the aorta may become dilated, weakened, and place stress on the aortic wall. AAA is a disease that is often asymptomatic and has up to 90% risk of mortality if the aneurysm ruptures. It originates just after the aortic valve connected to left side of the heart and extends through the entire chest and abdomen. The portion of the aorta that lies deep inside the abdomen, right in front of the spine is called the abdominal aorta. Overtime, artery walls may become weak and widen. The pressure of blood pumping through the aorta may then cause this weak area to bulge outward, like a balloon (called an aneurysm). AAA is localized displacement of the abdominal aorta that is 50% larger than the proximal normal 2segment at healthy subject. The enlargement is induced by progressively decrease in the elasticity of the wall of abdominal aorta due to acute inflammation. The debasement of aorta tissue does exclude finish aorta, but rather just middle of the road layer which end up weaker and defenseless by stress delivered by aortic divider. The aneurysm is generally as the lump delivered by the blood siphoned under heart weight. An aneurysm on the divider may contain stores of cholesterol, calcium, or little blood clusters. ^[1]

RELATED VIEW

An aortic aneurysm creates when the mass of your aorta debilitates and swells outward. This can be hazardous, particularly if the aneurysm blasts. The two sorts of aortic aneurysm are Thoracic Aortic Aneurysm (TAA) and Abdominal Aortic Aneurysm (AAA)

TYPES

Thoracic Aortic Aneurysm

TAA, which occurs in the piece of aorta in your chest. This can incorporate the rising aorta (the short stem of the stick), the aortic curve (the stick handle), the plummeting aorta (longer stem of the stick).

Symptoms: Jaw pain, Back pain, Shortness of breath

Abdominal Aortic Aneurysm

AAA, which happens in the part of aorta in your abdomen.^[1]

Symptoms: Severe pain in abdomen

II. PROPOSED SYSTEM

Ultrasonic transducer sensor distinguishes the measurement of the stomach aorta to analyze the scope of aneurysm. It comprises of transmitters, beneficiaries and handsets. By estimating the time and separation between sending a flag to the stomach area and getting a reverberate from the mid-region can be computed. The yield will be carefully shown in Liquid Crystal Display (LCD). The analyzed report of AAA can be transmitted starting with one place then onto the next place by utilizing remote transmission, for example, General Packet Radio Services (GPRS)/Global System for Mobile correspondences.^[5]

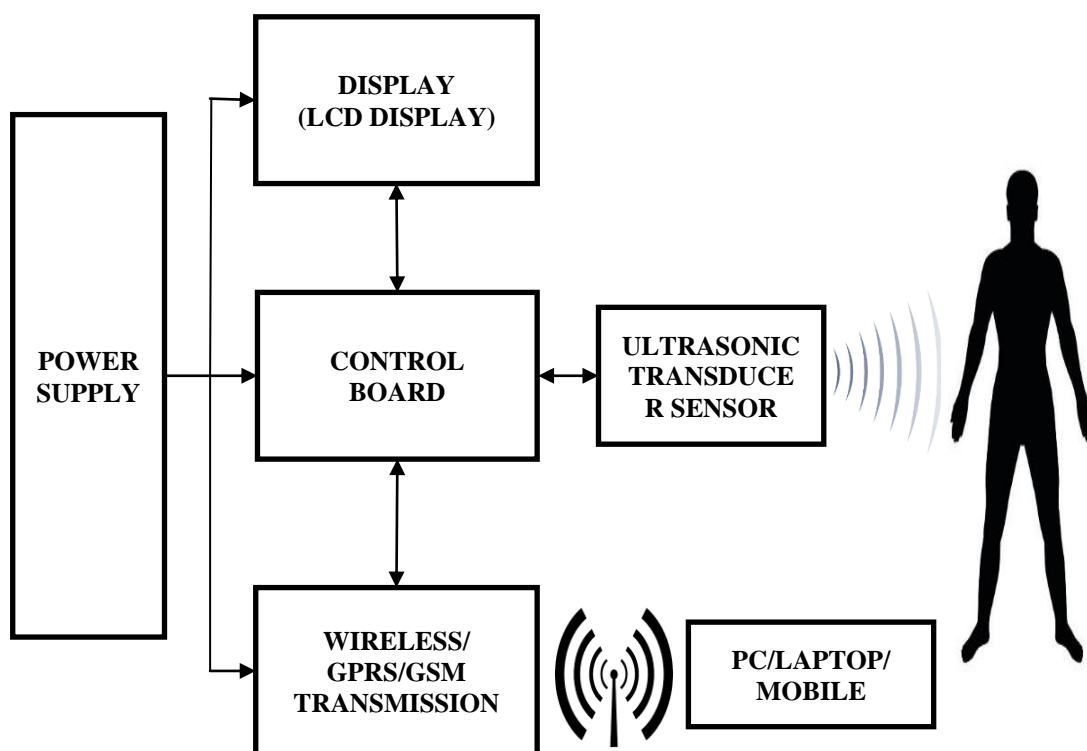


Fig. 1 Block Diagram

DESCRIPTION

We coded the program in the pack to discover the separation between the transducer and the mid-region. In this transducer, Piezoelectric precious stones are utilized for this transformation procedure. The power supply produces (0-5-12V) by utilizing venture down transformer in the pack as appeared in Fig.1.Arduino is the propelled variant of installed framework. Show unit is associated with the Arduino pack used to show the width of stomach

aorta. The analyzed report which is transmitted starting with one place then onto the next can be seen by either PC or versatile.^[3]

