Posture Correction Chair

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Abstract— **Posture Correction Chair is a concept to build an innovative and comfortable chair that provides and promotes the best 'posture healthy' seating arrangements. This concept has come out of the rising need to counter posture related problems and diseases. The sitting working professionals were the target group for this project. Prolonged sitting in the same position not only causes health problems such as back pain, joint pain, and reduced circulation but also leads to improper posture effects such as slouching and slumping. A self-adjustable posture correction chair prototype was developed with inbuilt infrared proximity sensors and ultrasonic proximity sensors to measure the distance of various demarcated parts of the body from various positions of the chair. The sensors placed at the armrest region along with the additional alarm-based reminder will indicate the incorrect posture. The smart chair also aims at correcting the posture from the shoulder level by connecting a proximity sensor at the shoulder level. In a nutshell, the height, armrest, shoulder level are the primary factors considered for the development of the prototype.'**

It will pique the curiosity of everyone who works at a desk or in a position that requires more time in front of a computer screen, whether they are a CEO or a clerk. There are currently no alternatives to the Posture Correction Chair that provide measures for sitting posture. The majority of chairs on the market are designed to address specific problems and do not give a "all-in-one" solution to address posture disorders.

Index Terms— Self adjustable posture correction, Slouching, Healthy posture

I. INTRODUCTION

Defining good posture is far less specific than defining bad posture, since it depends on what you desire and it's effectively impossible to assess progress . A healthy posture is most likely "dynamic," stressing movement and change. Keeping active, altering our posture frequently, and experimenting with various methods of moving around the world are all likely helpful ways to deal with posture uncertainties. The majority of people live sedentary lifestyles and engage in little physical activity on a regular basis. Even persons who are physically active at work are generally just active in one direction, and they want variation in their movement. More mobility and diverse positions are a sure bet and an excellent place to start when it comes to improving your posture.

A variety of postural behaviors will also aid in striking a balance between taking the path of least resistance and exerting obsessive and excessive effort, while remaining neither lazy nor overzealous.

Proper posture protects the bones and joints by keeping them in proper alignment, which allows muscles to work effectively. It also helps to reduce abnormal wear of joint surfaces, which can lead to arthritis, and it relieves stress on the ligaments that hold the spine's joints together. Beautiful posture protects the spine from getting stuck in abnormal positions, reduces strain, prevents back soreness and muscular pain, and helps you look good.

A. Need for Posture Correction

To fulfil their jobs, office employees, businessmen and women, instructors, and accountants must sit for long periods of time.

The posture can become a source of worry over time. Slouching, straining, long periods of inactivity, and poor posture all leave their mark on the back and the rest of the body. It causes an aching body, which might serve as a breeding ground for illnesses. As a result, moving the neck becomes difficult, and the neck may become permanently stiff. The neck bone is under a lot of stress, which makes it sensitive. The development of aberrant bone formations in the neck is a possibility.

When improper posture is maintained for several hours, the joints, such as the knee, shoulder, wrist, and fingers, begin to experience a great deal of pressure. Muscles lose their mobility with time and become painful. When a normal sitting position is not maintained, blood flow and circulation are affected. This causes muscles to constrict, causing choking and making it difficult to breathe. Eventually, the heart can no longer handle the pressure and lack of oxygen and blood, resulting in cardiac arrest.

Scoliosis, hunchback, rounded shoulder, anterior pelvic tilt, forward head, digestive difficulties, poor breathing, and other illnesses can all be caused by bad posture.

1. Hunchback

People who spend long hours in front of a computer screen or in a sitting position, especially those who work in an office, frequently develop hunchbacks.[3]

2. Rounded shoulder

Rounded shoulders are caused by poor posture, particularly while working in an office, or by following an unbalanced exercise plan that includes extensive chest pressing.[3]

3. Forward hip tilt

It is primarily caused by sitting for long periods of time without stretching, which shortens the hip flexors.[3]

4. Forward head tilt

When you breathe, the bent back that commonly comes with poor posture provides less capacity for your lungs to fill up. This can make it difficult to exercise or cause frequent shortness of breath. Chronic neck, shoulder, or back pain can be relieved by improving your posture. Upper Cross Syndrome is frequently caused by a slouched position.[3]

B. Causes of improper Posture

In terms of physiology, "normal" posture is the state in which the body functions most efficiently. The natural posture of a population is more difficult to assess structurally. Most drawings depict "perfect" posture rather than "average" posture. The ground surface, heat and cold, sickness and health, sadness and joy, clothes, and societal traditions all cause posture to vary constantly to rest active muscles and adapt to diverse conditions.[5]

There are a few factors that determine human posture and they are:[5]

(1) gravity;
(2) environment, eg, occupation, weather;
(3) architecture of the vertebral column, upper and lower appendages, organs and tissues that attach to or are suspended from the spinal column;
(4) physiology, normal and abnormal,
(5) pathology,
(6) emotional states; and
(7) pain.

