Patient Food Intake Monitoring System Using Mems Sensor

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ABSTRACT-

As of late patients are to be checked from multiple points of view for the improvement of their wellbeing. This task proposes another system for observing the food admission of the patients. This venture utilizes a wearable MEMs sensor which is an acoustic sensor to perceive the food type ie .,either fluid or strong. The framework is essentially made out of two sections: (I) Embedded Hardware System and (ii) Smart telephone application. The throat amplifier resembles acoustic sensors to get great sound signs of eating practices. The information are then sent through Bluetooth to an advanced cell, where food types are perceived.

This is an application which totals food acknowledgment results as well as gives the data in an easy to use way.

I. INTRODUCTION

Presently a days, patient food admission observing is a vital advance since the patient can't handle their food propensities even in emergency unit. A significant advance to tackle the issues is to screen the every day food admission of a patient correctly and helpfully. For this reason, we presenta wearable framework to screen and perceive food admissions in every day life.

An embedded hardware model is created to gather food consumption sensor information, which is featured by a MEMs sensor worn regarding the matter's neck to exactly record acoustic signs during eating in a noninvasive way. The acousticdata are preprocessed and afterward shipped off a cell phone by means of Bluetooth, where food types are perceived.

To screen the food admission of the patient, a MEMs sensor is utilized to get vibration signs of the throat .These vibration signals are changed over into acoustic signs in the MEMs sensor itself. These vibration signals are contrasted and the predefined values that are put away in the recollections, with the assistance of Micro regulator and the outcomes are

shown through LCD. These qualities are shipped off the cell phone application through Bluetooth.

Inorder to separate the fluid and strong, information base has been made by setting the sensors for individuals for different age gatherings. From the outcomes acquired from MEMs sensor, a limit esteem has been set from which we can separate the fluid and strong food sources.

The primary target of the current technique is to explore the standards of conduct of food utilization and delivering volumetric and weight evaluations of energy consumption. The observing is directed by a sound sensor situated over laryngopharynx and by a bone conduction receiver distinguishing biting through a beneath the-ear strain sensor.Amft introduced an acoustic ear-cushion sensor gadget to catch air-led vibrations of food biting.
To perceive the food types, Amft got ghastly highlights from all consistent biting sounds, then, at that point found the middle value of these highlights utilizing numerous sliding windows. A blend of a Fisher discriminant filter and a guileless Bayes classifier was utilized to perform include decrease and food classification separately.

A Throat mouthpiece is worn regarding the matter's neck to decisively record acoustic signs during eating in a noninvasive way. The acoustic information are preprocessed and afterward shipped off a cell phone through Bluetooth, where food types are perceived. Specifically, covered up Markov models were utilized to distinguish biting or gulping occasions, which are then prepared to separate their time/recurrence area and nonlinear highlights. A lightweight choice tree-based calculation is embraced to perceive the kind of food. An application on the cell phone, which totals the food admission acknowledgment brings about an easy to use way was created and gives ideas on better eating, for example, better dietary patterns or nourishment balance.

II. RELATED WORK

Edward S.Sazonov et al presents a goal to the most encouraging strategies for computerized food admission checking utilizing piezoelectric swallow detecting through a

brilliant neckband which screens vibrations in the neck. It utilizes Support Vector Machine (SVM) and wearable ear cushion sensor to recognize food admission.

Sebastian Pabler et al proposed a strategy for non-obtrusive checking of human food consumption conduct and long haul dietary convention has been created by the sole utilization of biting and gulping sound sensors. An epic sensor framework has been constructed containing an in-ear amplifier and a reference receiver incorporated in a listening device case to record biting and gulping sounds in the ear trench and ecological clamor, individually. Correlation between sounds from the two amplifiers empowers the separation among inner and outside sounds.

Costas Sideris et al presents a target examination of two of the most encouraging strategies for advanced dietary admission observing: piezoelectric swallow detecting through a keen accessory which screens vibrations in the neck, and sound based identification utilizing a throat receiver.

