Research Article

Wireless Bedwetting Alarm

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Abstract: *Seniors are much more likely to develop any type of incontinence. This is due to the high prevalence of incontinence relating diseases such as Multiple Sclerosis, Parkinson's Disease, Dementia and other related conditions. Neurological conditions can affect the relationship between the brain and the bladder, causing accidents and delayed communication. (Hall, 2018, para.5). A lot of bedwetting alarm are sold in the market, but the alarm being triggered near seniors make them embarrassed. They feel that they are treated like babies, without dignity. Some of them choose not to ask for help and suffer from the discomfort when bedwetting happens. This gives burden to caretakers as they need to check on the seniors all the time. The Bedwetting Alarm is made using 2 Micro:bits with radio transmitting capability and moisture sensor, LED and buzzer can solve the problem. The Detector near the seniors makes no sound but only detects bedwetting and trigger alarm on Alarm Watch worn by caretakers. This prototype returns dignity to them.*

Keywords: Micro:bit; bedwetting; elderly.

1. INTRODUCTION

One of the authors' family member cannot walk and has bedwetting problem. However, this elderly refuses to wear adult diaper. When there's bedwetting, he would bear with the discomfort rather than asking his family members for help. So, the caregivers have to keep checking on him all the time. The authors worked on a prototype to solve this problem, at the same time, supporting Sustainable Development Goal 3, which is Good Health and Well-being.

2. METHOD & MATERIAL

Wireless Bedwetting Alarm comprises of 2 devices:

2.1 The Detector

The Detector is a Micro:bit which is connected to the inputs of a moisture sensor, buttons and a noise sensors as well as outputs of a rainbow LED and radio sender.