II. LITERATURE SURVEY

A. Sample Selection and Measurements

Following is the anthropometric Data collected from a paper on "Anthropometric Design Of Furniture For Use In Tertiary Institutions In Abeokuta, South-Western Nigeria"[1]

The University of Agriculture (UNAAB), Moshood Abiola Polytechnic (MAPOLY), and Federal College of Education (FCE, Osiele), all of which are located in the Abeokuta metropolis, were chosen to participate in the study. Seven hundred and twenty (720) students were chosen at random from first to final year students, with 240 students (120 boys and 120 girls) from each participating institution. The students ranged in age from 17 to 27 years old (mean 22.85 years, SD 2.05 years). Based on a study, each student's body size was determined using standard anthropometric measurement techniques. Prior to the start of the measures, the students' consents were sought. The subjects were measured in light clothing, in a relaxed and erect posture, and without shoes. The measurements were obtained on a level floor in one of the selected universities' classrooms. In the month of April of 2010, measurements were taken every working day for 20 days with the assistance of a data-recording person. The data-recording person and a helper were taught on the use of anthropometers and other measuring instruments in the laboratory, and trial runs were undertaken to ensure the accuracy of the data. During the trial runs, the measurements were examined for consistency and accuracy. The information on/regarding age and sex was also entered alongside the measurements. The averages of three replications of the measurements were recorded. The accuracy of the measurements was also double-checked.

B. Description of Measurements

Following are the measurements taken into consideration for the prototype development.

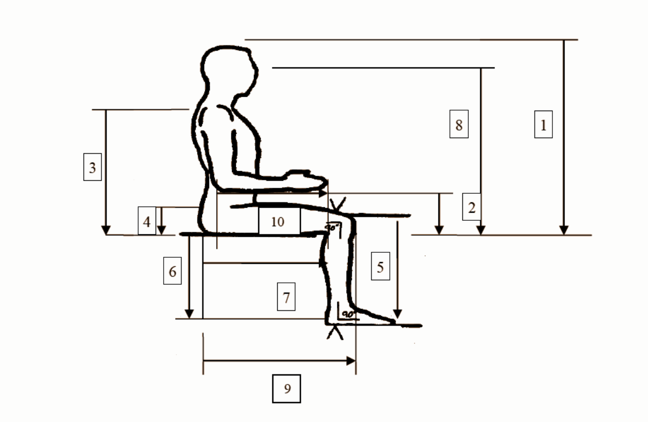

Fig. 1(b) Seating Dimension positions

Legend
1- Sitting Height
2 - Sitting Elbow height
3 - Sitting Shoulder Height
4- Thigh Clearance
5 - Knee height
6 - Popliteal Height
7- Buttock-Popliteal Length
8- Eye Height
9 - Buttock-knee Length
10- Forearm- Hand Length

DIMENSIONS / SCHOOLS	SEAT HEIGHT (cm)	SEAT DEPTH (cm)	SEAT SLOPE ANGLE (deg)	TABLE DEPTH (cm)	TABLE HEIGHT (cm)	TABLE CLEARANCE (cm)	SURFACE SLOPE ANGLE (deg)
FCE, OSIELE	47,00	38,00	3°	29,50	77,50	67,00	10°
MAPOLY	41,00	29,00	3°	29,00	69,00	55,00	10°
UNAAB	45,00	35,00	3°	26,50	76,50	71,00	10^0

