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Smart Vessel Holder for Liquid Boiling

Rahul Dilip Bhivare*

ABSTRACT

The number of intelligent systems is significantly increasing and in the near future thousands of smart systems will be present everywhere even in daily life. Cooking support is one of the hot topics for this purpose, which can be used for smart appliances, Quality Of Life support etc. Thus discover a new approach as smart vessel for monitoring and controlling liquid boiling, a liquid sensor mounton stainless steel mess appliance enclosure, the assumed sensor is connected to the input of an electronic signal conditioning circuit. The liquid sensor measures the change of temperature and predict the time. As a output ring the alarm before two minutes . The proposed system developed here is a modelcook support system and conducted preliminary experiment on the same. The accuracy of the temperature sensor is necessary to improve the consistency of experiment.

***Index Terms*:** Microcontroller, smart cooking and temperature sensor,

1. INTRODUCTION

There are many tools make human task get easier. Cooking has become a basic necessity for human beings, since liquid (or milk) boiling is one of basic human needs. Until now, the cooking utensils being used is still a hand tool. However everyone has to some extent high activity. The existence of cooking tools that can do the cooking work by itself is now necessary. Upcoming smart cooking machine is an simulated intellect machine that can do cooking work automatically. With this structure design, the time is minimized and the simplicity of work is expected to be achieved.

In currentstate of affairs life has become very fast and everybody wants to atomize his day after day working to stay away from tension and get himself exciting in some fruitful work. For example, take up a process of boiling of milk in kitchens it is a daily routine and a simple work, but due to busy life the person forgets to switch off Gas when milk has boiled which results in overflow of milk, choking of gas burners[1]. And of course gas flame quench due to over flow of milk but supply of gas is still open and hence chances of accident are there and also loss of expensive fuel. This in turn makes a simple work of boiling of milk into a tiresome job. The process of hardly 15 min turns up into a good job of half hour or 45 min. And in our very tight schedule people cannot afford to lose time, Hence the invention mentioned here under is a step forward in atomization of a everyday routine work like boiling of milk and hence saving time and routing tension so that our valuable time is save in monitoring boiling of milk till the whole process completes and hence saving of precious time[2].

To make such functions user friendly, the contents and the pace of the demonstration of the advices should be adjusted to user's level of cooking skill, personality, reason for using the system, and the other factors.

The organization of the paper as first section describes in brief introduction of the system. In section II reviews the literature survey. Section III study the framework of the smart vessel holder for liquid boiling. In section IV presents the experimental setup and algorithm of the proposed system. And the paper concluded in section V.

* Asst. Professor, Dr. D.Y. Patil School of Engineering, Lohegaon, Pune, *Email: rahul.bhivare@gmail.com*

2. LITERATURE REVIEW

There is partial research in the literature about thoroughly recognize cookery specific functional needs of people. Cooking support system corresponding to users' situated actions have been consider in HCI(Human-Computer Interaction) context since nobody is able to cook by going ahead with intended procedures. Bradbury et al [3] designed an interactive cookbook supporting situatedprocedures using eye-tracking and speech identification technology. Olivier et al [4] realized a situated training system by integrating projection systems, RFID, accelerometers, and under-floor pressure sensing technologies. Hamada et al [5] intended a cooking assistant system enabling users to cook several menus at the same time, recognizing the procedure and managing/keeping the time. Cooking training systems based on new digital platform such as iPhone or Nintendo DS have already become general place [6]. Vita Craft unrestrictedan automatic temperature control cooking pan that works with a special IH cooking heater in Japan [7]. Think Geekalso unconfined a temperature sensor embedded frying pan[8]. To cook quickly, smartly, and delightfully like professional, one has tolearner for years which may be as complicated as training to become champion athletes.But in this conservativesystem major drawbacks are:

- Use of special type of expensive utensils.
- Water to be filled between bi-layer of pot as medium at every use .
- Special utensil had less life due to scaling and corrosion
- effect inside the wall of utensil.
- Cannot identify accurate boiling point of the pot, it can vary on conditions .
- Quantity used in the applied pot is fixed, user can not change the quantity of milk .