Wenyao Xu et al presents anAuto Dietary, a wearable framework to screen and perceive food admissions in every day life. An embedded hardware model is created to gather food admission sensor information, which is featured by a high fidelity amplifier worn regarding the matter's neck to decisively record acoustic signs during eating in a noninvasive way.

III. SYSTEM IMPLEMENTATION

The Proposed framework is principally made out of two sections: (I) Embedded Hardware System and (ii) Smart telephone application. The MEMs sensor resembles acoustic sensors to get top notch sound signs of eating practices. These acoustic signs are intensified utilizing an IC 741 speaker.

Tomahawks of Acceleration Sensitivityvalues of the sign are taken. The qualities are contrasted and the predefined information that are put away in the memory .Then the information are examined and kind of the food is recognized.Then the information are sent by means of Bluetooth to an advanced cell for cautioning the specialists in regards to the patient's food consumption.

This framework enjoys a few benefits. This application totals food acknowledgment results as well as gives the data in an easy to understand way. Patients can be encouraged to better dietary patterns from the messages got by specialist. It will be utilized to screen the day by day food admission of the

patient by the specialist through the cell phone application.
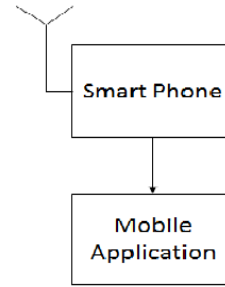
Figure 1 Block Diagram of Transmission and receiving section of Circuit Diagram
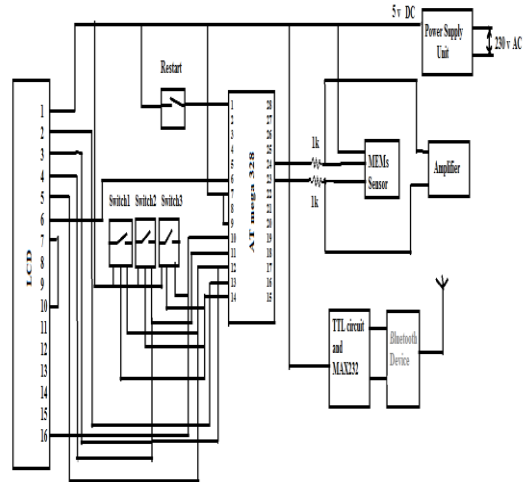
Figure 2 Hardware implementation

The Figure 4.2 displayed above clarifies the circuit chart of the proposed framework.

In this undertaking the attmega 328 microcontroller is utilized and with is interconnected with MEMS sensor utilizing pin 23, 24. The MEMS sensor is associated utilizing a speaker for boosting the beat signal got by the sensor. A Bluetooth handset is utilized from sensd the information to the client to the cell phone an android application is made to get the information which was than by the MEMS sensor.

A. ATMEGA 328

ATmega328 is a 8-digit and 28 Pins AVR Microcontroller, made by Microchip, follows RISC Architecure and has a glimmer type program memory of 32KB. It's anything but an EEPROM memory of 1KB and its SRAM memory is of 2KB. It has 8 Pin for ADC activities, which all consolidates to frame PortA(PA0 – PA7). It likewise has 3 builtin Timers, two of them are 8 Bit clocks while the third one is 16-Bit

Timer. You more likely than not knew about Arduino UNO, UNO depends on atmega328 Microcontroller. It's UNO's heart. It works going from 3.3V to 5.5V yet ordinarily we utilize 5V as a norm. Its amazing highlights incorporate the expense effectiveness, low force dissemination, programming lock for security purposes, and genuine clock counter with independent oscillator. It's regularly utilized in Embedded Systems applications.

Atmega328 pin out:

Through pinout graph we can comprehend the setups of the pins of any electronic gadget, so you are chipping away at any Engineering Project then you should initially peruse the parts' pinout.

• Functions related with the pins should be known to utilize the gadget properly.

• ATmega-328 pins are separated into various ports which are given exhaustively beneath.

• VCC is an advanced voltage supply.

• AVCC is a stockpile voltage pin for simple to advanced converter.

• GND means Ground and it's anything but a 0V.

• Port A comprises of the pins from PA0 to PA7. These pins fill in as simple contribution to simple to computerized converters. In the event that simple to advanced converter isn't utilized, port A goes about as an eight (8) bit bidirectional info/yield port.

