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The development of smart lock container game for slow learner children

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Abstract

A slow learner is someone who takes longer to understand things than the typical person or who needs many explanations before grasping an idea. Because of the Covid19 pandemic, children are frequently distracted when studying something at home, and because of their parents' difficulties and lack of ideas on how to engage their children in learning at home. Smart Lock Container Games for Slow Learner Kids were developed to address this issue. This device can assist slow learners in learning while also allowing them to have fun answering questions at home. Slow learner children are required to play a game or answer questions while being supervised by a parent in order to open a locked container containing prizes for them. It is a novel approach for assisting and encouraging slow learners to study or generate interest in learning, as well as improving their thinking skills when solving the game to open the lock.

Keywords: Slow learner, Arduino Nano, HC-05 Bluetooth Module, Assistive Technology.

1. Introduction

A slow learner is someone who takes longer to grasp things than a normal person or who needs many explanations before grasping a concept and is not eligible for special education [1]. These people account for around 14.1% of the population, which is larger than the combined number of children with learning difficulties, intellectual disabilities, and autism [12]. A slow child's tested intelligence ranges from 75% to 90% of that of an average child, and their learning rate is 4/5 to 9/10 of that of an average child, according to Yusha' [1]. Slow learners' disabilities are not usually as visible as those of children who are blind, deaf, or physically disabled. Their inability to think and learn is tied to their impairment. As a result, they are less capable than other children to meet the normal demands of education and modern life. As adults, many of them will be absorbed into the community's life and will contribute meaningfully without bringing undue attention to themselves.

2. Literature Review

2.1 Slow Learner Cildren

Slow learners do not have special needs but are classified as having learning disabilities (LD). They have mild cognitive problems and are unable to acquire something in the time allotted for it. Slow learners have a low intelligence quotient (IQ), limited cognitive capacity, information processing limitations, poor memory or short-term memory abilities, difficulty with abstract thinking leading to incapacity to convey ideas, and focus problems [8].

2.2 Assistive Technolgy (AT)

Assistive technology (AT) or assistive device is any item, piece of equipment, software application, or product system that is designed, made, or adapted used to help people with disabilities increase, maintain, or improve their functional abilities. Based on certain factors parents should choose suitable assistive devices for their child to use to aid in the process of learning [11].

Although AT cannot cure or eradicate learning problems, it can assist a child in reaching his or her full potential by allowing her to focus on her strengths while avoiding areas of difficulty. A child who suffers from reading but excels at listening can benefit from listening to audiobooks. Teachers and parents should become aware of assistive technology and understand how it can be implemented into their teaching to support an inclusive learning environment. Assistive technology might be low-tech, mid-tech, or high-tech.

2.3 Learning Styles

A learner's 'learning style' can be defined as the characteristics of that learner that influence how that person learns. Individual differences shape how people learn; some prefer reflection, while others need to see and practise their new skills. Understanding one's preferred learning style can help one's ability to absorb and retain new information.

3. Methodology

3.1 Block Diagram

The project design's block diagram, shown in Figure, consists of a microcontroller and a communication system. The central processor is an Arduino Nano, and the Bluetooth module is an HC-05. To control the Servo motor, the Bluetooth Module will act as a communicator between the game app and the Arduino Nano. Once the Bluetooth module is connected, the game app can control the motor to open or close the lock.

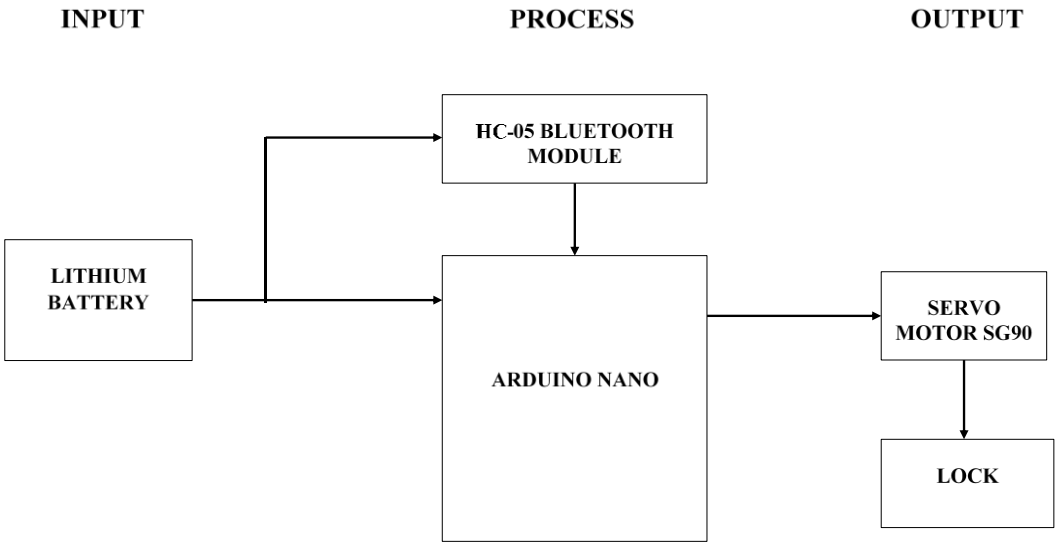

Figure 1: Block Diagram of Smart Lock Container Games

3.2 Software Implementation

The Arduino Software (IDE) was used to make this project, which is open-source software that allows users to simply write code and upload it to the board. This software works with any Arduino board. There are two kinds of programming systems: Arduino programming language (based on Wiring) and Arduino Software (IDE) (based on Processing).

