

二零二三年香港學生科學比賽

延伸摘要範本 (發明品)

(字數上限：2,500 字, 頁數上限：3 頁)

隊伍號碼：SAPE121

作品名稱：伴讀解

參賽類別：發明品

就我們所知，坊間有/沒有*類似的作品；(如有) 相關產品連結如下：

https://www.hkedcity.net/sen/spld/subject/page_556567e0316e83cc07010000

<https://www.heephong.org/whatsnews/heep-hong-news/detail/new-apps-read-and-write-trooper>

我們的作品所作出的改良 / 其不同之處為：

根據調查，現時的網上的自學平台主要的服務對象都是正常學生，而能夠幫助有障礙的學生的都是一些桌遊和卡牌遊戲，缺乏一些實體上手去改善寫字認字的 app，我們認為這些 app 的實際應用並不能改善情況，因此我們才設計這個為讀寫障礙學童的線上自學平台。

**請刪去不適用。本比賽重視作品的原創性，學生須於開始研究或發明前作足夠的文獻搜索以確保自己的作品具一定獨特性並列出相關參考資料。*

I. 前言

一般家長都會選擇把字詞寫在紙上，然後對摺多次，問小朋友怎樣寫？如果小朋友不記得怎樣寫時，可以打開紙張再看一次，想看多少次也可以，只是必須要把紙張對摺好才可以默寫。在對摺的時候，亦可給予時間讓他們去記憶。

家長平時在教導自己子女的時候經常會感到焦慮和煩躁，不知道從何下手指導。為了解決這種現狀，我們悉心改良了這個方法，讓子女能夠獨立學習，讓家長能夠騰出多點時間完成自己的工作。

為了解決讀寫障礙學童的自身學習的劣勢，因此我們針對他們平常會遇到的困難設計這個應用程式去增強他們對學習的興趣和自信心。他們需每天進入程式觀看字詞教學片段，學習字詞的意思，讀音和筆畫順序然後嘗試讀和寫，同過語言分析技術及人工智能判斷用家的讀音的字詞相似度是否通關。

<https://asld.org.hk/%e6%94%bf%e7%ad%96%e5%8f%8a%e7%a4%be%e6%9c%83%e8%b3%87%e6%ba%90/>

<https://youtu.be/Ultm7AQDo9I>

II. 目標

我們的應用程式想以「每日一讀，每日一寫」的學習技巧讓患有讀寫障礙的學童加強對文字的讀寫訓練，解決在學習困難的處境和心態問題。我們期望這個應用程式用家能夠在對字詞的認識上重新打好基礎，在未來學習的日子能夠簡單點。

III. 研究方法

我們利用 app inventor 製作了一個應用程式，幫助患有讀寫障礙的兒童，有自製的教學短片幫助他們認識字詞的寫法，意思和讀音，有語音識別系統去訓練他們的發音標準和利用 AI 去識別他們寫在白紙上的字詞的整潔度，幫助他們減少發生寫錯字的機會和幫助他們認字。我們已經全面開發這個應用程式并且投入使用。在製作階段，我們找了不同的人寫下了不同的字形模樣協助 AI 訓練能夠辨識各種不同的字詞；即使你的字形不太端正和潦草，只要符合在合格範圍之內都能過關。

