Topic Name

Kitchen Automation System

Final Year Project

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Project guide

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Abstract

A trip to the store to stock-up your food supplies is a very annoying task which most people want to avoid. While at the store you begin to wonder what else you might need
so you can avoid another trip tomorrow. Could you running out of cereals or eggs or vegetables or sauces ? This becomes difficult as no human can precisely remember the
current state of the pantry. So to make our life comfortable, we would introduce Personal
Task Assistant (PTA) for kitchen automation. The system is intended to automatically maintain inventory status of kitchen food stuffs for the purpose of updating the user shopping list. A variety of system configurations were investigated ranging from an active system with micro-controller based kitchen containers, instrumented with sensors
to passive systems with only identification tagging on the containers. A base station provides network connectivity if the application warrants. This is an exploratory project
in PTA that is examining both devices and user interfaces for personal augmentation systems that can assist in such tasks as automatically maintaining kitchen food stuffs inventory and integrating it with a shopping list application. Through sensorized kitchen
containers and various mnemonic methods, the system majors the fill status of the containers and maintains a distributed database that is uploaded to a personal device
which is network connected and user aware. This is an example of symbiotic robotic systems- systems that enable greater human assistance without achieving full scale autonomy.

Introduction

The food services, may it be at home or industrial food chains has always been a labour intensive task. Throughout the centuries, operators and inventors work to challenge the paradigm. Over the time, introduction of high-end tools and technologies like electronic sensors and controls were boosting production speed and defeciency in kitchens. Automation is about more than reducing head count and efforts. It is primarily also about increasing efficiency, maintaining product consistency, improving throughput, smaller kitchen footprints, automating repetitive processes, maintaining a higher product flow. We would also like to point out that automation can also lead to a safer working environment with less potential burns or repetitive stress injuries. Today's automation push complements efforts over the past decade to make kitchens more efficient. More computerization, more self directed controls, more graphical user interfaces to avoid language barrier issues may not seem like automation issues, but anything that speeds up the process, makes training easier, makes equipment easier to use and maintain is an element of automation. We thus intend to propose advancements in kitchen working environment for a comfortable human life.

Objectives

The project has a wide scope in daily as well as in our professional lives. The machine reduces the quantity of labour. This machine will perform it's functions with hygiene.

1) To reduce manpower by automated design
2) This automation will give various types of menus in single person i.e a single person can handle multiple machines.
3) By implementing automation we can be able to reduce wastage of food when this model will be implemented in large industries. It is best to avoid the accidents which were happened during large scale production in food industry.
4) In this automated kitchen system we can order ingredients or recipe for long term and no. of chefs are able to save one or more type of recipe or ingredients in different ways.
5) As per quantity of people we can reduce or increase the quantity to avoid wastage of food.

Literature Review

Originally, The idea was to implement a smart home system or home automation system but as we all know kitchen has the most important and the most hectic work at home so the automation of kitchen appliances and everyday products used in them would be more reliable and efficient.
The technology stack used in this was chosen by taking into consideration that the cost of the whole system should be minimum and affordable to everyone. The idea of Egg tray automation can be implemented using image processing as well but to make it efficient and reduce the cost, Image processing was replaced by weight sensors so when eggs are less and it's weight is less than a given threshold weight the mechanism will take place. For gas automation, the right type of hardware was needed to be found as it has to deal with an extremely high temperature and the hardware should have the capacity to sustain that amount of heat so IR based temperature sensors are used.

This project can also be further extended to automation of various other kitchen appliances like refrigerators, mixer grinders etc.

Problem Definition

The goal of this project is to successfully configure & implement Kitchen Automation system in all the appliances and other day to day useful items to reduce human labour and attain safety from tasks that are risky to be done by humans.

The user must successfully be able to interact with the system using his smart phone so an application must be built for the communication between the user and the automation system.

There must be constant updating of data and user must be notified every time a certain small level goal is achieved.