Fig. 1(b) Seating Dimensions

Anthropometric Dimension	Mean	SD	Min	Max	5th percentile	50th percentile	95th percentile
Age (Yrs.)	22,85	2,05	17,00	27,00	19,00	23,00	26,00
Sitting Height (cm)	78,74	5,30	69,00	92,00	72,00	77,50	89,00
Sitting Elbow Height (cm)	19,18	2,11	15,00	23,50	15,50	19,00	22,50
Sitting Shoulder Height (cm)	49,56	4,89	52,00	60,00	42,00	50,00	55,00
Thigh Clearance (cm)	13,81	1,23	12,00	18,00	12,00	14,00	16,00
Knee Height (cm)	50,50	4,16	42,00	61,00	44,00	50,00	58,95
Popliteal Height (cm)	40,92	4,65	44,00	52,00	36,00	40,00	49,00
Stature (cm)	164,87	7,99	150,00	187,00	153,03	163,75	180,00
Body Weight (kg)	59,56	6,27	41,00	83,00	52,00	59,00	73,90
Buttock Popliteal Length (cm)	40,72	3,54	32,00	47,00	32,05	42,00	46,00
Hip Breadth (cm)	32,88	2,40	27,00	55,00	29,00	33,00	36,00
Eye Height (cm)	69,46	5,22	58,00	87,00	63,00	69,00	79,00
Buttock-Knee Length (cm)	55,74	2,94	50,00	63,00	51,05	56,00	61,00
Forearm- Hand Length (cm)	45,50	3,08	39,00	53,00	41,00	45,00	52,00

Fig. 2 Anthropometric Measurements

(i) *Sitting Height:* The person sits up straight with his head in the frank fort plane, arms at his sides, and hands on his thighs. A stadiometer was used to measure the vertical distance from the seat surface to the vertex of the head with the hair pulled down.[1]

(ii) *Sitting Elbow height* With the elbow in 900 degrees of flexion, the vertical distance from the bottom of the tip of the elbow (olecranon) to the sitting surface is measured. The subject is dressed lightly and sits fully upright, with his thighs fully supported and his lower legs dangling freely. The forearms are horizontal and the upper arms swing freely downward. The armrest height is determined by the height of the sitting elbow.[1]

(iii) *Sitting Shoulder height* The person sits up straight, arms at his sides and hands on his thighs. The vertical distance between the acromion process at the apex of the shoulder and the persons' feet.A stadiometer was used to measure the vertical distance from the top of the shoulder at the acromion process to the students' sitting surface. This measurement is crucial in determining the Backrest Height (Upper).[1]

(iv) *Thigh Clearance* The person sits tall and calm, his legs spread. A vernier calliper was used to measure the vertical distance from the sitting surface to the top of the thigh at its intersection with the abdomen. The table height must be determined by taking into account the thigh clearance, popliteal height, and shoe clearance.[1]

(v) *Sitting Knee Height* The vertical distance between the floor and the topmost point on the knee is measured here. The patient was sitting upright on a chair with his knee at a correct angle. A stadiometer was used to take the measurements.[1]

(vi) *Popliteal height* The vertical distance between the foot resting surface and the posterior surface of the knee, measured with 900 degrees of knee flexion (popliteal space). The patient sits fully supported, with the sitting surface reaching as far as feasible into the hollow of the knee and the lower legs dangling freely. The distance between the measuring block and the forward edge of the seating surface is calculated. The measurement is required to determine the seat height.[1]

(vii) Stature: With the hair pressed down, this is the vertical distance from the floor to the vertex of the head. The subjects are fully erect with their feet together and their heads in the Frankfurt Plane. The stadiometer was used to take measurements[1].

C. Ergonomic Chair Features

When it comes to the "traditional" office chair, there are a few features that an ergonomic chair should have, including:

(i) *Seat height:* The seat height of an office chair should be freely adjustable. The simplest method is to use a pneumatic adjustment lever. Most people should be able to sit comfortably at a seat height of 16 to 21 inches off the ground. This enables the user to sit with his or her feet flat on the floor, thighs horizontal, and arms at desk height.
Seat depth and width The seat should be wide and deep enough to comfortably support any person. The standard is usually 17-20 inches broad. [4]

(ii) *Seat width and depth* must be sufficient for the user to sit with his or her back against the ergonomic office chair's backrest while leaving roughly 2 to 4 inches between the back of the knees and the seat. The seat's forward or backward tilt should be adjustable. [4]

(iii) *Lumbar support:* The importance of lower back support in an ergonomic chair cannot be overstated. The lumbar spine has an inward curve, and sitting for lengthy periods of time without support for this curve causes slouching (flattening the natural curve) and strains the lower spine tissues. An ergonomic chair should include lumbar adjustment (both height and depth) so that each user can find the right fit to support the lower back's inward curve. [4]

