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PRAYER MAT FOR MONITORING THE COMPLETENESS OF PROSTRATION AND THE NUMBER OF RAK'AHS FOR THE BLIND

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ABSTRAK

Potensi kesalahan dalam sujud tidak kalah banyak bila dibandingkan kesalahan dalam jumlah rakaat shalat. Tujuan penelitian adalah membuat alat validasi kelengkapan sujud dengan sensor sentuh, dimana ketika sujud akan diingatkan sebagai sujud keberapa pada rakaat keberapa. Pengumpulan data menggunakan uji simulasi. Analisis data menggunakan analisis deskriptif. Pembuatan sajadah pengingat sujud dan jumlah rakaat untuk penyandang tunanetra dan rabun tua menggunakan sensor sentuh berupa tombol *keypad* yang akan membuat perangkat *microkontroller* memerintahkan DF Player mengirimkan suara jumlah sujud pada rakaat tersebut melalui *bluetooth* kepada *headphone* yang dipakai penyandang tunanetra dan rabun tua. Perangkat ini tergolong efektif digunakan karena luarannya berupa *voice* (suara) yang dapat didengar oleh penyandang tunanetra dan rabun tua tanpa mengganggu jamaah lain atau orang-orang yang ada di sekitarnya.

Kata kunci: *rakaat, sajadah, sensor sentuh, shalat, sujud, voice*.

ABSTRACT

The potential for mistakes in prostration is no less than the mistakes in the number of rak'ahs of prayer. To make a validation tool for the completeness of prostration with a touch sensor, where when you prostrate, you will be reminded of how many prostrations you make in how many rak'ahs. Data collection using a simulation test. Data analysis used descriptive analysis. Making prayer rugs to remind the prostration and number of rak'ahs for the blind and nearsighted using a touch sensor in the form of a keypad button, which will make the microcontroller device instruct the DF Player to transmit the sound of the number of prostrations in these rak'ahs via Bluetooth to the earphones used by the blind and nearsighted. This device is classified as effective in use because the output is in the form of a voice that can be heard by the blind and nearsighted people without disturbing other worshipers or people around them.

Keywords: *prayer mats, prostrate, salat, touch sensors, voice*

INTRODUCTION

Prayer is a fundamental obligation for every Muslim throughout the world. However, many people who are stricken with the disease forget. Several innovations and creative solutions emerged in making prayer mats that can count the number of *rak'ah*s of prayer. There are already several models and designs of prayer rugs that remind you of the number of rak'ahs, which can help people who are forgetful when praying. One of them is a prayer mat for calculating prayer *rak'ah*s by utilizing a force sensitive resistor connected to the Arduino Mega 2560 as the main brain and calculating the number of prostrations with a force sensitive resistor pressure sensor (Mobaraki et al., 2021). There are also prayer rugs that are designed using a touch switching application based on skin sensing, namely prayer rugs that are equipped with counters and touch screens. By touching the forehead to the touch screen, the person praying can find out how many times he has prostrated and how many *rak'ah*s he has completed (Guo et al., 2024; Li et al., 2022). Even so, the accuracy of calculating the number of rak'ahs is very dependent on the length of time of prostration. If you prostrate more than the specified time, you will respond to prostrate twice (Syed, 2025).

The habit of forgetting the number of prostrations or the number of *rak'ah*s of prayer actually affects more blind people and the elderly. However, of the many models and designs of prayer mats, there has been no innovation that focuses on making prayer rugs for reminders of mistakes in prostration and the number of *rak'ah*s for the blind or old people who are myopic. The average output of the prostration reminder tool and the number of *rak'ah*s is in the form of writing on the LCD screen or a fairly loud voice. The output in the form of writing on the LCD screen is impossible for the blind and old people who are myopic to see. Most of the tools for remembering prostration and the number of *rak'ah*s of prayer for the blind use sound as an output, making it easier for the blind to understand commands (Messaoudi et al., 2022). The use of kinesthetic methods and control prayer mats that can speak is indeed considered effective by many people in reminding the number of prostrations and the number of *rak'ah*s of prayer for the blind (Marasco et al., 2021). But the volume will annoy those around him. Even though it is possible for blind people to pray in congregation at the mosque. So that the sound of reminding the number of prostrations and the number of *rak'ah*s of prayer will certainly disturb other congregations. Moreover, mistakes in the number of prostrations that can have more fatal consequences than forgetfulness in the number of *rak'ah*s.

