Anki Auto-lookup

A convenient tool for English learning

B08901062 張家翔[1] B07202020 王昊謙[2] B07202037 徐鼎翔 [2]

[1]Department of Electrical Engineering
National Taiwan University

[2]Department of Physics
National Taiwan University

January 7, 2020

Table of Contents

Introduction

- Anki: a cross-platform flashcard application with API and HTML support.
- Goal: a learning tool to help user generate flashcards.
  - Automatic lookup
  - Detailed dictionary entries
  - Convenient UI
  - Article analysis
  - *Image recognition

Wordlist Window

- **treading**: multitasking
- Inherit from tk.Frame
- Adding scrollbar, checkbutton, automatic updates, etc.

Crawler

colour

noun UK (US **color**)

UK /kʌl.əʳ/ **US** /kʌl.ɚ/

colour *noun* (APPEARANCE)

A1 [C or U]

red, blue, green, yellow, etc.

顏色

- *What's your favourite colour?*
  你最喜歡甚麼顏色？
- *She wears a lot of bright colours.*
  她穿得很鮮艷。
- *What colour are your eyes?*
  你的眼睛是甚麼顏色的？
- *Does the shirt come **in** any other colour?*
  這件襯衫有其他顏色的嗎？
- *I like rich jewel colours, such as purple, blue, and green.*
  我喜歡濃重的寶石色，如紫色、藍色和綠色。
- *Are the photos **in** colour or black and white?*
  照片是彩色的還是黑白的？

[U]

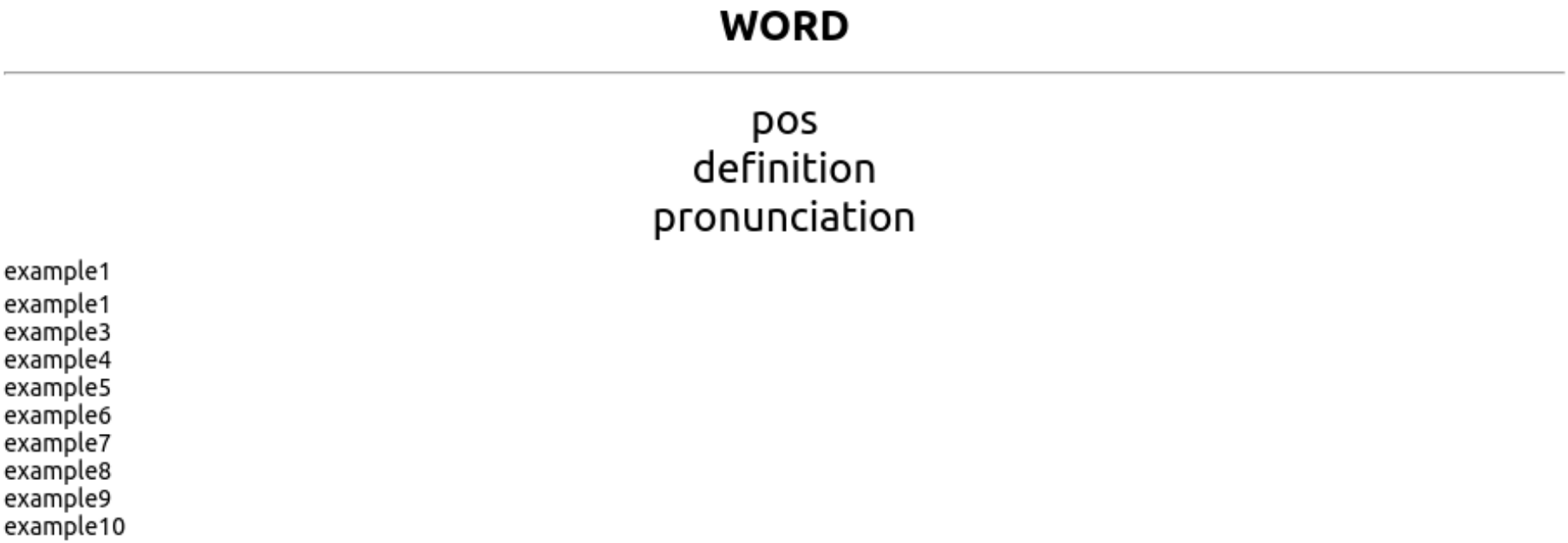
the pleasant effect of a bright colour or of a lot of colours together