(iv) *Backrest:* An ergonomic office chair's backrest should be 12 to 19 inches wide. If the backrest is not attached to the seat, it should be height and angle adjustable. It should be able to accommodate the natural curve of the spine, with particular care dedicated to good lumbar support. If the seat and backrest of the office chair are one piece, the backrest should be adjustable in forward and back angles, with a locking mechanism to prevent the backrest from moving too far backward once the user has selected the proper angle. [4]

(v) *Seat Material:* The padding on the seat and back of the office chair should be sufficient to allow you to sit comfortably for long periods of time. A breathable cloth fabric is preferred than a tougher surface. [4]

(vi) *Armrests*: Armrests on office chairs should be adjustable. They should let the user rest their arms comfortably and relax their shoulders. While typing, the elbows and lower arms should be lightly rested, and the forearm should not be resting on the armrest. [4]

(vii) *Swivel:* Any traditional or ergonomic chair should be able to rotate freely so that the user can reach various parts of his or her desk without straining. [4]

III. BLOCK DIAGRAM

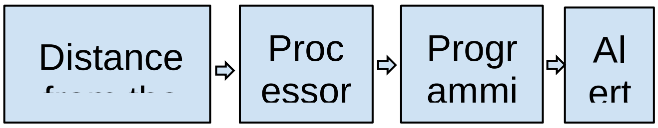

Fig. 3 Block Diagram of Posture correction Smart Chair

A block diagram is a diagram of a system in which the significant parts or functions are represented by blocks connected by lines that show the relationships of the blocks. This product is ergonomic .It has a mechanical part as chair and the electronic part sensors for the awareness for maintaining a bad posture.In the mechanical part,it is specifically designed to be comfortable and easy to use, physically and psychologically. Ergonomic products are often advertised as reducing fatigue and repetitive strain, and boosting productivity. Unlike other types of chairs, the smart chair offers a strong support for the lower back. [2] Ergonomic drafting chairs differ from ergonomic office chairs because they are raised up to allow the user to easily access a drafting table, which sits much higher than an office desk. The arms of this smart chair are adjustable away from and toward the seat to provide you with enough hip room while sitting in the chair. An ergonomic desk chair should have a seat that is thick enough to remain

comfortable over long use and wide enough to provide you with a little extra space on each side while seated.[2]
The electronics part of this smart chair consist of three IR sensors .They are placed at the shoulder point , lower spine and one at the neck region .The sensors senses the presence and if the posture does not match the proper posture it gives an alarm as vibration. The comparing is done using the arduino programming.If any of the position is improper it gives the vibration.or an alert.

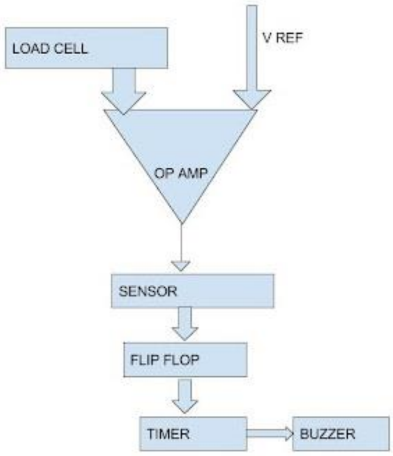

Fig. 4 Generic Flowchart

The smart chair works on the principle that whenever a person sits on the chair,the load cell will give out a voltage which is compared with the reference voltage by the comparator.Then the comparator gives an output voltage to the proximity sensor.It senses the position of sitting and then if he/she maintains the incorrect posture for a time period greater than 20 minutes then it will give an alert .Time is set by the timer which it gives alert if time exeeds than 20 minutes

IV. DESIGN AND DEVELOPMENT

The Posture Correction Chair will be inbuilt with infrared proximity sensors and ultrasonic proximity sensors to measure the distance of various demarcated parts of the rear end of the body from the rails of the chair. The sensors will indicate the incorrect posture using LEDs placed at the armrest region of the chair and an additional alarm based reminder to indicate to the seat occupant that person is sitting incorrectly.