METHOD

The research was conducted in December 2021 – March 2022 which was conducted at the Physics Laboratory of SMA Negeri 1 Maos and Cilacap State Polytechnic (PNC). The tools and materials used are DF Player serial MP3 Player, WTV020 Module Serial MP3 Player for Arduino AVR STM32, Arduino Uno R3 Atmega 328P Atmega 16U2 Compatible Board + USB Cable, JBL Bluetooth Wireless Headset TWS Soundsport Earphone Handsfree, Bluetooth Transmitter Receiver 5.0 Wireless 2 in 1 Audio Portable 2 in 1, XH-M226 USB Bluetooth 4.0 Audio Receiver Wireless Module with decoding, and X5 Box X5 Box Black X5 Box Arduino Electronic Box.

Data collection uses a simulation test, namely a prayer demonstration with his eyes closed. Respondents followed the instructions for remembering the number of prostrations and the number of *rak'ah*s of prayer. Data analysis used descriptive analysis with narration about the level of satisfaction of the respondents in the simulation test of the completeness of prostration and the number of *rak'ah*s of prayer.

RESULTS AND DISCUSSION

Prayer mats are mats made of cloth used to perform prayers. The reason for using prayer rugs is to maintain cleanliness when performing prayers. Nowadays, there are various forms of prayer mat sizes available, there are wide, small, long, short, thin, thick and some have various images so that users feel comfortable (Chohan et al., 2024). The prayer rug is also equipped with a *kibat* direction detector with the addition of the HMC5883L which is connected to the Arduino Nano as the microcontroller which will process the input and then send it to WTV020 with audio output (Ariza & Pearce, 2022). Blind people can use control prayer mats to improve their ability to pray using the kinesthetic method (Shoaib et al., 2023; Zulkifli et al., 2022).

Prayer mats for prostrating and the average number of *rak'ah*s have an output in the form of writing on the LCD screen, which is impossible for blind or myopic people to see due to old age. There are also prayer rugs that have a sound output that is sure to disturb the people next to them. Therefore, it is necessary to design prayer rugs for the blind and low-vision with a sound output but not disturbing the people next to them. The technique is that the sound is sent via Bluetooth to the earphone so that it can only be heard by the person wearing the device. This tool is integrated with prayer rugs as a reminder of the number of *rak'ah*s of prayer with an output in the form of a sound signal. An illustration of the position of the tools to be used during prayer can be seen in the image below.

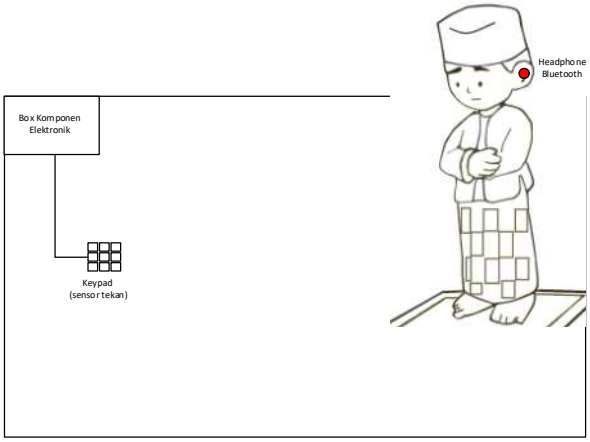

Figure 1. Illustration of tool placement when used

There is a prayer mat that is in the forehead position when prostrating, and a touch sensor has been installed in the form of a keypad button. If this button is active, the microcontroller will instruct the DF Player to transmit the sound of the number of prostrations in that cycle via Bluetooth to the earphones.