Figure 1. The Detector

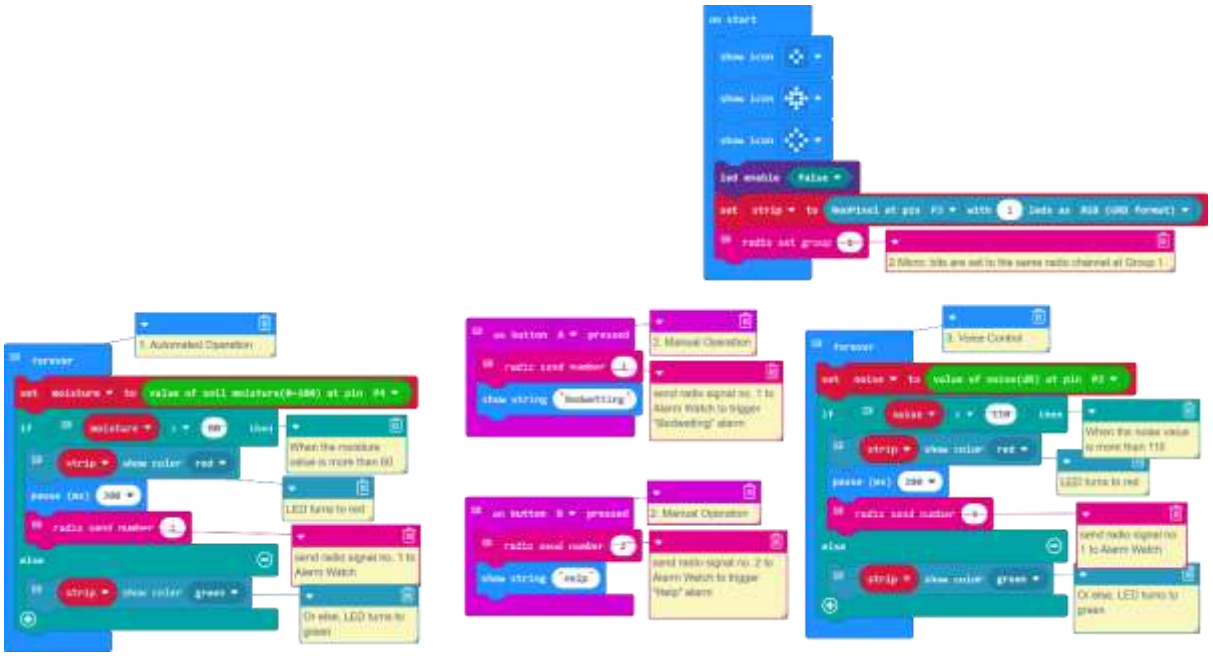

Figure 2. The codes of The Detector

2.1 The Alarm Watch

The Alarm Watch is a Micro:bit which is connected to the inputs of a radio receiver and outputs of LEDs and a buzzer. The watch strip is made of used clothes.

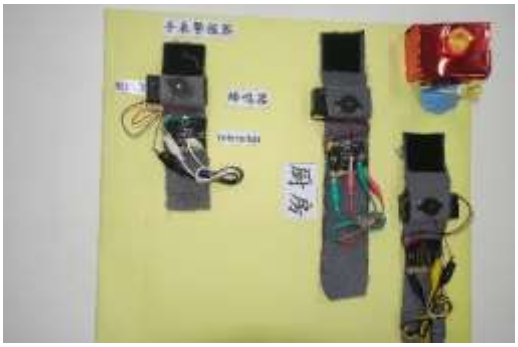

Figure 3. The Alarm Watch

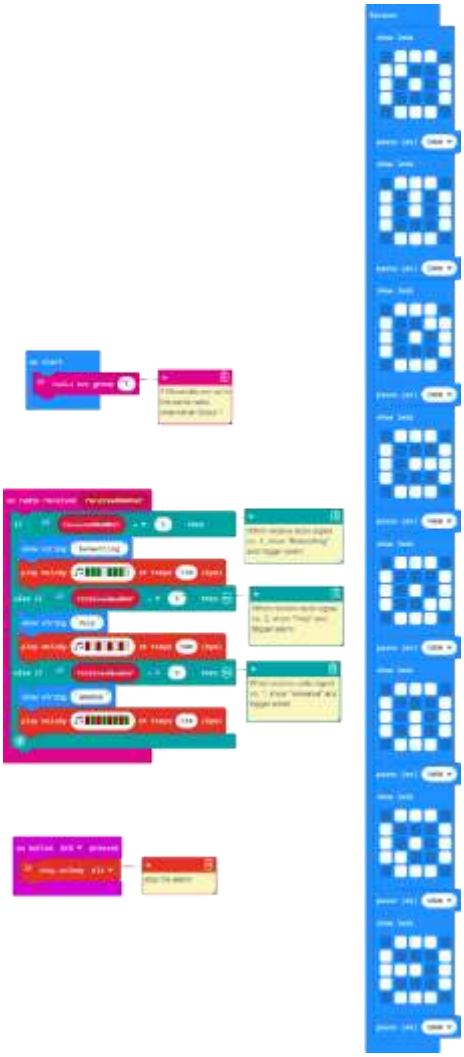

Figure 4. The codes of The Alarm Watch

3. FINDINGS

A soil moisture sensor is sensor board that can be connected to a Micro:bit to monitor the moisture present in the soil. It is usable too in our specimen, which is saline solution, resembling urine. This sensor uses the two probes to pass current through the urine, and reads the resistance to get the moisture level. When the moisture value detected is more than 60, the detector will send a distress signal to the alarm watch.

	Moisture Value			
Tester	Joey	Lucas	Yu En	Average
Dry	1	1	1	1
Water	79	79	75	78
Saline solution	62	61	62	62

Figure 5. How to get the average moisture level of 60

4. DISCUSSION

Wireless Bedwetting Alarm comprises of 2 devices: The Detector (placed next to elderly's bed) and The Alarm Watch (worn by caregivers). The Detector detects bedwetting and sends radio signal to caregivers' Alarm Watch, sending distress signal (wording and alarm). The prototype can work in 3 ways.