Table 1 Components and specifications

No	Component Name and Specification	Quantity
1	Infrared Inductive Proximity sensors M12DC	1
2	Strain Gauge Load cell	1
3	Bi-Colour LED CN600SD	1
4	Hi-Power LED DC9-12 V	1
5	ActI-Tape	1
6	Connecting wires	1

A. *Arduino UNO R3*

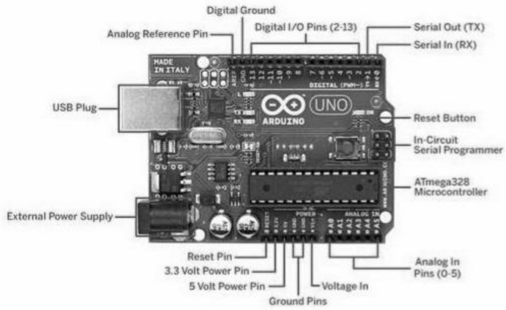

Fig. 5 Pin out Diagram of Arduino UNO R3

An AC-to-DC adapter (wall-wart) or a battery can provide external (non USB) power. A 2.1mm center-positive plug can be plugged into the board's power jack to connect the adapter. Battery leads can be placed into the POWER connector's GND and Vin pin headers. The ATmega328 has 32 KB of memory (with 0.5 KB occupied by the boot loader). There's also 2 KB of SRAM and 1 KB of EEPROM on board. A computer, another Uno board, or other microcontrollers can all be communicated with via the Uno. On digital pins 0 (RX) and 1 (TX), the ATmega328 supports UART TTL (5V) serial connection (TX). This serial communication is channelled through USB by an ATmega16U2 on the board, which appears to software on the PC as a virtual com port.

B. *Infrared Sensor*

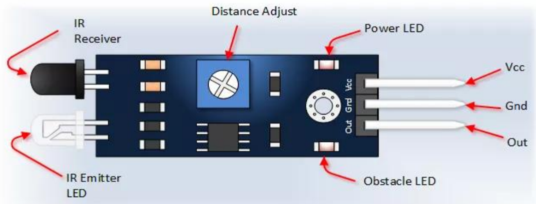

Fig. 6 IR Sensor

An infrared sensor is an electronic instrument which is used to sense certain characteristics of its surroundings by either emitting and/or detecting infrared radiation. Infrared sensors are also capable of measuring the heat being emitted by an object and detecting motion.All objects which have a temperature greater than absolute zero (0 Kelvin) posses thermal energy and are sources of infrared radiation as a result.Sources of infrared radiation include blackbody radiators, tungsten lamps and silicon carbide. Infrared sensors typically use infrared lasers and LEDs with specific infrared wavelengths as sources.A transmission medium is required for infrared transmission, which can be either a vacuum, the atmosphere or an optical fiber.

A proximity detector is a device that detects when something is close by. Using IR LEDs and IR phototransistors, you may make a proximity detector in two methods. The first step is to align the IR LED and phototransistor so that they are facing each other. The phototransistor then detects the infrared light. When an object gets in the way of the IR LED and the phototransistor, the light is blocked and the phototransistor shuts off.

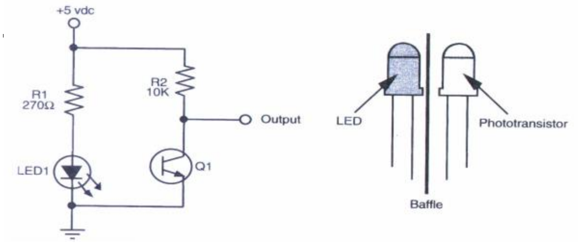

Fig.7 (a) Basic Infrared circuit diagram

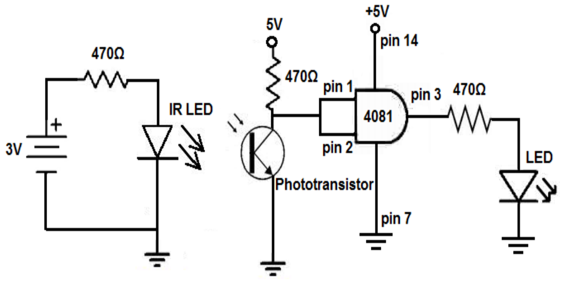

Fig.7 (b) Circuit Diagram of IR sensor

To converge or concentrate infrared radiation, optical components such as quartz, CaF_2, Ge, and Si optical lenses, polyethylene Fresnel lenses, and Al or Au mirrors are utilised. Band-pass filters can be used to limit spectral response. The radiation that has been concentrated is then detected using infrared detectors. Pre-amplifiers and circuits are necessary to further process the incoming signals because the output from the detector is usually quite modest.