• Port B comprises of the pins from PB0 to PB7. This port is a 8 cycle bidirectional port having an inner draw up resistor.

• Port C comprises of the pins from PC0 to PC7. The yield cushions of port C has balanced drive attributes with source capacity also high sink.

• Port D comprises of the pins from PD0 to PD7. It's anything but a 8 digit input/yield port having an inner draw up resistor.


Fig. 3 Atmega328-Pinout

B. BLUETOOTH

Bluetooth innovation is an innovation that empowers short reach remote among work area and scratch pad, PCs, handhelds, individual advanced aides, cell phones, camera telephones, printers, computerized cameras, headsets, consoles and surprisingly a PC mouse. Bluetooth is a radio recurrence standard. Bluetooth advancements UN fittings your computerized peripherals and makes link mess a relic of past times. Bluetooth imparts on a recurrence of 2.45 GHz.

C. POWER SUPPLY

The square graph of AC to DC power supply comprises of a Transformer which assists with venturing the family line voltage up or down as we require. The rectifier is utilized to change over the AC voltage into DC voltage. The channel is utilized to smoothen the throbbing DC voltage to a differing DC voltage.

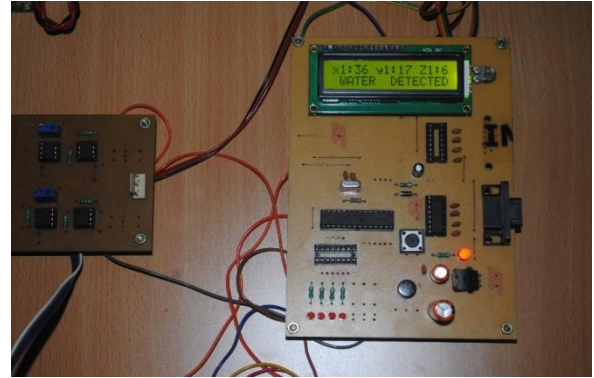This Figure 4.9 shows the square graph for the force supply.
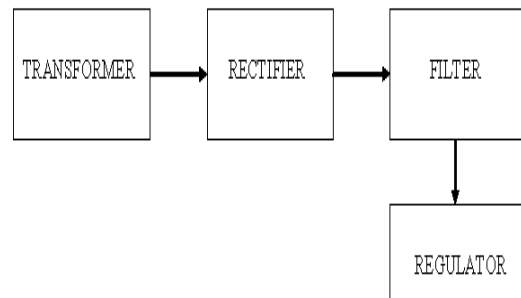
Figure 4 Block diagram for power supply

IV. RESULT AND DISCUSSION

The information's are assumed the premise old enough and we have gathered information for 200persons completely. Every information differ as per the way of eating and furthermore relies upon their dietary patterns. The accompanying Table 5.1 comprises of number of information that we have taken for different age bunch people groups.

Table 1 Database Details

S.NO	AGE GROUPS	No. of PERSONS
1	19-30	110
2	30-50	43
3	50-72	47
	TOTAL	200

(a)

(b)

Figure 5 (a) Data collected for liquids (b) Data collected for solids

Figure 6 The AT mega 328 Interfacing Board

Figure 7 Interfacing of Amplifier and LCD
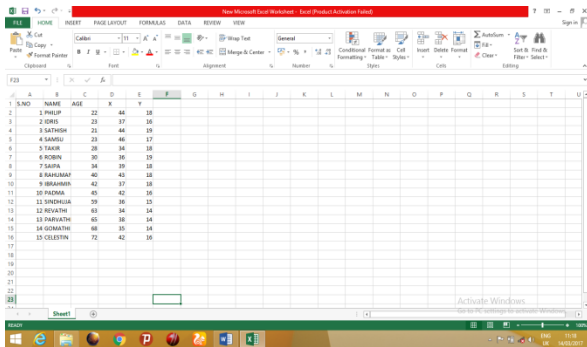
SMART PHONE APPLICATION

