The Magic Piano | User Manual

Hogeschool van Amsterdam – PAD SSS04



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# Introduction

## The Magic Piano

The Magic Piano is a toy which serves as a piano for children to play with. The Magic Piano comes with an application designed for the caretakers of the child(ren). This application serves a bridge between the caretaker and child and gives them some form of control and interaction through multiple activities within the application. The piano has changeable sound collections and a mode where children can play along with the caretaker’s keypresses in the application, this is called ‘Sequence Mode’.

## The goal

The goal of this product is to give children with the Pitt Hopkins Syndrome a special type of toy designed with their circumstances in mind. The current toy market does not contain many type of toys specially created for these children.

The children do not have great control over their bodies, complex solving and learning capabilities, communication capabilities and more which differ per child. The challenge of realizing this goal is that each child is different in its own way, so to make a toy which satisfies most needs and capabilities of those children is a challenge. It must be sturdy, splashproof and as safe as it can be, while still being fun to play with.

## The team

The team that worked on this project consists out of five IT-students of the Hogeschool van Amsterdam (HvA). This was done during a project in the first year called Project Agile Development. The team-members and their course programs at the HvA are:

* Hamam Hadib | Technical Information Technology
* Koen Hengsdijk | Software Engineering
* Luuk Nieuwdorp | Software Engineering
* Brian Buenting | Game Development
* Joeri Vervaat | Game Development

# Components

## The Piano

The main part of the toy, the piano, consists out of a wooden frame with five keys and an on-off button. When turned on, the piano will be able to produce sound when one of the keys is pressed. The piano has five built in sound collections for the keys, these are:

1. Piano
2. Farts
3. Burps
4. Cows
5. Sheep

Each of the collections can be loaded in via the application which comes with the piano.

The piano has several lights situated above the keys, they can light up when combined with the application to interact with the user of the piano.

## The Application

The application comes with piano and works together with the piano via a Bluetooth connection. When opening the application for the first time the user will be prompted with a message asking the user to connect with the piano. Once done, the piano will save the device used to connect with it for ease of use the next time the same device wants to connect with the piano.

Navigation within the application is done by using the navigation bar located in the bottom part of the screen.

Within the application, the sound collection of the keys can be changed to one of the five default collections. This is done by going to the collections menu via the tab located in the left bottom corner of the application and selecting one of the collections by using the dropdown menu. The default selected sound collection is the Piano collection, the piano will not save the last set collection.

To exit the application, press the back button on the device to go back to the main menu and once more to exit the application after a confirmation prompt.

## Other components

### Sounds

The piano is fitted with a small speaker in the right side of the piano when facing the piano with the keys faced in the user’s direction. The volume can be changed within the application by using the slider option in the main menu.

### Charging

As a battery, the product contains a power bank which can be charged by plugging the cable.

The piano can be charged by plugging in the cable, which comes with the product, with the USB side into the piano and with the outlet side into an outlet. There, currently, is no way to see how charged the piano is. Charge the piano for a maximum of four hours when the battery is empty.

### Other Content

The piano consists out of a raspberry PI to handle the piano’s logic. Multiple female to male cables to connect the content of the piano together in a closed circuit.

# Safety

## Caution

* The piano is resistant to small drips and liquid spills, but large amounts of fluid can disrupt the circuit within the piano.
* Be careful not to rest the piano on top of liquid as the wood will absorb the liquid and expand. This weakens the structure of the piano.
* Keeping objects with electrical signals near the piano’s left side might make the sound crackle.
* Overcharging the battery for longer periods of time shortens the lifespan of the battery and thus the piano.
* Sharp object can pierce the piano when hitting it multiple times, this can expose wiring and damage the internal circuitry of the piano.
* The phone application will remember the last connected device for usage, so when using a new device to connect with the piano; make sure to re-select the correct device on start-up.
* When the device crashes for an unknown reason; the piano might not recognize the previous device it connected with.
* Using the on/off button located on the back of the piano will shut the piano off. Be careful when doing this while connecting with the mobile device.