C. Strain gauge load cell

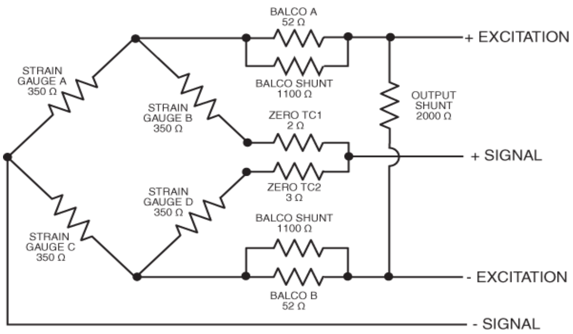

Fig.8 Typical Load cell schematic

In industry, the most common load cells are strain gauge load cells. The force being sensed deforms a strain gauge due to a mechanical construction. The strain gauge detects deformation (strain) as a change in electrical resistance, which is a measure of strain and thus applied forces. In a Wheatstone bridge arrangement, a load cell normally consists of four strain gauges. There are also load cells with one strain gauge (quarter bridge) or two strain gauges (half bridge). The electrical signal produced is typically a few millivolts, and it must be amplified by an instrumentation amplifier before it can be used. The force exerted to the transducer can be calculated by scaling the output of the transducer. A high-resolution ADC, typically 24-bit, can be used directly in some cases.In our project we are giving the power supply to the excitation terminal .The output is fetched from the signal terminals.

D. Opamp as a comparator

A voltage comparator is an electrical circuit that compares two input voltages and determines which is higher. Because the polarity of the op-output amp's circuit depends on the polarity of the difference between the two input voltages, making a voltage comparator from an op amp is simple.

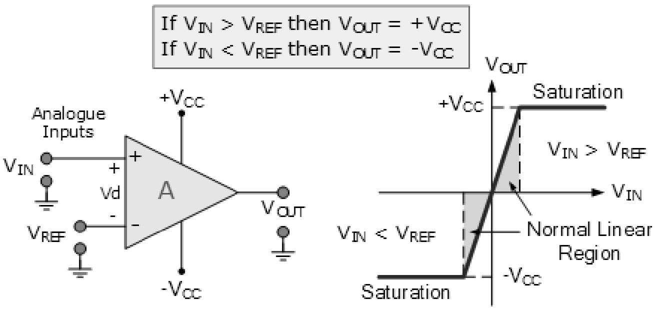

Fig.9 Opamp as a comparator

E. Timer IC

The 555 timer IC is a type of integrated circuit (chip) that can be used to make timers, pulse generators, and oscillators. The 555 can be used as a timer, oscillator, and flip-flop element. In one package, derivatives can have up to four timing circuits.

It provided circuit designers with a relatively cheap, stable, and user-friendly integrated circuit for both monostable and astable applications.Since the device's initial commercial release, a slew of new and unusual circuits have been built and published in a variety of trade, professional, and hobby magazines. Some manufacturers have discontinued producing these timers in the last 10 years due to competition or other factors. Other firms, such as NTE (a Philips subsidiary), carried up where others stopped off. Although the CMOS version of this IC, such as the Motorola MC1455, is more commonly used these days, the conventional form is still accessible; however, the circuitry has undergone many modifications and alterations. However, all types of plugs are pin-to-pin compatible. In our project we are setting the time as 15 minutes so that his sitting posture is maintained after 15 minutes if he is in the wrong posture.

15 Minute Timer Circuit

15*60 = 1.1*R1*1000 uF

R1 = 818.2 k ohm

As per above calculations, for a 15 minute timer circuit, we need the value of resistor to 818.2 kohm.

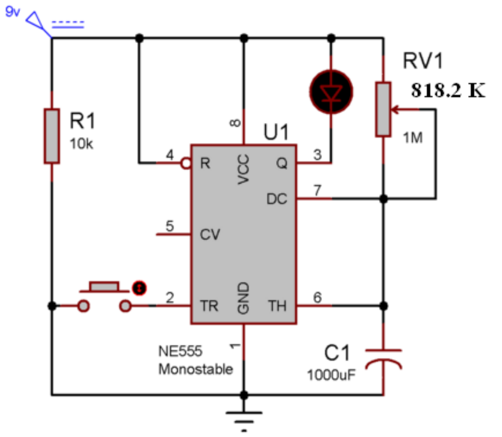

Fig.10 Timer IC Circuit

F. Circuit Diagram and Working

The project of a posture correction chair consists of strain gauge load cell,comparator,proximity sensor,flip flop and an alarm.