As long as situated suggestions by real-time sense and giving feedback, our system embeds the sensors connected with thevessel which is used for liquid boiling. The combination of the vessel, seven segment display and temperature sensor provide a new user experience that enableusers to enjoy daily milk boiling with trials and errors rather than expertise-improving or automation-cooking.

3. PROPOSED SYSTEMS

Developing the smart vessel holder for liquid boiling system challenge us to propose processor artifact to be used in an tremendoussituation, the kitchen that is always coupled with water and fire. Movingtowards Ubiquitous Computing environments, HCI design is required to settle with usages in uncertain but exciting daily life.

Smart vessel holder for liquid boiling system guides users to control the fire and cook consecutively with the instructionsvia sound, light, vibration, projection of the smart vessel, and also the monitor 7-segment display. Users checkpresent temperature and follow the instructions projected on the smart vesselas shown in figure 1. The system analyze the embedded motion-sensor's degree of angle, recognize the vessel's temperature condition, and provides text instructions on the display with perceptible alert.

1. Input knob for liquid select: This knob is used to select type of liquid used for boiling or heating purpose. At present it supports water, milk and vegetable oil.
2. Temperature sensor: Important resource of the system. It updates the temperature for every of the liquid on every a second / update rate can also be programmed. Temperature sensor works for the resolution of 0.5 degree centigrade.
3. Microcontroller: The 8 bit Microcontroller is used in the system. It reads the temperature of the liquid from temperature sensor and updates the display and also processes the input. Controlling and decision making according to type of input selection programming is done to improve the system intelligence.

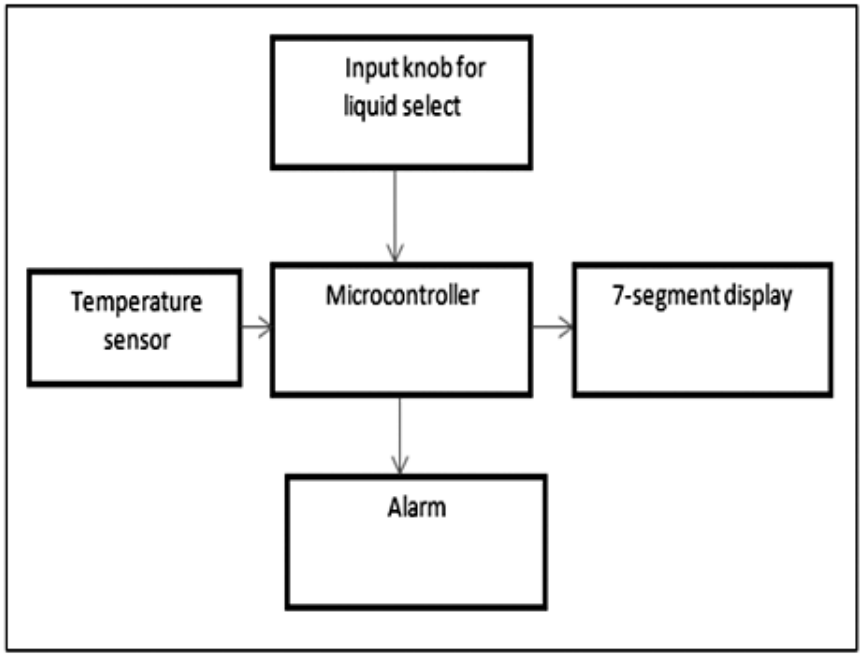

Figure 1 : Block Diagram of the Smart Vessel Holder for Liquid Boiling System

4. 7-segment display : Purpose is to update the system information. Temperature, set temperature value for the according liquid, current temperature of the liquid.
5. Alarm: Used to alert the user on completion of process set.

The sensor embedded vessel with temperature sensor monitor the recent temperature on the 7-segment display in its handle. A consumer invention enable automatic cooking by integrating a sensors embedded vessel with a smart cooking machine. This system is designed as to save the valuable time of user suitable for usage in domestic kitchens enabling users to master professional method, approach, and technique for smart cooking.

4. EXPERIMENTAL SETUP

Smart vessel holder for liquid boiling system mainly consists of four parts; the special kitchen utensil (smart Vessel) with embedded sensors, microcontroller, alarm and 7- segment display connecting to the vessel which is used for liquid boiling and the display system showing vessel temperature in sequence. In order to make complete user experiences, observed how the system effects the users' actions while cooking, verified the usability of the present model, and found its problems. The user study was conducted in an environment specially construct in our research laboratory as compare with kitchen, as shown in Figure 2.

