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Smart Kettle Mobile Application

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Abstract : In the twenty-first century, technological changes are occurring more quickly in various applications. Some appliances can be connected to online devices with the use of the internet at the users' convenience. The main purpose of this project is to reduce both overall expenses and energy and electricity use. The implementation approach that has been used is to develop a smart kettle that uses an online application to regulate the temperature. The kettle's temperature is always up to the user by entering a value. Moreover, there are four options for temperature setting that have been provided and users are allowed to change them. The user can also choose the length of the kettle's timer, depending on their preference. The internet connection has been utilized to control the kettle's operations from everywhere using mobile phone. The proposed system appears to be quite practical for the family due to its lower energy and electricity use and potential cost savings.

Keywords: Electric kettle, Internet, Mobile application

1. Introduction

A kettle is an essential item in the kitchen because it helps in making hot beverages such as coffee, tea and even hot chocolate. Almost everyone in the world has had an experience with a kettle. In order to reheat the water in the kettle, the user needs to physically go to the kitchen and press the button. Thus, the idea of the smart kettle was invented. Smart Kettle is a result of improving a traditional kettle [1]. The smart kettle is essentially a water heater that can be programmed for different temperature settings or can schedule operations. The flexibility of the features will be a handful for users to carry out multi-tasking activities. By using the smart kettle, the user could try out various features, such as the users can always choose the temperature of the kettle. There are four options for the temperature and if users want to customize the temperature. Besides, the user also can select the timer of the kettle if they want to keep it longer or shorter. If the user wants to learn more regarding the application, the users can check for more information on the discovery page which is connected straight to the information [2]. For safety reasons, the user also can check their list of kettles that are connected or not.

By making a smart kettle, it could save so much time and energy. For example, if the user wants to reheat the water, they do not need to shift away from what they are doing [3]. They can control it in the application that has been provided. This product will improve user satisfaction. With the help of precise temperature control, a well- suited temperature will boost the taste of the beverage. For example, a coffee lover would like this feature because a well-suited temperature for hot water could affect the taste of the coffee. Next, is the wireless edge. Very convenient for the user that likes to multitask. Only a touch on their smartphone could turn on the smart kettle.

2. Materials and Methods

The decision to create this application came from our own experience and with the help of the world wide web. The idea of the Smart Kettle was being made after a few consideration regarding usability and effectiveness among users. Compared to a normal kettle, at least we are not physically going to the kettle place and turn it on manually. The Smart Kettle allows user to turn it on wirelessly and it does not makes user walk at the kettle. Besides, current kettle is also does not have many features.

Smart Kettle has been developed using the Mobile Application Development Lifecycle Model (MADLC) [4]. The reason to use MADLC is that the activities and duties stated in each step were precisely described and elaborated to ensure the creation of Smart Kettle application with the fewest possible risks. The MADLC process consists of seven (7) phases identification, design, development, prototyping, testing, deployment, and maintenance.

