EYIC PROPOSAL
Thyroscope

A device to detect thyroid level at home by oneself.

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1 INTRODUCTION

Due to lack of resources, the rural people, in particular most of the women are facing a lot of difficulties for their regular thyroid checkups as they cannot afford to reach the hospitals for every 2 to 3 months and severe negligence in it, is leading to goitre. This inspired us and hence in order to help them we have come up with a solution in which the thyroid suffering patient can check his/her thyroid levels in home by oneself. This product also helps the urban people (working women), as it saves a lot of their time in consulting a pathologist for every 2 to 3 months for their regular thyroid checkups. Solving this problem is very necessary because most of the women residing in rural areas avoid consulting the doctors for their thyroid checkups as they cannot afford to pay or travel every time to the laboratories located at the outskirts of the town for every 3-4 months. This negligence may lead to goitre in future.

2 MARKET RESEARCH

About 32 of the Indian population is suffering from Thyroid diseases according to the 2014-2016 survey. Every third Indian suffers from a Thyroid disorder in which North India recorded the maximum cases of hypothyroidism. Recent study in Cochin, Hyperthyroidism was present in 1.6percent and 1.3percent of subjects participating in a community survey. More than a third community detected hyperthyroidism cases have positive TPO antibodies and about 32percent of these have goitre. In women, the prevalence was higher at 11.4percent when compared with men, in whom the prevalence was 6.2percent.

3 SURVEY

As per our survey most of the women are suffering from thyroid disorder village as well as urban people are victims of this disorder and the problems faced by both of them are common. Here are some of the information about the problem faced by them.

1)SULOCHANA B of age 35 years from a small village suffering from thyroid disorder shares us that she faces a lot of problems to get her regular thyroid check-ups as the transportation facility is not in a good manner in her village i.e., buses are not in time, hence to reach thyroid center which is located at the outskirts of the city and getting the thyroid level checked takes her almost a day.

2) MAMATA GANGOJI of age 47 is another thyroid victim who share about the problems she faced to get her thyroid check-ups being in a city itself. For her time is the only constraints as the reports won't get immediately, it takes a day and sometimes the doctor is very often available.

4 PRODUCT BRIEF

The technology used in our product is ELFA (Enzyme - Linked Fluorescence Assay). To modify or reduce the thyroid machine which is used to detect the thyroid levels for 30 samples to a portable device which detects the thyroid levels for only one sample so that it is easy for every individual to carry his own tests to check his thyroid levels at home without any need of visiting the laboratories for his regular checkups. The uniqueness of this product is that the person can check his thyroid levels any time in his home according to his convenience. It is user friendly, cost efficient and also time efficient. There is need for our product because the traditional methods are time consuming and include manual interferences. Hence our device is very portable, cost efficient and time efficient which helps the people to check their thyroid levels on their own and later consult the doctor accordingly.

5 COMPONENTS:

5.1 HARDWARE

1)8051 microcontroller (to control the strip movement and to control stepper motor)

2)stepper Motor (to rotate at 3000 -4000 rpm)

3)laser diode (to pass through various chemical reaction)

4)IR receiver (to detect the enzymes and calculate the results)

5)voltage amplifier

5.2 SOFTWARE

1)assembly language

6 BLOCK DIAGRAM

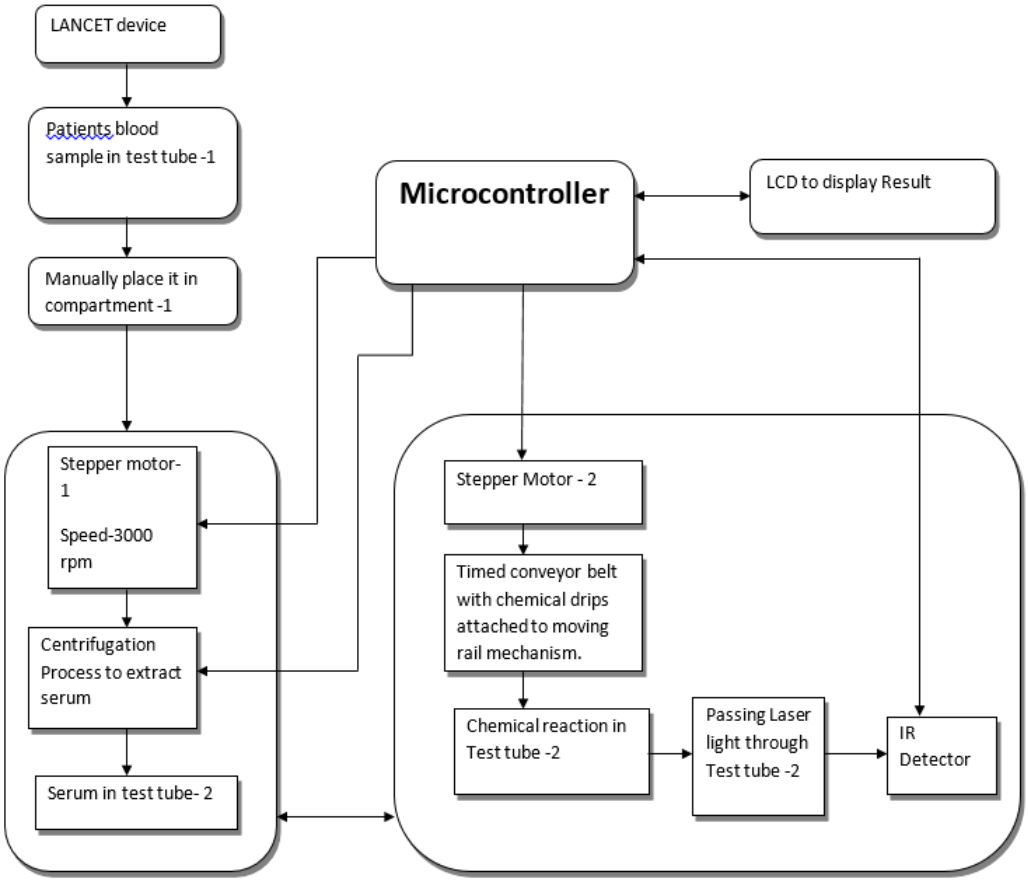

Figure 1: Blockdiagram implementation

7 IMPLEMENTATION

This device works on the ELFA (Enzyme fluorescent assay) principle and immune concentration technology. In this device a certain amount of blood samples is been taken from the user and placed in a test tube. This test tube is connected to a motor which rotates at 3000-4000 rpm. After, the revolution of the test tube for a certain period of time the serum of the blood which is the main component for the detection of thyroid gets separated on the upper part of the test tube. This serum is automatically taken and placed into another test tube which is connected to a belt attached between two motors. A strip of certain chemicals is placed right under the test tube containing serum, This belt linearly moves as per the timing given to it. The serum contained in the test tube reacts with the chemicals present in the strips. Certain amount of chemical reaction occurs inside the test tube. Finally, after the chemical reaction a laser light of certain nanometer is passed through the final solution and is received by the IR receiver/detector. According to the ions present in it a fixed value i.e., with the help of digital meter a fixed value is calculated and shown on the display attached at the outside of the device. Hence this is the working of the device. This device does this for only one sample at one time.

8 IMPACT OF THE PROPOSED IDEA

The impact of our proposed solution on the customer is that the result obtained does not involve any manual interference, overall process is also not time consuming and hence by using this product the user can check / regulate their thyroid level at home by oneself.