色彩，色調

- *I think we need a bit of colour in this room.*
  我覺得我們這個房間需要增加一點色彩。
- *Red and yellow peppers give a little colour to the sauce.*

Adding Cards

Step 1: Connect with Anki API.
Step 2: Create a model that contains the fields we need.



Adding Cards

Step 3: Create a new card using the information got by the crawler.

raise

---

verb

/reɪz/

舉起；抬起；提起, 增加；提高；改善, 引起，導致；使存在, 養育；餵養；種植, （賭牌時）比對手多下賭注，提高（賭注），加賭注, 解除；終止；解（禁），（尤指透過電話或無線電）與...取得聯繫，與...通話

Would all those in favour please raise their hands?
He raised the window and leaned out.
The government plan to raise taxes.
I had to raise my voice (= speak more loudly) to make myself heard over the noise.
Her answers raised doubts/fears/suspicions in my mind.
This discussion has raised many important issues/problems.
Her parents died when she was a baby and she was raised by her grandparents.
The lambs had to be raised by hand (= fed milk by people) when their mother died.
I'll raise you.
I'll raise you $50.

noun

/reɪz/

加薪

She asked the boss for a raise.

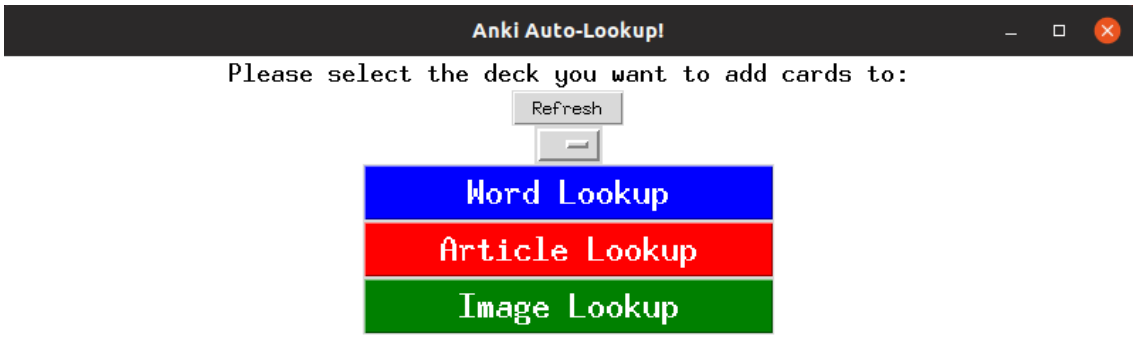
Article Analysis

- A dictionary with frequency of english word used in American movie subtitles, lyrics, TV shows, etc.
- Define vocabulary difficulties as frequency of usage.

GUI

Module: **tkinter**

- Menu (select decks, select functions)
  - Word Lookup
  - Article Lookup
  - Image Lookup



Word Lookup

1. When you key in 'Enter', add the line into 'Words to be added' column.
2. When you press 'Done', add the words into Anki.