4.1. Algorithm

1. User will select the liquid (say milk) by pressing corresponding knob.
2. The boiling point of that liquid is already known.
3. Calculate rate of change of temperature and hence predict the time.
4. Let, T1 = temperature at time t1

   T2 = temperature at time t2

   B = Boiling point of liquid
5. Grad = (T2 – T1) / (t2 – t1)

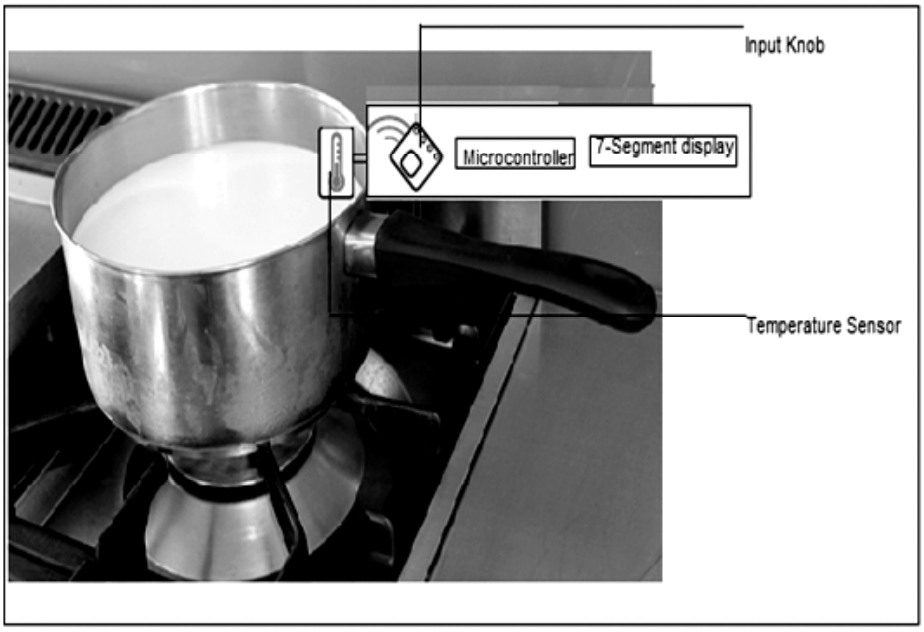

Figure 2: Experimental Setup

6. Time remaining = (B – T2) / Grad
7. Display time on 7-segment
8. And 2 minutes before, ring alarm.

4.2. Testing Framework

The Goal of the usability testing was to gauge potential users efficiency, effectiveness, understanding and acceptance of self-updating timer, enabled be sensors embedded into cooking tools such as a timer, input knob and microcontroller.

Figure 3 show the working flow diagram of the proposed system in detail If the user selects a input knob to cook, then the user must first determine which liquid selected by user based on input key press. the liquid will boiling soon, check the database for a variety of detail required and get boiling point of the liquid. A digital temperature sensor is used to gauge the temperature of a liquid being cooked. This data is used to adjust foe variability in the starting temperature and volume of liquid. For example, a small pot filled with warm water will boil faster than a large stock pot filled with cold water. An Seven segment display is used to provide visual feedback for timers. 7- segment display indicates timers updated, timers staring and timers finishing. Microcontroller is used to to manage the input and output of the system. It reads data from the sensor send output to 7-segment display unit and sends data to the applications.

4.3. Result Analysis

From observation during the study, user should not only calculate the efficiency of the system itself, but they must verify real experience of users with systems. When the vessel is being heated, the system makes

Table 1
Parameter to Boils the Liquid in the System

TEMP (^{0}c)	40	55	70	85	100
Sound	4 mins on display. No alarm	3 mins on display. No alarm	2 mins on display. Alarm	1 min on display. Alarm	Warning tone

a sound like the second hand of a clock at 1-sec intervals. At the similar instance, the user is required to monitor the detailed instruction by referring to the text on the 7-segment display.