III. HARDWARE DESCRIPTION

i. POWER SUPPLY UNIT

Power supply is the essential part in an electronic circuit. A stage down transformer is utilized in this unit, which changes over high voltage, low current power (essential side) into low voltage, high current power (optional side). It is a different yield transformer. It changes over AC control into DC control by utilizing rectifier. A rectifier diode (1N4007) is utilized as one-way check valve. This diode enables an electrical flow to stream in just a single heading, they are utilized to change over AC control into DC control. This diode is electrically good.^[3]

ii. CONTROL BOARD

The PIC microcontroller PIC16f877a is a standout amongst the most prestigious microcontroller. The principle utilization of this controller is to consume the program effectively for the estimation of stomach aortic distance across. The time interim and separation esteems were at that point settled in the controller to work in a set up way. The coded program can be composing delete whatever number as could be allowed dependent on our advantageous. An EEPROM is additionally included in it which makes it conceivable to store a portion of the data forever like transmitter codes and collector frequencies. The customized PIC microcontroller is interfaced with the arduino board to control every one of the squares as appeared in Fig .1^[6]

iii. ULTRASONIC SENSOR

HCSR04 arduino ultrasonic transducer sensor assumes an imperative job in this circuit. It can gauge separations from 2cm to 400cm with a precision of about 3mm. It deals with a guideline like radar or sonar which assess the qualities of an objective by translating the echoes from radio or sound waves individually. It is a gadget that changes over vitality into ultrasound or sound waves over the ordinary scope of human hearing. It creates sound waves in the ultrasonic range, of 40 kHz, by transforming electrical vitality into sound, at that point after getting the reverberate transform the sound waves into electrical vitality which can be estimated and shown in Liquid Crystal Display (LCD).

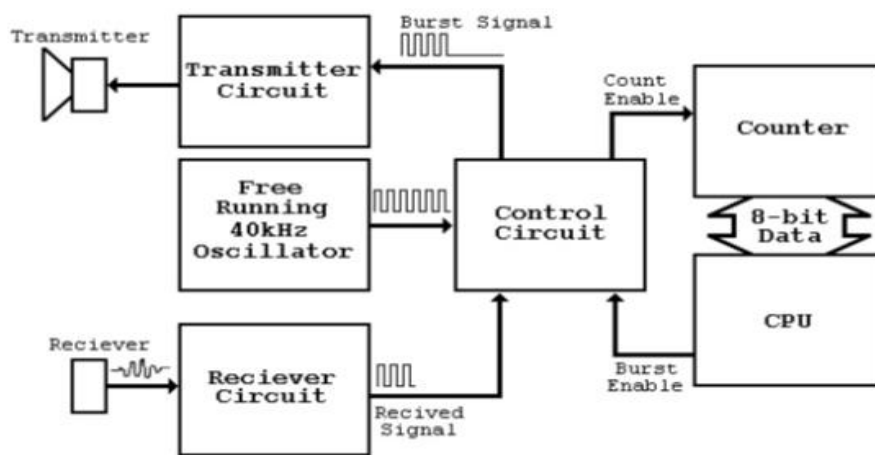


Fig. 2 Block Diagram of Ultrasonic Sensor

HC-SR04 module has 4 pins:

VCC – 5V, +ive of the power supply

TRIG – Trigger Pin

ECHO – Echo Pin

GND – -ive of the power supply

Ultrasonic sensor produce high recurrence sound waves by the transmitter to the midriff and assess the resound which is gotten back by the sensor from the aorta. Sensors ascertain the time interim and separation between sending the flag and getting the reverberate from an aortic divider. In the meantime, it quantifies the distance across of an aorta.^[2]

iv. LCD DISPLAY

Liquid Crystal Display (LCD) is an Alphabetic Display it implies that it can show Alphabets, Numbers and in addition uncommon images in this manner LCD is an easy to understand Display gadget which can be utilized for showing different messages not at all like seven portion show which can show just numbers and a portion of the letters in order.^[4] The time and separation figured from the sensor and to the stomach area were shown. The main impediment of LCD more than seven portion show is that seven fragment is vigorous presentation and can be imagined from a more drawn out separation when contrasted with LCD. Here we have utilized 16 x 2 alphanumeric showcases.^[5]

v. WIRELESS GPRS/GSM TRANSMISSION

The distance across of aorta which is shown in Liquid Crystal Display (LCD) can be transmitted starting with one place then onto the next with the assistance of remote transmission, for example, GPRS/GSM. General Packet Radio Service (GPRS) is a remote administration channels can be utilized with the end goal of information transmission; however, they just give a greatest transmission speed of around 9.6 Kbps. Worldwide System for Mobile interchanges (GSM) have a few additional moves up to adapt to GPRS activity. The transmitted analyzed consequence of patient can be seen by either PC, PC or versatile.^[6]

IV. RESULT & DISCUSSION

The distance across of stomach aorta is estimated and the report is dissected alone, regardless of whether the scope of stomach aortic width is typical/anomalous. It tends to be exchanged from one clinician to other medicinal expert by utilizing remote transmission benefit.

V. CONCLUSION

This undertaking is expected to recognize the aneurysm that happens in stomach aorta, with no radiation introduction. It is the least complex strategy and it tends to be handle with no restorative specialist.

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