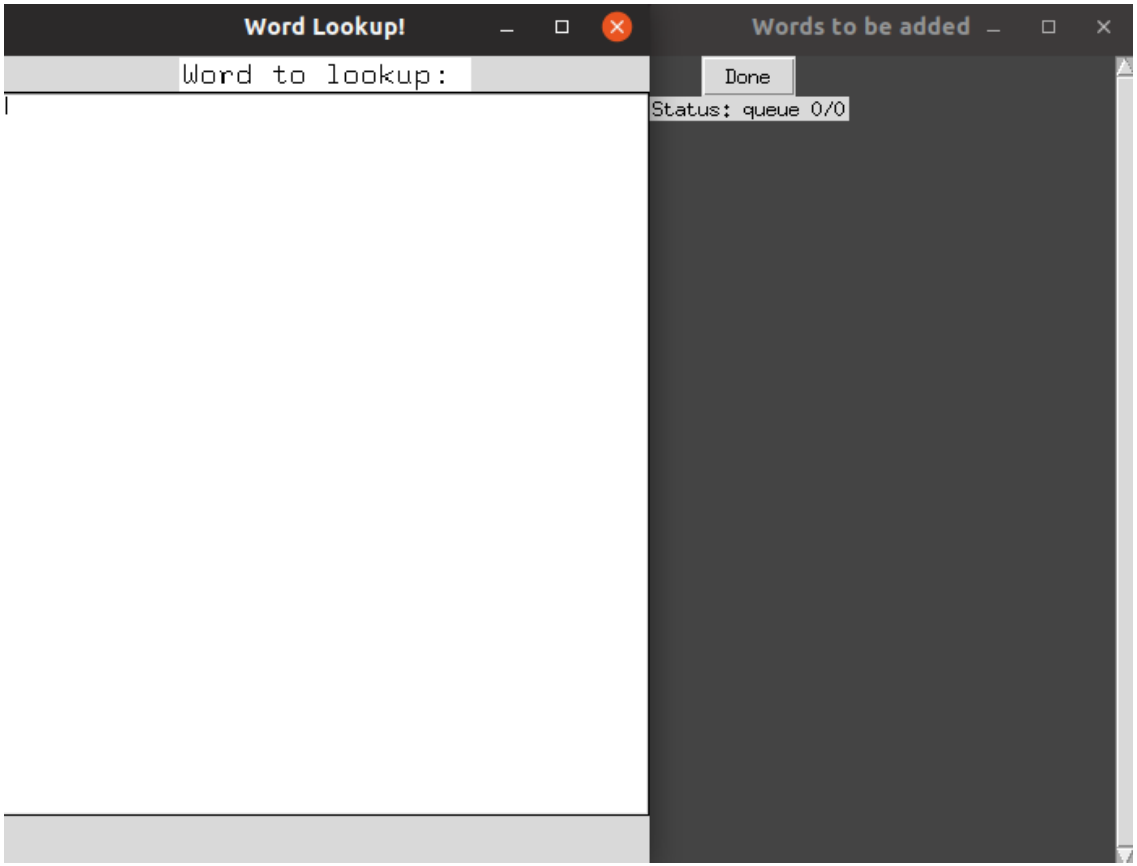


Image Recognization

Goal: Indentify words in a picture and generate flashcards.

BREAKING THE STATUE

i have always known
i just didn't understand
the inner conflictions
arresting our hands
gravitating close enough
expansive distamce between
i couldn't give you more
but i meant everything
when the day comes
you find your heart
wants something more
than a piece and a part
your life will change
like a statue set free
to walk among us
to create d estiny
we didn't break any rules
we didn't make mistakes
making beauty in loving
making loving for days