4.1 Three Ways How it Works

4.1.1 Automated Operation

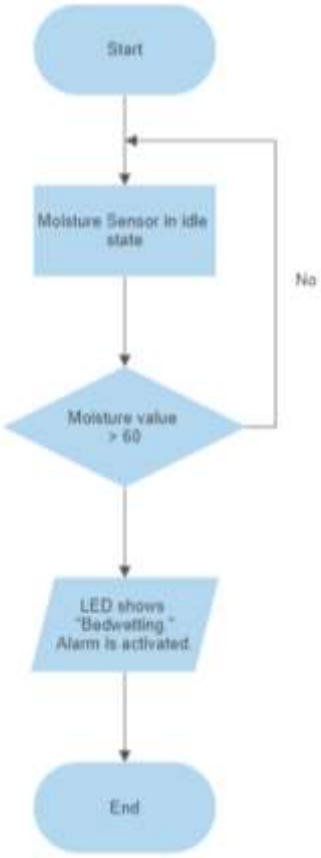

Figure 6. Automated Operation

When there is bedwetting, the moisture sensor will detect the urine. Then, the rainbow LED will turn from green to red. Next, Micro:bit will send a radio signal to the alarm watch worn by the caregiver. She can see the wording "Bedwetting" on the watch, followed by an alarm from the buzzer. Then, she can act swiftly.

4.1.2 Manual Operation

Without bedwetting, the elderly can send signals by themselves. By pressing button A, a message of "Bedwetting" will be sent to the caregiver, followed by the alarm. Button B is more general, which is "help."

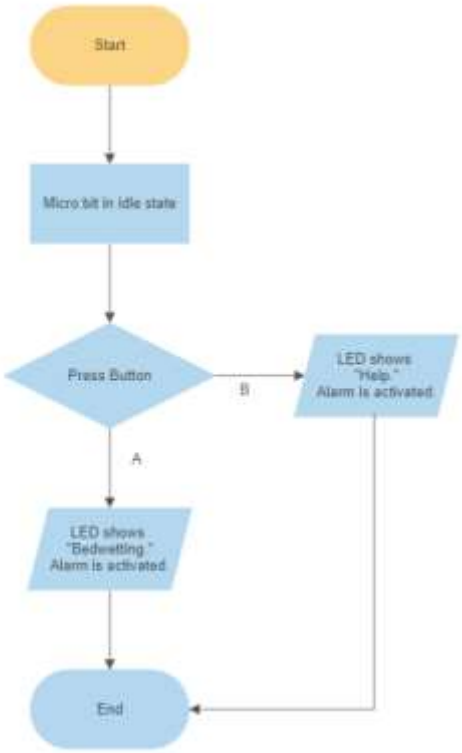

Figure 7. Manual Operation

4.1.3 Voice Control

When the elderly shout for helps or babies cry, the noise sensor can detect it. The caregiver can see the wording "Wawawa" on the watch, followed by an alarm.

4.4 Practicality

4.4.1 The Alarm Sound

The alarm is only set in the alarm watch, but not in the Detector in the bedroom. It is because the atuhors do not prevent the alarm sound from disturbing the elderly or babies to rest.

4.4.2 Connection of the Two Micro:bits

The alarm watch is portable. It can be worn to anywhere within the range of 70 meters from the detector, with the condition that the caregivers are in an open area without many other computers around.

5. CONCLUSION

Although this prototype is better than similar products in the market, the cost is still cheaper. Moreover, this prototype can be made easily. The prototype is user-friendly too as it is mainly automated. Therefore, the authors believe that the Bedwetting Alarm can reach a lot of elderly or babies in a short time. Care can be given to them at the right time. It can reduce the caregiver's burden who needs to frequently check on the elderly previously.

References

Samantha Hall (2018) in What Causes Incontinence in the Elderly at Night? Incontinence UK. Retrieved from https://www.incontinence.co.uk/what-causes-incontinencein-the-elderly-at-night