IV. 發明品的設計

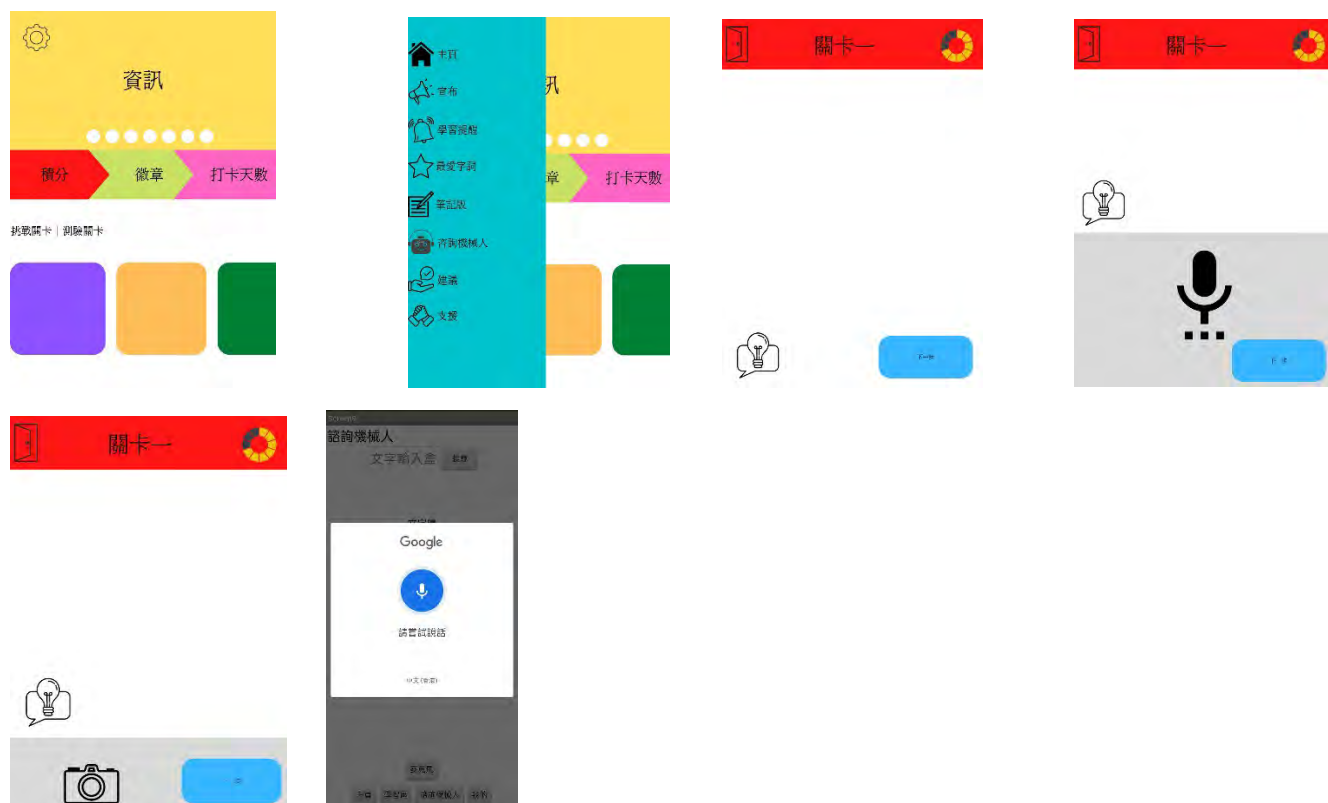
- 描述發明品的設計和原理 (例如：描述項目的意念、並舉出原形及不同的創意方案)
- 展示相關草圖、圖畫或照片

我們利用了 MIT App Inventor 來開發我們的手機應用程式

Personal Image Classifier (AI 識別)，將目標照片上傳到網站並訓練，就可以把訓練好的。到您的 App Inventor 專案中，投入使用作圖像識別。

MIT App Inventor 的 Google 語音輸入法來開發**語音識別功能**，為聲音進行語音輸入及辨識功能

利用了 IBM Cloud 的 **NLP** 及 **Watson assistant** 來配合**機械人辨識功能**，解讀諮詢的問題和用意並作出建議回覆。



V. 相關應用 / 市場需求

我們的 app 和市面上的一些認字學習 app 很類似，但經過我們的一些問卷調查和一些 app 的試玩我們發現在學習障礙的學生並沒有一些經常使用的輔助性 app 我們希望可以填補市場在這方面的空缺我們和普通的 app 一樣有認字學習意思的功能 不過我們更希望去改變他們的字體整潔度 我們加入了 ai 分析去更改他們的字體也創新性的加入了老師系統 我們主要是希望他們可以依靠我們的 app 去跟進他們的學習進度 根據資料發現近年患有學習障礙的人數有明顯的上升 我們希望這款 app 可以成為他們在學校學習中重要的一部分 我們可以和市面上一些實體補習等合作以廣告形式達到持續改進等 不過可能會收到自律性的限制 我們的 app 比較偏向自行使用 不過我們在 app 內會有排行榜希望可以增加用戶對於 app 的粘性。

VI. 如發明品將角逐可持續發展大賞，請列明作品與哪一個可持續發展目標有關，並說明參與競逐此獎項的原因。(字數上限 500 字)

如果我們的應用程式角逐可持續發展大賞，那我們的作品和第 4 個可持續發展目標有關，即提供優質教育，我們的組員內就有患有學習障礙的同學，我們深刻的感覺到了患有學習障礙同學的困難，可能在相同的時間內學習時間內大家的學習效率是完全不一樣的，這樣會大大的打擊他們的求學欲，反復以往形成惡性循環造成學習上的巨大困難，我們希望我們的 app 可以幫助他們在學校內緊跟正常同學的學習進度和正常同學的成績形成競爭關係以激勵他們的求學欲形成良性循環。改善字體也可以相同原理，誰又不希望自己能寫得一手好字呢？而在校外我們希望增加他們的自律自己使用 app 去改善或學習，而 app 也可以給予有進行補習的同學一些補習上的幫助，補習老師可以根據 app 上的學習進度去幫助同學進行補習，形成良性循環的改善可以讓同學考上自己夢想的學校等，以增加他們日後就業的選擇，從根源上減少不平等機會讓同學回歸到正常生活。