It shows the patient number, date, and season of recognition and furthermore shows the kind of food identified (i.e.) fluid or strong.
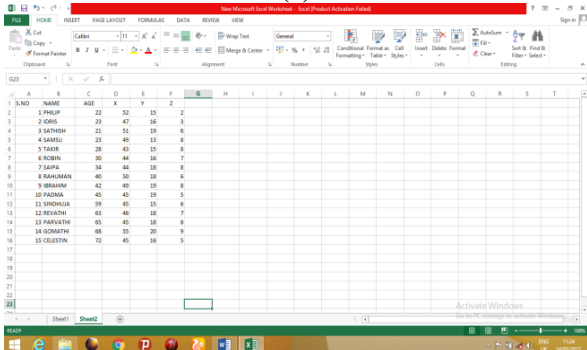
Details

• 512MB RAM and Greater RAM.

• Android portable

• Bluetooth 2.0
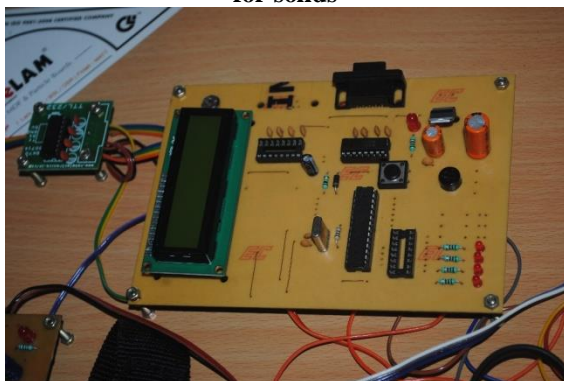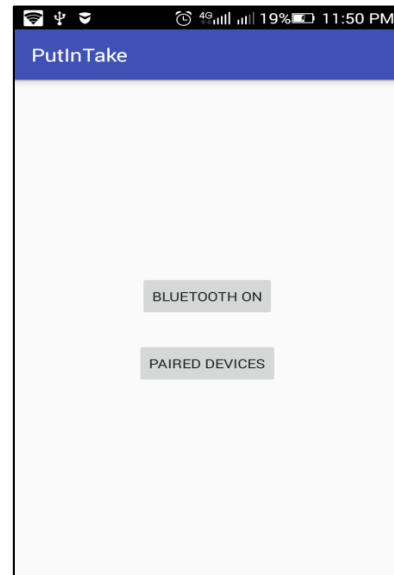
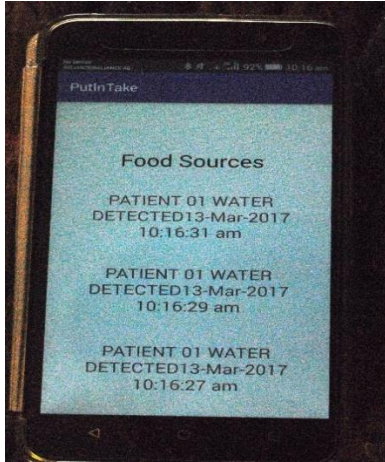Instruments utilized

• Android Studio

Figure 8 Smartphone application

Confusion Matrix

To figure the precision of the proposed framework disarray grid is used.Table 5.2 shows the disarray lattice for the observing framework.

Table 5.2 Confusion matrix for monitoring system

Predicted			
Liquid		Solid	
Actual	Liquid	A	B
	Solid	C	D

V. CONCLUSION

This undertaking can be utilized in clinical or physiotherapy concentrates with extraordinary interests in food admission conduct. For instance, in diet control for diabetes patients, absolutely checking day by day food admission and subsequently give appropriate eating ideas can be exceptionally useful to mitigate the illness by definitely recognizing awful dietary patterns and proposing great ones.It can assist with diminishing gut issues because of inappropriate biting and gulping speed. Furthermore, it tends to be particularly valuable for incapacitated and debilitated individuals, for whom every day food consumption observing that includes an excessive amount of human mediation isn't practical.The project has been checked with both programming and hardware testing devices. As of now, the kind of the food (both strong and fluid) is checked and results are confirmed. This task in not so distant future can be reached out by figuring the calorie admission of the patient and same can be applied to diminish heftiness related sicknesses.

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