SHILOW

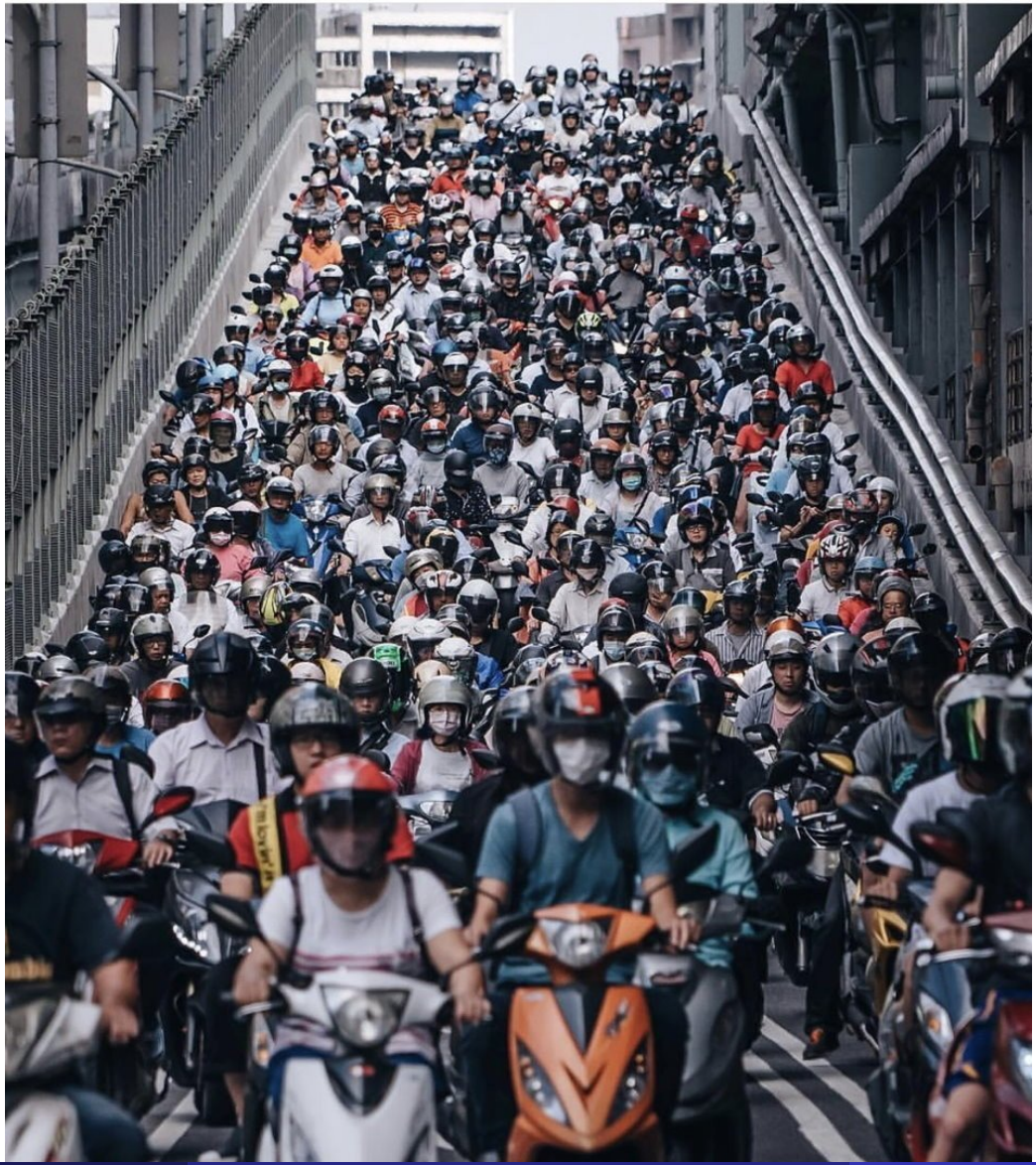
Figure: Target picture

Method

Step 1: Convert the picture to grayscale, then set the darker pixels to absolute black, lighter pixels to absolute white.
Step 1-1: To implement Step 1, we turn the picture into np.arrays.