As a base for nodes of the proposed platform as shown in **Figure 1**, three universal modules from the open-source electronics platform Arduino have been chosen: Arduino Mega, Uno and Nano. The base of the kettle contains the primary node known as Base Node. It functions as a communication bridge between a logger node and a kettle node. TCP/IP and HTTP protocols are used with the GET and POST commands to achieve data transport. The serial peripheral interface connects the microcontroller and WLAN module (SPI). The radio module, which is implemented in the Kettle Node, is also communicated with via the SPI. Moreover, the Base Node also supports water weight measurement that realized with extensometer with additional amplifier, thus making voltage signal from extensometer higher and possible to correctly detect its changes.
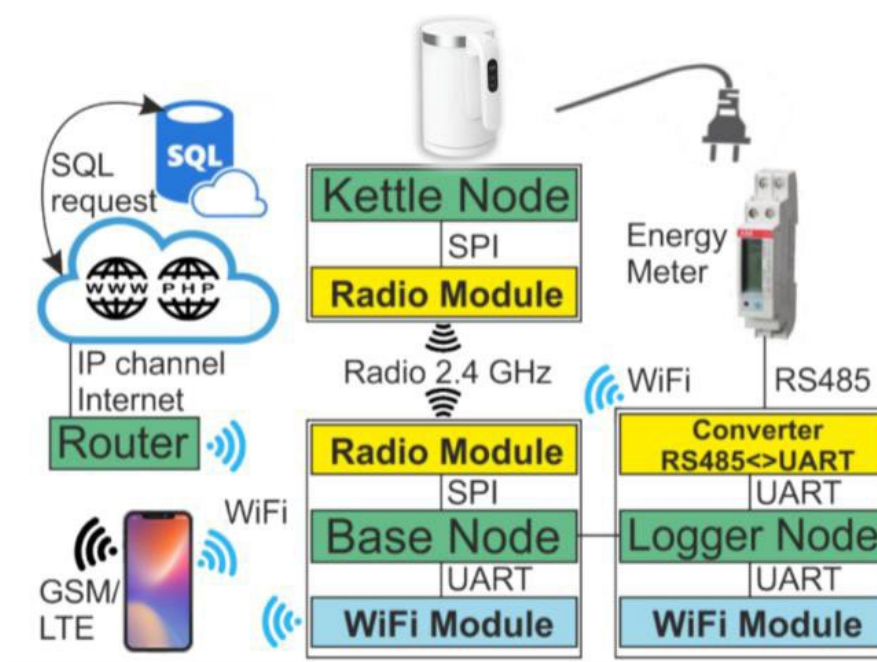

Figure 1: Technical Diagram of Smart Kettle

3. Results and Discussion

For the prototype on the mobile application, five screen have been developed in which each page has their own speciality and functionality that will direct the users to use the application without any confusion. The interaction style of our application are command-base which users need to type their name, tapping on the button that have in each page that might be useful to them or they also can selecting options from the application and last they can directly go to the website when they clicking on the wording which it connected direct to the URLs.

The pairing interface (**Figure 2**) of the Smart Kettle application where users need to pair their kettle with this application first before started using it. If they do not have the Smart Kettle it cannot be use and error message will be appeared (**Figure 3**). The yellow wording on the application is where the user want to learn more about the Smart Kettle they can just click on the word and it will directly go the official website.
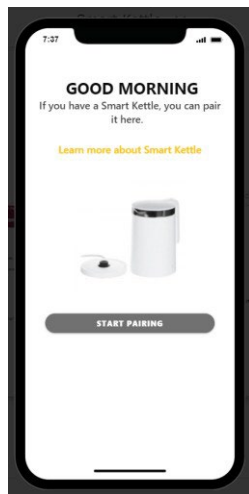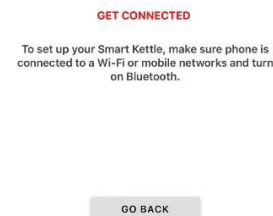

| Figure 2: Pairing interface | Figure 3: Error message. |

The main page (**Figure 4**) of the application after user successfully paired. This page contains various features that provide to the users like on the bellow it has tap bar which contains the control for the temperature, the timer of the Smart Kettle, the water level and more information. On the other hand, the icon on the right corner show that if the user wants to logout from the main page. As we can see on this page also user can choose their temperature or they want to customize their own temperature by entering the number. If the user already chooses the temperature it will appear successful messages (**Figure 5**).

As for this timer feature, the user can select the timer for the boiling water on the Smart Kettle. This feature given 3 option for the user to choose (**Figure 6**). After choosing the right temperature, a new message (**Figure 7**) will be appearing which said that they had already successfully chosen the timer for the Smart Kettle. With this user can always notify if the already select the timer or not.