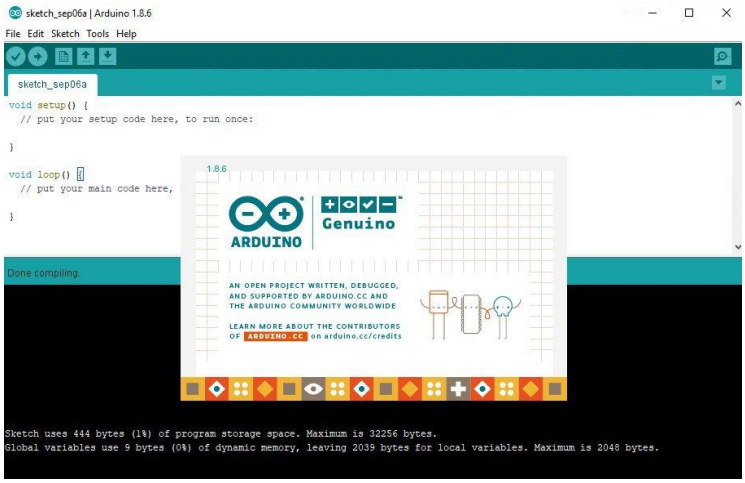

Figure 2: Arduino Software IDE

4. Result & Discussion

4.1 Experiment on MIT App Inventor

This section of the experiment shows how to create software or a game using the MIT App Inventor and how it will communicate with the Arduino via a Bluetooth module. MIT App Inventor is an open-source tool for people who want to create simple software or games using blocks as programming. The goal of this experiment is to ensure that the game visual is in the right location on the graphic smartphone and is linked to the programming and hardware and to make sure that the Bluetooth was connected successfully and the motor can be controlled.

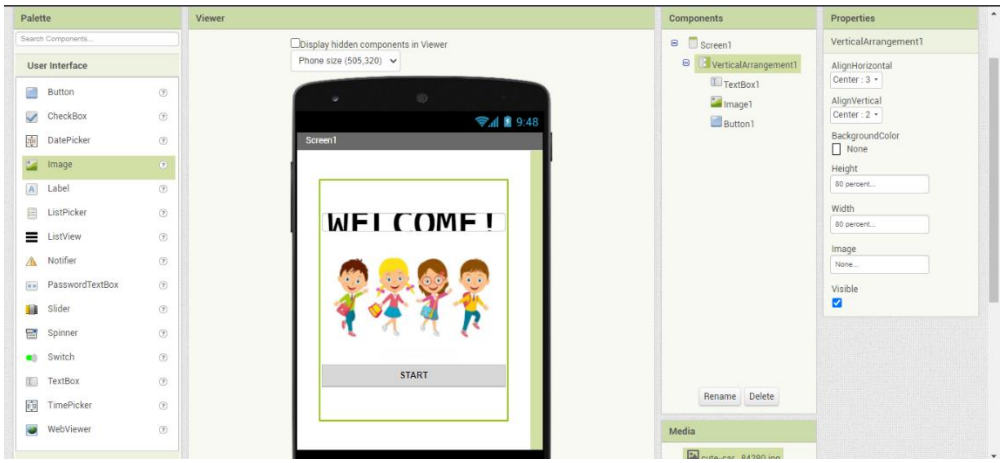

Figure 3: Testing the visual of the game

4.2 Analysis of people that heard or come across slow learner children

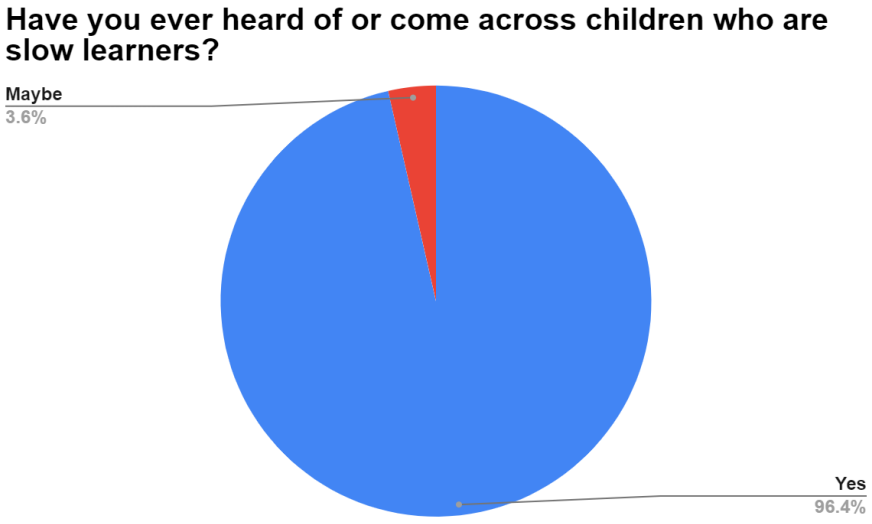

Figure 4: Pie chart percentage of people who ever heard or come across slow learner children

Figure 4 shows the analysis of people who ever heard or come across slow learner children. It shows that only one respondent is unsure if they have ever come across a slow learner child, but the majority of respondents have seen or heard of such.

5. Conclusions

In the domain of adaptive technology behaviour, slow learners have no trouble making connections, establishing themselves, and socialising. Their main problem is a lack of educational development When it comes to learning new things, slow learners will need more attention and practice than their counterparts. To assist children to stay focused and assimilate knowledge quickly, audio-visual aids, graphics, displays, reference books, internet material, and worksheets must be employed; nevertheless, they are not interactive enough for today's children.

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