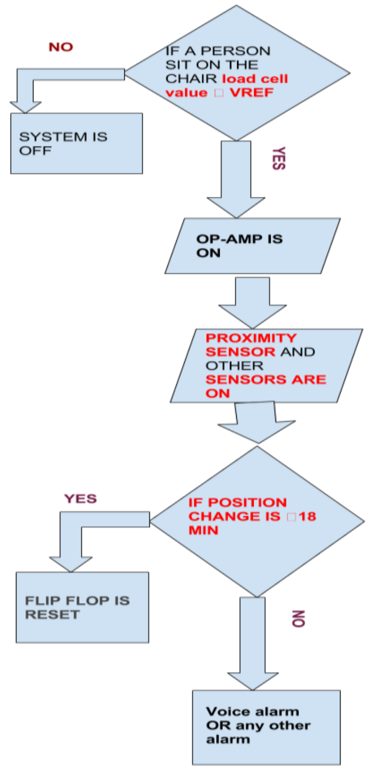

Fig.11 Detailed Flow Diagram

The following describes the basic principle in detail.

The load cell detects the presence of human .Whenever a person sits on the chair, the load cell will give an output voltage which is compared with the reference voltage by the comparator. The comparator is a device that compares two voltages or currents and outputs a digital signal indicating which of the two compared values is larger.

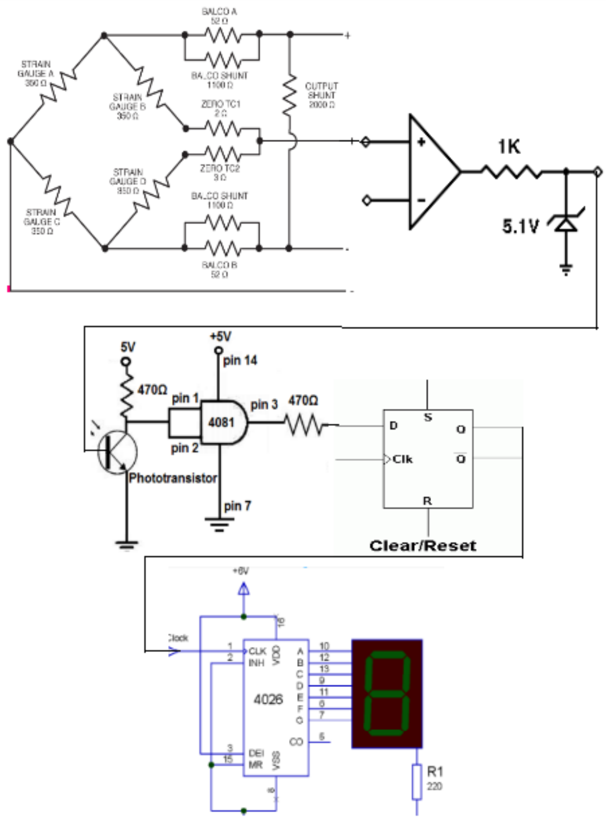

Fig.12 Circuit diagram of Posture correction chair

The strain gauge measures the deformation (strain) as a change in electrical resistance, which is a measure of the strain and hence the applied forces. Then the comparator gives an output voltage to the proximity sensor. The proximity sensor senses the position of sitting and the current posture of the seat occupant.If he/she maintains the incorrect posture for greater than 20 minutes then it will give an alert.The time limit is kept as 20 minutes since it is the time period that a person can maintain a bad posture and still not suffer from any poor posture related health issue. Time is set by the timer which gives an alert if time exceeds 20 minutes.

V. FUTURE SCOPE

People no longer have time to take care of their health and hence require frequent reminders to perform important activities. The posture correction chair can be changed and made useful in numerous areas. The posture correction chair concept can be used in a variety of situations, including:

A. Office Chairs

In offices where employees and employers must sit for lengthy periods of time, frequently in front of a computer screen, posture correction chairs can be extremely beneficial. According to surveys, most people who work at a desk have bad posture, which can contribute to posture-related disorders later in life.

B. Aeroplanes

Frequent users of long-distance plane travel have back problems. The chair can also be utilised to solve this problem at a later stage in its development.

C. Medical Domain

Longer exposure to the posture correction chair will aid in the reversal of incorrect postures and related health problems.

D. Gymnasiums

The posture correction can be integrated into a gym setting, which will raise awareness of the importance of keeping a healthy posture in addition to physical activity.

VI. RESULT

The posture correction chair project was executed after assuming a certain threshold value for distance of human body from that of the chair. It was found that there are certain points of the human spine that need to physically have contact with the chair body.The root cause for conditions like hunch back, rounded shoulders, forward head tilt etc is mainly due to lack of awareness of the seat occupant of the gradual decrease in quality of his/her posture.