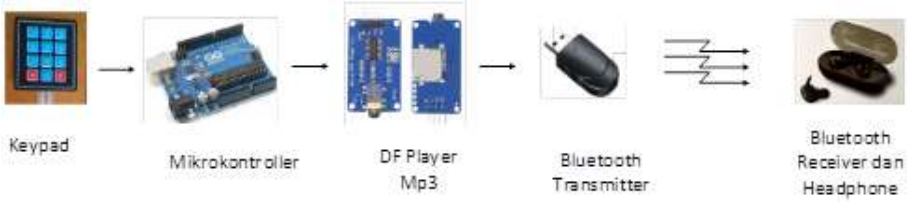

Figure 2. Tool block diagram created

The power source used in this tool comes from a 6 V battery that is installed in the electronic component box. Placing the box in the upper corner so as not to disturb the prayer movement. earphones use bluetooth that already has a battery in it.

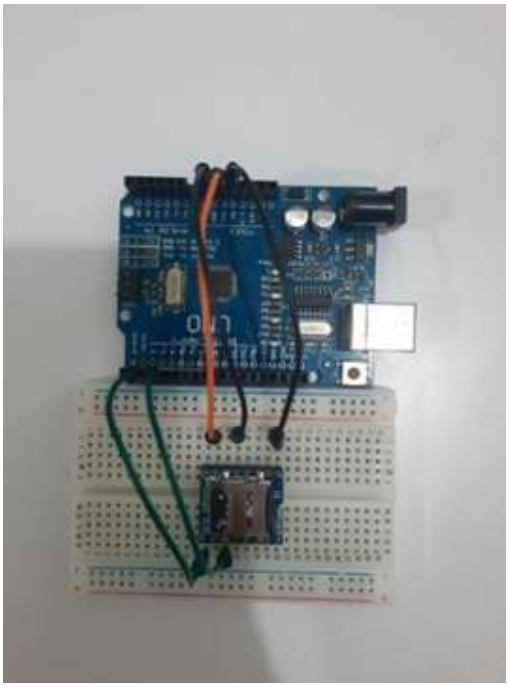

Figure 3. Sensor Assembly

The innovation of the sensor device for the reminder of prostration and the number of *rak'ah*s actually has a sound output, but it is directly connected to the earphones so that it disturbs other people.

The advantage of this device is that it can be used by all groups, both blind people, nearsightedness or healthy people. This device can be combined with prayer rugs, can also be used separately. Thus this device can be used in congregational prayers at the mosque.

Figure 4. Sensor Devices

This device uses a knock sensor, so that when the wearer touches his forehead to the sensor board, a voice will be sent via Bluetooth to the earphones, which will say how many prostrations for how many *rak'ah*s. This device can be used separately or as a package with prayer rugs. At the time of the first prostration in the first *rak'ah*, a voice will be heard on the earphone: "prostrate one to the first cycle." Likewise, in the second prostration in the first cycle, a voice will be heard: "the second prostration of the first cycle," and so on. But this sound can only be heard by people wearing earphones.

Picture 5. How to use

A warning in the form of a voice that is sent every time the forehead touches the keypad informs the number of prostrations in the number of *rak'ah*s. This tool is practically used as a reminder of prostration and the number of rak'ahs without worrying that the volume of the sound will disturb the people around it or disturb the congregation next to it. Easy to carry placed anywhere on the forehead position during prostration. Thus, this tool is effective in helping blind people and elderly people who are nearsighted to be able to perform their prayers without worrying about making mistakes in counting prostrations and the number *of rak'ahs* of *rak'ahs*.

CONCLUSION

Making prayer rugs to remind the prostration and number of *rak'ah*s for the blind and nearsighted using a touch sensor in the form of a keypad button, which will make the microcontroller device instruct the DF Player to transmit the sound of the number of prostrations in these *rak'ah*s via Bluetooth to the earphones used by the blind and nearsighted. This device is classified as effective in use because the output is in the form of a voice that can be heard by the blind and nearsighted people without disturbing other worshipers or the people around them.

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