VII. 如發明品將角逐社會創新大賞，請列明作品所針對的目標群組或社會議題，並說明參與競逐此獎項的原因。(字數上限：500字)

如我們的應用程式將角逐社會創新大賞，我們的作品對針對患有讀寫障礙的學童。他們主要特征是認字能力差，寫出來的字會較繚亂和會認錯字，長期下去可能會因自己的缺陷而導致自己壓力過大或放棄學業。我們的應用程式提供了發音和寫字訓練還自製了不同字詞的教學短片，片中有該字詞的解釋，書寫時的筆畫步驟和發音，讓學童能夠在認識字詞之餘還可以通過關卡中訓練自己的朗讀和寫字能力，通過我們的應用程式日復一日慢慢幫助他們增加對學習的興趣和自信心，給他們一個與他人競爭的機會。

VIII. 結論

我們有四大可持續發展方向；第一，我們以半年為一個階段，每階段的字詞都會因應當下的常用性和學習進度而有所轉變。第二，會和特殊學習課程的導師合作，共同策劃獎勵計劃和培訓活動，為學生進行針對性的訓練。第三，我們會定期根據學生表現進行評語和心理輔導。第四，為確保應用程式能全面符合學生需求，時不時會向學生諮詢意見並作出優化。

我們學校有伴讀大使計劃，目的是幫助有特殊需要的學生改善他們的中文語文能力，而改善的方法是老師單對單為同學進行中文輔導，而這些輔導一般都是默寫。在這種情況下，我們嘗試將我們的應用程式投入至使用，希望同學自己也能自主學習。

✦ 我們的作品是以之前的比賽作品為題進行了持續研習，有關改良如下：

- 在先前只有關卡訓練，為了增加娛樂性我們添加了一些能夠同時學習字詞的小遊戲
- 加入了諮詢機器人，目的是讓學生學會更多資訊
- 設計了進度條讓學生清楚知道自己的學習情況
- 自製了教學短片讓學生能夠在進入關卡前學會字詞的書寫步驟和字詞意思

Hong Kong Student Science Project Competition 2023

Template of Extended Abstract (Invention)

(Word Limit: 1,600 words, Pages: 3 pages only)

Team Number:

Project Title:

Project Type: Invention

To our best knowledge, there are / are no * similar works in the market; (if there are,) related product links are as below:

<https://www.heephong.org/whatsnews/heep-hong-news/detail/new-apps-read-and-write-trooper>

The enhancement our project made / the difference with related products are:

According to the survey, the current online self-study platforms mainly serve normal students, while those that can help students with disabilities are board games and card games. There are no physical apps to improve handwriting and literacy. We believe that the practical application of these apps will not improve the situation, so we designed this online self-learning platform for dyslexic children.

**Please delete if not applicable. The competition values the originality of works. Students must do enough literature research to ensure that their works are unique and list relevant reference materials before starting research or invention.*

I. Background

Generally, parents will choose to write the words on the paper, then fold them in half several times, and ask the children how to write them? If the child does not remember how to write, he can open the paper and read it again, as many times as he wants, but the paper must be folded in half before he can write silently. When folding in half, you can also give them time to remember.

Parents often feel anxious and irritable when teaching their children, and do not know where to start. In order to solve this situation, we carefully improved this method, so that children can study independently and parents can free up more time to complete their work.

In order to solve the learning disadvantages of children with dyslexia, we designed this app to enhance their interest and self-confidence in learning according to the difficulties they usually encounter. They need to enter the program every day to watch word teaching clips, learn the meaning, pronunciation and stroke order of words, and then try to read and write, and use language analysis technology and artificial intelligence to judge whether the word similarity of the user's pronunciation is clear.<https://asld.org.hk/%e6%94%bf%e7%ad%96%e5%8f%8a%e7%a4%be%e6%9c%83%e8%b3%87%e6%ba%90/>

II. Objectives

➤ State the **aim(s)** of project

Our app wants to use the learning skills of "reading once a day, writing once a day" to help children with dyslexia strengthen their reading and writing training, and solve their learning difficulties and mentality problems. We hope that users of this app will be able to re-establish a solid foundation in word recognition and make their learning days easier in the future.