Fig.13 Posture Correction chair prototype

Initially, the prototype was created using Rhinocerous (3D Model) software and 3D printed prototype.The programming and electronics were done concurrently. Following the successful deployment of the 3D model, the smart chair's mechanical model was designed.

Fig.14 3 Dimensional Design of Posture correction chair

Posture correction chair was developed with the help of

a. Programming in arduino
b. PCB Designing and fabrication using Orcad
c. Design of the chair using Rhinocerous (3D Model)

Posture correction chair was developed with the following features

a. Adjustable backrest
b. Adjustable thigh rest
c. Motor - used for the movement.
d. Alarm for alerting the user

The posture correction chair is successful in removing the problem caused due to lack of awareness of the seat occupant by providing timely reminders to the seat occupant.It was found that continued exposure to greater than 20 minutes of incorrect posture would double-fold increase the rate of attaining posture related issues.

VII. CONCLUSION

The smart chair is primarily designed for IT professionals who spend a lot of time sitting at their desk. The mechanical component is created with ergonomics in mind. Even though the smart chair is ergonomically constructed, the people who sit in it may not have the same understanding of appropriate posture. We used the electronic portion for the posture correction in the analysis. It is accomplished through the use of IR sensors and arduino programming to process the data.As a result, the smart chair for posture correction was successfully developed anthropometric data collection and analysis from the reference paper.

APPENDIX

Arduino programming code is as mentioned below:

```
int set1 = 7;
int set2 = 8;
int set3 = 9;// This is the input pin
int out1 = HIGH;
int out2 = HIGH;// HIGH MEANS NO OBSTACLE
int out3 = HIGH;
int a = 2;
int b = 3;

int c = 4;
void setup() {
pinMode(a, OUTPUT);
pinMode(b, OUTPUT);
pinMode(c, OUTPUT);
```

```
pinMode(set1, INPUT);
pinMode(set2, INPUT);
pinMode(set3, INPUT);
Serial.begin(9600);
}
void loop() {
out1 = digitalRead(set1);
out2 = digitalRead(set2);
out3 = digitalRead(set3);
if ((out1 == HIGH)&&(out2 == HIGH)&&(out3 ==HIGH))
{
Serial.println("ON POSITION");
digitalWrite(a, HIGH);
digitalWrite(b, HIGH);
digitalWrite(c, HIGH);
}
else
{
Serial.println("NOT IN POSITION");
digitalWrite(a, LOW);
digitalWrite(b, LOW);
digitalWrite(c, LOW);
}
delay(20000);
}
```

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BIOGRAPHY

Jiby Krishna K G, currently working as Senior Research and Development Engineer at Agappe Diagnostics Ltd. Graduated in Biomedical Engineering from Sahrdaya College of Engineering and Technology, Kerala, in the year 2018 and a University Rank Holder Calicut University 2014-18. Recipient of the Diamond Ring for the Best Student of the 2014-18 batch, Sahrdaya College of Engineering and Technology, from the honourable Bishop Mar Pauly Kannookadan. Also, the award winner for the Best Student of the year award for the years 2016-17, 2017-18. Best Curriculum Project Winner for the years 2014-15, 2016-17. The Project on Diabetic Foot Ulcer: Diabetic Wound Healer was the best research work exhibited during the final year. Correspondingly, the paper presentation and publication in ICCISCON Conference and published in IJAERT publication.

An active IEEE Volunteer since 2014. Recipient of the IEEE Kerala Section Outstanding Student Volunteer Award 2017-18 and IEEE Kerala Section Outstanding WiE Volunteer Award 2020-21. Currently holding the position of WiE Secretary, IEEE Kerala Section.

IEEE Kerala Young Professionals Publication Team 2020 Coordinator: Works on blogs for publishing in our esteemed site. The blogs are divided into three broad categories namely, Industry, Academia & Research. Published 18 blogs during the period Feb 2020-21.

Venus Campaign Coordinator: It is an IEEE Wie initiative since March 2020. The campaign focuses on digital empowerment of women led micro startups Currently serving 100+ entrepreneurs.

Biomed Campaign Coordinator: It is a collaborative initiative with HTSS [Healthcare Technology Systems and Services Society] since May 2020. This brings out a resourceful detail on every medical equipment which not only aims at authentic information but also focuses on upliftment of Biomedical Engineers. Currently serving 94 biomedical students.