作品名稱
物聯網英文教具記憶卡牌
IoT English Teaching Memory Card

隊伍名稱
我是誰 Who Am I

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Abstract

English is the common language all over the world currently. However, the English studying approaches in Taiwan still rely on reciting. It is worth noting that method could not improve the abilities for listening and pronunciation. Currently, English teaching is mostly based on natural pronunciation. The goal of our work is to create a new learning approach to learn natural pronunciation while playing games, and learning happily through games. The students not only improve hand-eye coordination and memory ability, but also improve English-related abilities greatly.
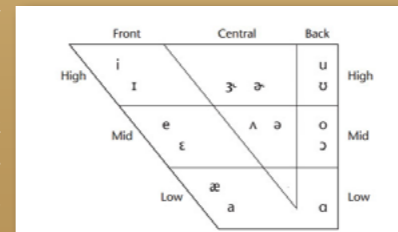
In this work, we chose the game, Memory Card, as our playing method. This game is usually to be used to improve the player's memory ability, concentration and logical ability by memorizing the position of multiple cards. The combination of Memory Cards and English pronunciation could improve the memory of learning English pronunciation, and also make the learning process more fun and interesting.

This work combines Memory Cards, IoT systems, and real English pronunciations. Players could change various learning themes by swapping cards to diversify the learning vocabularies of students. The game method is simple and fun, and easily accepted by younger children. Compared with traditional Memory Cards, a human player is required to determine whether the pairs are correct. In our work, each card is an IoT node, therefore our work could automatically judge the combination. At the same time, it also provides English nature pronunciation learning. All operation sequences could be uploaded to the cloud database, and parents or teachers could check the learning status of students.
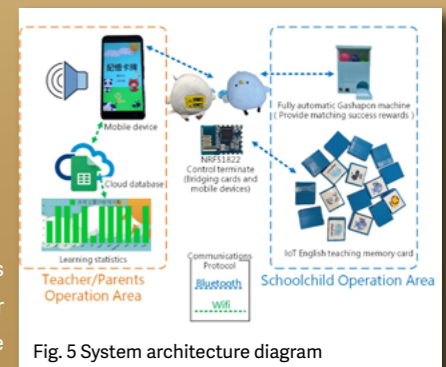
This work uses the accelerometer sensor of the ARM Cortex-M0 microcontroller to fetch the X-axis and Y-axis values, and then determine the status of Memory Cards. And use NRF51822 Bluetooth module wireless broadcasting ability, all memory connected to each other and sent their status to mobile devices. The mobile device analyzes the received values, and send naturally pronounced in English. In order to improve the learning motivation of students, we also designed an interactive IoT capsule machine. When students complete the matching of Memory Cards. There is a capsule would be released as a gift to students.

作品摘要

英語是目前全世界的共通語言，但在臺灣的英語學習過程中，很多還是靠死背單字來獲取好成績，但這樣的方式對於聽力和發音成效並不顯著。為了改善這個問題，目前英語教學大多以改為自然發音為主。本作品的目標就是希望透過遊戲的方式，讓學童能在一邊玩遊戲、快樂學習的狀況下學習自然發音，長期下來便不但能提升手眼協調能力與記憶力，更能大大提升英文方面的相關能力。

圖 1. 長短母音分類圖

在這個作品中，我們選擇了記憶卡牌（Memory Card）這種桌遊做為我們的遊戲方式，這個遊戲可以透過記憶多張卡牌的位置，提高記憶力、專注力和增加邏輯思考能力，將記憶卡牌於英文發音結合在一起，便可提高學習英語發音的記憶力，也能讓學習過程變的好玩又有趣。

圖 2. 物聯網英文教具記憶卡牌

本作品結合了記憶卡牌、物聯網系統與應用外語系同學真人發音，可以透過抽換牌面快速更換不同的學習主題，讓學童的學習字彙多樣化。遊戲方法簡單有趣、容易被較幼小的學童接受。相較於傳統的記憶卡牌，需要用眼睛來判斷翻起的卡牌是否正確，因每張卡牌都是物聯網元件、所以本作品能夠自動判斷翻牌正確與否、同時並提供學童自然發音的學習刺激。而所有操作紀錄均可上傳至雲端資料庫，並提供網站讓家長或教師可即時查詢學童的學習狀況。

本作品使用 ARM Cortex–M0 微控制器來讀取三軸感測器 X 軸和 Y 軸的值，來判斷目前記憶卡牌為正面、反面，並使用 NRF51822 藍芽模組無線廣播將每塊記憶卡牌的狀態統一傳給主控端，再傳送操作數值傳送至行動裝置，行動裝置分析所接收到的數值，判斷每塊記憶卡牌為正面或反面，並依照所有記憶卡牌的狀態來控制是否撥放記憶卡牌上的圖樣之英語自然發音。同時將時間、翻牌順序、答對次數和答錯次數等數據上傳至 Google 試算表進行分析，並且提供網站讓老師及家長可以即時在任何裝置上查詢。為了加強學童的學習動機，我們還設計出互動 IoT 扭蛋機，在孩童完成記憶卡牌配對時自動轉出一顆扭蛋，透過獎勵的方式，強化孩童學習英文的興趣。

表 1. 傳統記憶卡牌的優缺點

Fig. 3 Classification of long and short vowels

Fig. 4 IoT English teaching Memory Card

Fig. 5 System architecture diagram