III. Methodology

We use app inventor to make an app to help children with dyslexia. There are self-made teaching videos to help them recognize the spelling, meaning and pronunciation of words. We have a speech recognition system to train their pronunciation standards and use AI to Recognize the neatness of words they write on white paper, help them reduce the chance of writing mistakes and help them recognize words. We have fully developed the application and put it into use. In the production stage, we asked different people

to write down different glyphs to assist AI training to recognize various words; even if your glyphs are not correct and scribbled, as long as they meet the qualified range, you can pass the test.

IV. Design of Invention

We used MIT App Inventor to develop our mobile app

Personal Image Classifier (AI recognition), upload the target photo to the website and train it, and the training can be completed. into your App Inventor project for image recognition.

MIT App Inventor's Google voice input method to develop voice recognition function, voice input and recognition for voice

Using IBM Cloud's NLP and Watson assistant to cooperate with the robot recognition function, interpret the questions and intentions of the consultation and make suggestions and replies.

V. Application / Market Need

- Explain the area of **application** and function of invention
- Indicate the market need and impact of invention
- Discuss **limitation** and compare with existing related works (if any)

Our app is very similar to some word recognition learning apps on the market, but after some of our questionnaire surveys and some app trials, we found that students with learning disabilities do not have some frequently used auxiliary apps. We hope to fill the market. The vacancy in this area, we have the same function of learning characters as ordinary apps, but we hope to change their font tidiness. We added AI analysis to change their fonts and innovatively added the teacher system. We mainly hope They can rely on our app to track their learning progress. According to the data, the number of people with learning disabilities has increased significantly in recent years. We hope that this app can become an important part of their school learning. We can share tutoring with some entities on the market. Such as cooperation in the form of advertising to achieve continuous improvement, etc. However, there may be self-discipline restrictions. Our app is more inclined to use by ourselves, but we will have a leaderboard in the app, hoping to increase user stickiness to the app.

VI. If your team will compete the Sustainable Development Award, please indicate the specific sustainable development goal the project is related to, and provide justification for competing for this award. (Word limit: 300 words)

If our app competes for the Sustainability Awards, then our work is related to the 4th SDG, which is to provide quality education. There are students with learning disabilities in our team members, and we deeply feel that people with The difficulty of students with learning disabilities may be that everyone's learning efficiency is completely different in the same learning time, which will greatly dampen their desire to learn, and repeat the past to form a vicious circle and cause great difficulties in learning. We hope that we The app can help them keep up with the learning progress of normal classmates in school and form a competitive relationship with normal classmates' grades to stimulate their desire to study and form a virtuous circle. The same principle can be used to improve fonts. Who doesn't want to be able to

write well? And outside of school, we hope to increase their self-discipline and use the app to improve or learn by themselves, and the app can also give some tutoring help to students who have tutoring. Tutor teachers can help students with tutoring according to the learning progress on the app, forming a benign cycle. The improvement of the cycle can allow students to be admitted to the school of their dreams, etc., so as to increase their employment options in the future, reduce unequal opportunities at the root and allow students to return to normal life.

VII. If your team will compete the Social Innovation Award, please list the target group or social issue the project focuses on, and provide justification for competing for this award.
(Word limit: 300 words)

As our app will be competing for the Social Innovation Awards, our work is aimed at school children with dyslexia. The main feature of them is their poor ability to recognize characters, their writing will be confusing and they will recognize wrong words. In the long run, they may be overstressed or give up their studies due to their own defects. Our app provides pronunciation and writing training, and we also make teaching videos of different words, which include explanations of the words, stroke steps and pronunciation when writing, so that students can learn words through Train your reading and writing skills in the level, and slowly help them increase their interest in learning and self-confidence through our app day after day, and give them a chance to compete with others.

VIII. Conclusion

- We have four sustainable development directions; first, we take half a year as a stage, and the words in each stage will change according to the current common use and learning progress. Second, we will cooperate with the tutors of special learning courses to jointly plan reward programs and training activities, and provide targeted training for students. Third, we will regularly conduct comments and psychological counseling based on student performance. Fourth, in order to ensure that the application program can fully meet the needs of students, students will be consulted and optimized from time to time.
-
- Our school has a companion reading ambassador program, the purpose of which is to help students with special needs improve their Chinese language ability. The method of improvement is that the teacher provides one-on-one Chinese tutoring for students, and these tutoring are usually dictation. In this case, we try to put our application into use, and hope that students can learn by themselves.

*** Our project is developed based on previous project and the enhancement is below:**

- In the past, there were only level training. In order to increase entertainment, we added some small games that can learn words at the same time
- Added a consulting robot, the purpose is to let students learn
- A progress bar is designed to let students know their learning situation clearly
- Self-made teaching videos so that students can more information