Scope

The kitchen is the heart of the house. The demand for automated kitchens is growing particularly for branded quality products. As the demand for apartments grows and lifestyles change, style, convenience and efficient use of space drives the demand for prefabricated kitchens. A modular kitchen is no longer just about maximising use of a small space, it has also become about maximising comfort for the users for our generation trying to keep up with their hectic life and schedules.
The ability to supplement or replace human labour with automated solutions is fast becoming a lifeline for the upcoming future. These solutions would help a lot of people who already struggle to cope up with the fast moving life making just about simple tasks like stocking food pantry easier and convenient for them. Future homes will be able to offer almost all required services, e.g, Communication, Medical, Energy, Utility, Entertainment and security. As we move into the next generation more and more devices will begin to connect to one another. The dream is a future in which data is communicated between devices and humans without relying on manual input of individual bytes. Computers can automatically mine data and then use that data to change aspects of the home environment is the future. These are all goals that the engineers are working towards and pert is the next generation home automation innovation, that let's you control, monitor and secure your home with your smart phone. As technologies continue to advance, you can expect the house of tomorrow to be even more automated than that of today.

Technology Stack

1)Node MCU (acting as central processing unit)

2) IR Temprature Sensor
Weight sensors of different ranges
Sound Sensor

3)Rotor mechanism to control Gas

4)User Interface for controlling Automation System (Android/iOS application operable on mobile devices)

Benefits for environment

Besides supporting quick refilling , Kitchen automation also has a large effect on environment. Measuring this impact isn't straight forward and simple.Many emerging technologies offer the potential to reduce emissions. They could also theoretically improve resource-use efficiency, provided increased efficiency does not trigger over-consumption.

Benefits for society

1) Savings : Saves energy, Cutting utility costs over time. Prevent exorbitant bills. Certain devices even offer rebates. Precise updated home instance scenario.

2) Safety : Many home automation technologies prevent accidents like fires, fall injuries, appropriate light and temperature controls, accurate handling of food stuffs.

3) Convenience : Because home automation technologies performs rote tasks automatically, end users experience great convenience. Lots of smart gadgets are compatible with one another, and you can set different triggers between devices to automate regular home processes.

4) Control : Consumers also choose smart home devices to better control functions within the home. With home automation technology, you can know what's happening inside your homes at all times.

5) Comfort : Connected devices can also help create a comfortable atmosphere. They provide intelligent and adaptive environment which proves to be very inviting in nature.

6) Peace of Mind : Finally many consumers invest in home automation technologies for peace of mind. They help us to know what is going on at our house at all times and at any place and provides us with its control from anywhere. This gives us the satisfaction of our house's well being.

Applications

After learning in brief about what automation system is and how helpful it is, let's have a look at some of the home automation products.

1)Put off the Bathroom Fan Automatically

We all have a tendency to leave the bathroom fans on. Also many a times we forget to put it off which consist us a lot of electricity wastage. Now if you have a home automation system you can probably set a timer inside the bathroom that will automatically stop the fan at the set time. This way the fan will go off even if you forget to put it off manually. If you are worried that the fan will go off when a person is inside the bathroom then you can fix a motion detector too so that the fan does not go off when there is motion inside the room.

2) Turn Your Webcam into a Security Camera

Instead of installing a surveillance camera you can always use the webcam for keeping track on your children as it can successfully perform the activity of taking note of all activities. Also it is cheap and very minute and the activities can be checked with the help of the internet.

3) Install a Wireless Intercom

You are busy eating your food and suddenly you see the vegetables are over. You call out to your spouse to give you some who is busy in some work. You have to scream at the top of your voice which is very embarrassing. Instead of shouting you could simply attach a wireless intercom and call out to her and ask her for the vegetable. In this way you can save your energy and time too.

4) Capture Party Moments without using your Digital Camera or DSLR

The best way to capture party moments without your DSL would be with the help of a webcam. Set the time and let it go on capturing videos and images. There are software's available for windows. The software helps in saving the captured pictures as JPEG files. In that case you no more need to worry to take your camera along if you have a webcam with you.

5) Use Automatic Sprinklers to Water your Garden

You can make your own DIY automatic sprinkler that will reduce your effort of dragging the sprinklers out in the garden. Again you can set a time so that the sprinkler automatically sprinkles water in the yard at the set time.Now that you know what a home automation system can do and how it can make your life easy, make sure you install one soon at your home as I am sure you are thrilled about the system after reading its works.