Inside the water level page (**Figure 8**), the user can see how much left the water level on their kettle without go and check physically. All the information of the water level appears on this page. Besides that on the bottom, we can see another button of list of kettle which indicate how many Smart Kettle that own by the user and which kettle is connected or not as we can see on the page (**Figure 9**), with this we can always alert which kettle we want to use and connect.
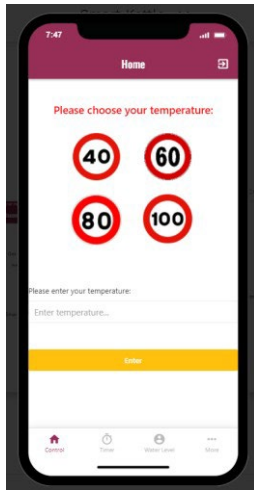
Figure 4: Main page
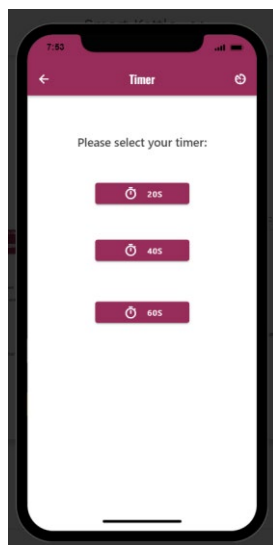

Figure 5: Successful message.
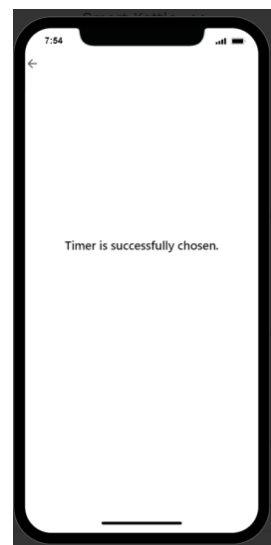

Figure 6: Timer page

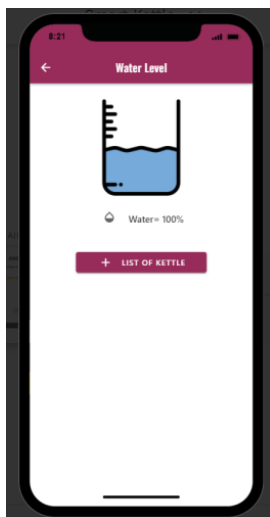**Figure 7: Successful page**

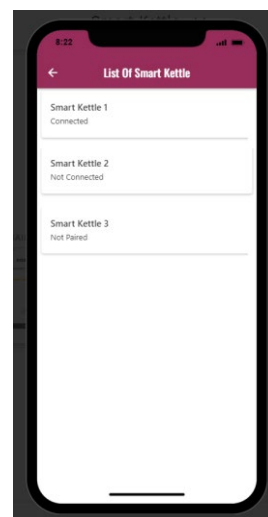**Figure 8: Water level page**

Figure 9: List of Smart Kettle

On the discover page (**Figure 10**), it will be appeared when the user clicks on the more button on the main page. In this section, the user will be able to see more information about the Smart Kettle. As we can see the user will be easily search more information on the website given and it includes the user guide.

Figure 10: Discover page.

Smart Kettle is a very good application which can provide users with a lot of function features and also very user friendly, which we know that older people will be difficult in processing on how to use the application but our application really easy to use because all the function just needed to click on it. Users also can know the list of their Smart Kettle which one is connected or cannot connected. Knowing that some people careless but with the application user can always check on it without need them to walk to the kitchen and see it. With the technology keeps changing every seconds or minutes, with this technology of Smart Kettle can know what our customers need and wants because other kettle cannot do these features that really advance in technology. The author always keep on reading all the comments and feedback about the application and the kettle because we does not want to lost their customer trust because nowadays everyone will create more advance thing using technology that can make people life more easier, with the feedback that read the authors can keep improving but so far it was a good feedback and we want our product and the application will be the best technology for the customers. Therefore, this product and the application that make the product more easier to use will be an example for an advance technology product as the product always concerned with what the user want and needed this day by using the technology and creativity that will make the user more comfortable even though there are new technology that comes out.

4. Conclusion

By making this app, it is providing more values when it comes to customers as business landscape had been changed that can be rely more on the technology by mobile application. Further than searchable for products and establish and follow up orders following the convenience of them, customers also use a customized mobile compulsory understanding to make sooner and better-informed during in purchase decisions. For better customer experience which is with instantaneously communication with the customer is vital. Mobile customer service will gain the profits between both the business owner and customer in meaningful ways.

Acknowledgement

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