INTELLIGENT JUICE EXTRACTOR

Deepti Patne
Department of Instrumentation Engineering
Vidyavardhini's College of engineering and Technology
Vasai ,India
deepti.patne@vcet.edu.in

Sonali Surve
NM Technocrafts
Kandivali,India
sonalisurve252@gmail.com

Akshay Tarade
Sikraft
Nallasopara,India
akshaytarade980@gmail.com

Saurav Majgaonkar
NM Technocrafts
Virar,India
Saurau05@gmail.com

Yojitvanshikumar Shelar
Vidyavardhini's College of engineering and Technology
Borivali,India
yojitshelar02@gmail.comom

ABSTRACT

Fruit Juice is one of the most preferred drinks in the world. Fresh fruit juice is full of nutrition and active to people health. But even if drinking them is refreshing, making them isn't. Many times, while making the juice we have to stay beside the machines and choose right amount of ingredients and wait for juice to get ready. Due to this most of the times the quality of the juice degrades and time is also wasted. Therefore, a fully automated and intelligent juicer prototype is to be built with the help of **Arduino Microcontroller**. All the steps of making a juice will be achieved automatically. The fruit will be added to the mixing jar; accordingly, the milk/water and sugar will be added to the jar. After mixing operation is done the ready juice will be automatically poured into the glass. Once the juice is taken out of the jar, with the option of CIP (Clean In Place) mixing jar will be cleaned with the water and machine gets ready for its next operation. With above Instrumentation, it'll minimize human efforts and juice will be prepared by giving just few instructions to the machine.

Keywords—

Clean in process ,health, Arduino, Juicer

INTRODUCTION

Juice is a drink made by extracting the natural liquid contained in fruits and vegetables. Juices are often consumed because of their health features. Even though there are many benefits of juicing, there are also some negative effects if you don't do it properly. Drinking too much of the flavorful juice can cause problems for those who need to control their blood sugar (i.e. diabetic patients). Sugar from natural fruits are released into the blood stream quickly and this can cause instant rise in a person's blood sugar level[1]

In today's world, main task of the engineers is to apply their scientific knowledge in the solution of technical problems and then to optimize that solution within the given material, technological and economical constraints. A juicer grinder is one

of the important components in one's kitchen. Electrical appliances have taken over the hand handled devices that were used in traditional kitchens[1]. The arrival of modern technology and it's use in the modern-day juicer is not only convenient but also retains the nutritional quality of the juice and fiber that are very essential for the betterment of human body. We have designed an Automatic Juicer that will prepare juice by giving just few instructions to it.

As long as we know how to do juicing and not overdo it, we will receive the benefits for a lifetime. Since it is a very healthy habits to incorporate into our lifestyle.
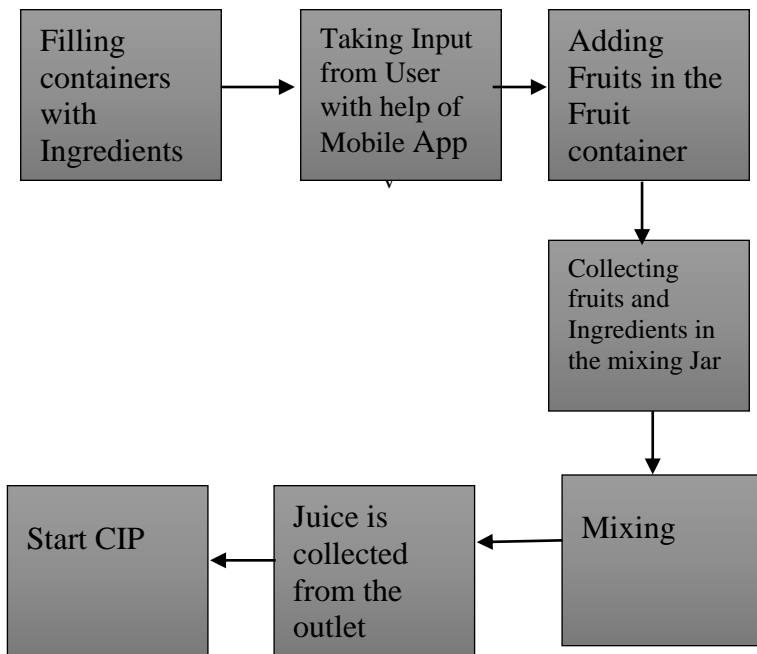
I. THE PROCESS

Fig. 1.1: Block Diagram

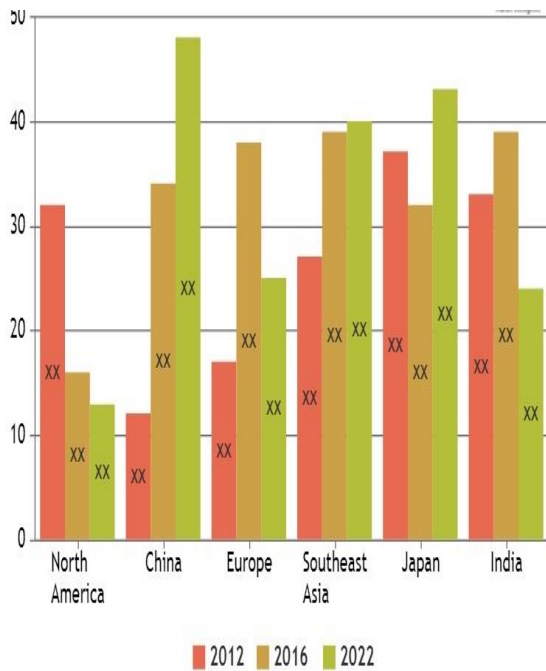Ingredients which are common to all the juices (e.g. water, milk, sugar) will be added to the respective containers previously. User will select a juice with help of the Mobile app TAJ. According to the input given by the user, the fruits will be taken into the respective container. According to the weight of fruits added fruits and all the other ingredients will be added into the mixing jar by predefined ratio with help of solenoid valves. The lid of mixing jar will be automatically closed and the mixing process will take place with help of a DC motor. Once the mixing process is done, the ready juice will be filtered and taken out from an outlet. After all the juice is taken out of the jar, CIP will take place. Th e whole mixing jar will be cleaned with water and the waste water will be taken out. Once the CIP is done, the juicer will be ready to make a new juice. All of these processes will be controlled by Arduino UNO.