Table 1 shows the experimental reading with parameter to boils the liquid in the system. The temperature changes depending on the value, which also synchronizes with the temperature sensor and 7- segment display unit. When the smart vessel is being heated the system makes a sound like the second hand of a clock at 1-secintervals. When temperature raises, before two min of boiling it makes a warning tone. The current system is able to support cooking circumstances such as the temperature or movements. When the liquid starts boiling a signal is transmit with the help of signal conditioning circuit and the alarm is ringing. Hence supply of gas is stopped and milk is protected from over flow This process intends to restress the user, because the user can experience the work in a naturalsituation. To understand complete feedback at each point throughout cooking and make thick descriptions about userexperience, this process is highly resourceful and efficient.

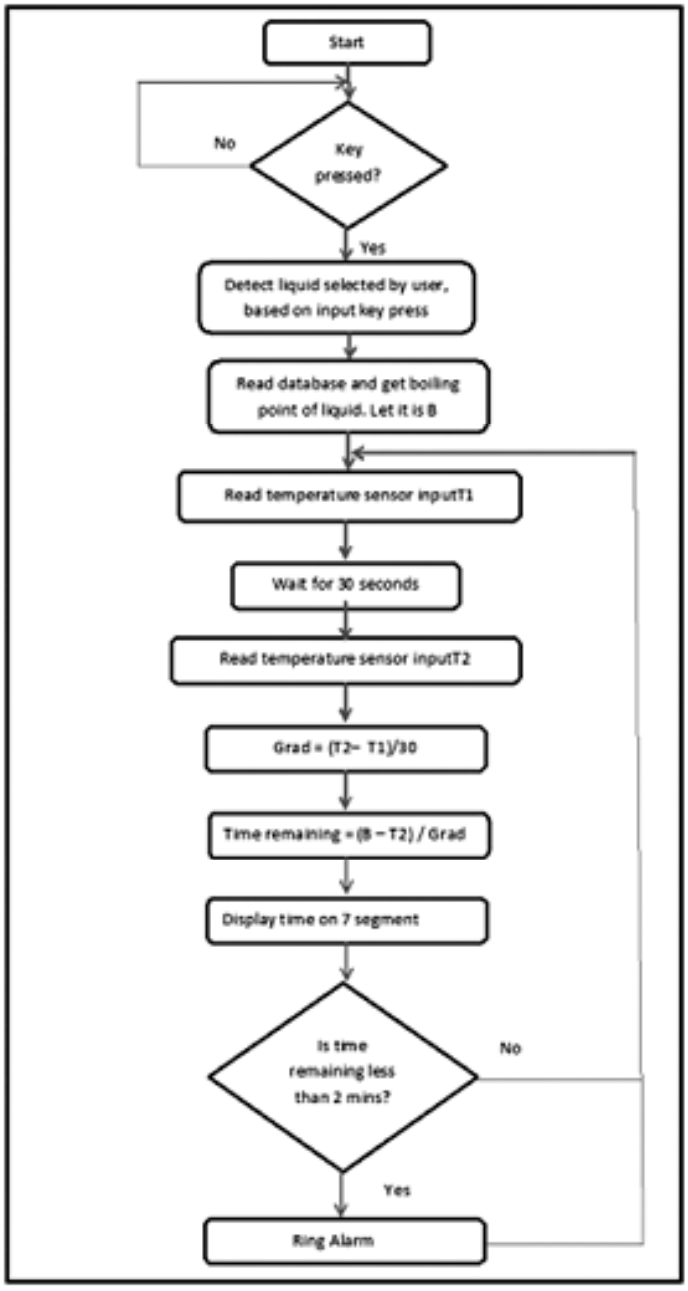

Figure 3: Working Flowdiagram of the System

5. CONCLUSION

Throughout the proposemethod and the user study, system is developed in the temporal kitchen set with respect to research place, and obtain a model for designing daily commodities (e.g. kitchen utensils) as smart things inspiring our daily life experiences. This model consider a technical framework and a methodology. The proposed system is eliminate continuous monitor of boiling liquid. The system is fully automatic and consistent. This causes saving of valuable time and also mental tension. The study examine the usability issue regarding to the systems such as analyzing relatively the aspects associated to anthropometry and dimensional variables that will used for the invention and the invented product's safety. As a future work, to solve the various issues of information related to process with new concepts of cooking in intelligent systems.

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