Automatic Juicer:

Concept of Automatic Juicer is already there in market. Currently in India 20,000 tons of juices are produced every year and its production increases by 12% every year. These juices are prepared using huge machines which are bulky and not economical for common people[1][5].

Also, the growing trends of fitness and keeping oneself healthy is driving the juice business in India. Over last five years, the country has seen juice bars and juice cafes opening in India.

The Juice market for 2012-2022 by regions is given below in graph.

Fig1.2:Juice market (2012-2022)

Fig 1.3:Schematic diagram of intelligent juicer

The automatic juicer is great step towards Home Automation, it will help to overcome tedious job of picking right quantity of fruits/vegetables ,milk as well as cleaning process etc. The machine will also assure the test by programming right quantity of food materials[3]. This machine will going to save time energy and human efforts .The juicer performance not going to affect even though quantity increases. This is very good user friendly device as it can be also operated by mobile. The use of Arduino Uno board helping it to get connect with mobile systems.

As shown in Fig1.3 sugar,fruit,water and milk are kept at the top of system. Food pipes are connected to mixer .As soon as mobile instructions for user choice juices are given to mixer via Arduino board,

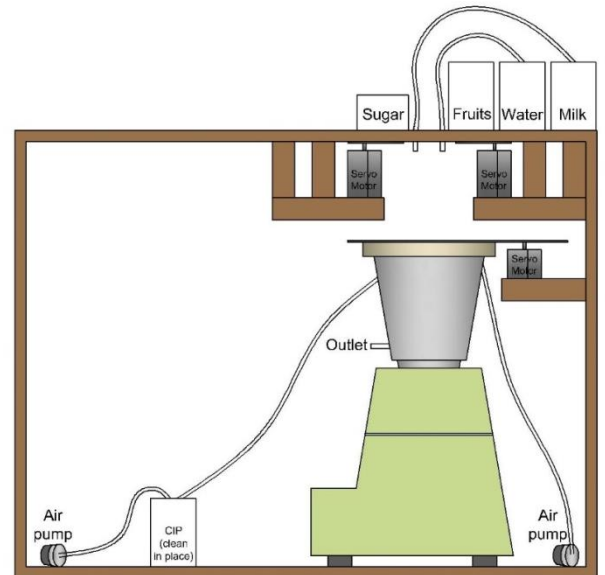right amount of food quantity is pour into the juicer via food pipes. Juicer motor operating at 700 watt starts its operation[2][3]. Centrifugal juicer with high quantity blades for faster cutting helps to finish the juicing process at the earliest. Separate outlet tab helping to collect the juice[6].

Clean In Process:

This is a unique feature added in the system. In a normal Automatic Juicer Processor this feature is missing .The main aim behind adding this feature as it will help to make juice of varies veggies and fruits continuously with getting affect with previous test.Every time fresh test juicer can be served .It is possible with Clean In Process. After juice is collected from outlet tab Clean In Process will start. For fraction of seconds (time period as programmed in Arduino)water is jetted inside Juicer pot .Juicer will again operate with its speed helping it to clean the device. Then water is taken

out. The juicer is now ready for next set of juicing operation. This process will not let you take out the mixing Jar and clean it and hectic of properly assembling it on right place.

ARDUINO UNO

Specifications: SOURCE	CONFIGURATION
Operating Voltage	5V
Input Voltage (recommended)	7-12V
Input Voltage (limit)	6-20V
Digital I/O Pins	14(of which 6 provide PWM output)
PWM Digital I/O pins	6
Analog Input pins	6
DC Current per I/O Pin	20mA
DC Current for 3.3V pin	50mA
Flash Memory	32KB of which 0.5KB used for boot loader
SRAM	2KB
EEPROM	1KB
Clock Speed	16MHz
LED_BULTIN	13
Length	68.6mm
Width	53.4mm
Weight	25g

Conclusion:

Making a juice manually is a tedious job[1]. Making juice manually can also reduce the quality and healthiness of the juice. Through this project we are trying to minimize this problem to some extent. This project will help people by saving their time and money. It will also provide them a healthy and refreshing juice with less human efforts. By means of this project we intend to simplify the juicing process at domestic as well as business level with the help of Arduino kit and other components. This will take the overall juicing experience to a whole different level. The Project successfully satiated the objective of minimizing the Human Intervention in a trivial job of making Fruit Juice. Different fruits like apple, Watermelon, banana, orange, etc. can be juiced. This process can be controlled through an android app "T.A.J" from android phone. Cleaning of the mixing jar is done by CIP.

Future Scope:
The scope of the project further enhanced as described below:
1. More compact less weight design
2. Basic cutting can be incorporated for easy and fast juicing process.
3. Clean in process can be possible with better solution along with water.
4. Air jetting inside can also help the clean in process.

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