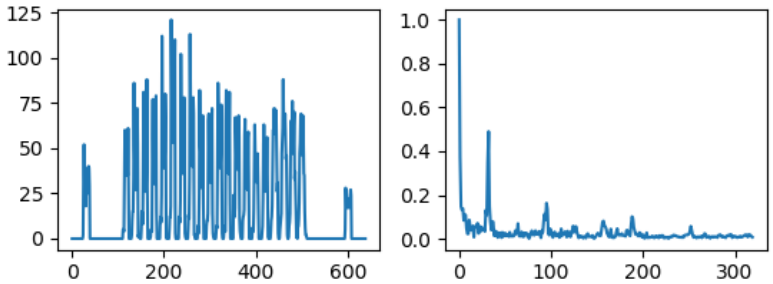
Task

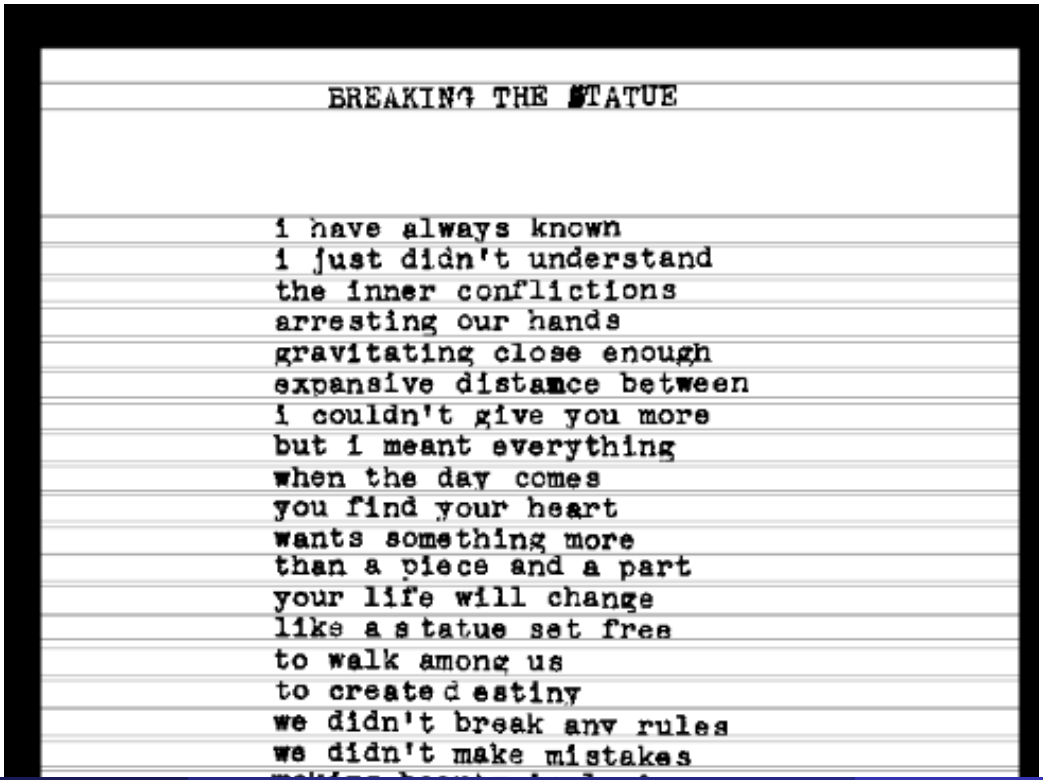
How do computers recognize a word?



Fourier Transform

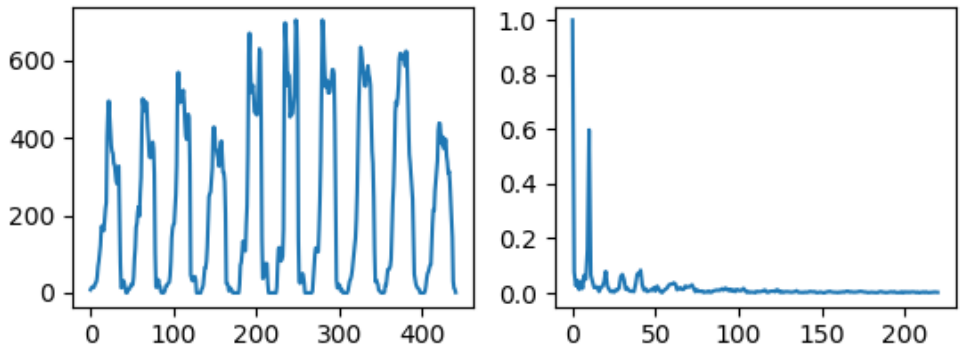
Seems good...but does it?





Fourier Transform

Fewer data lead to less precision.

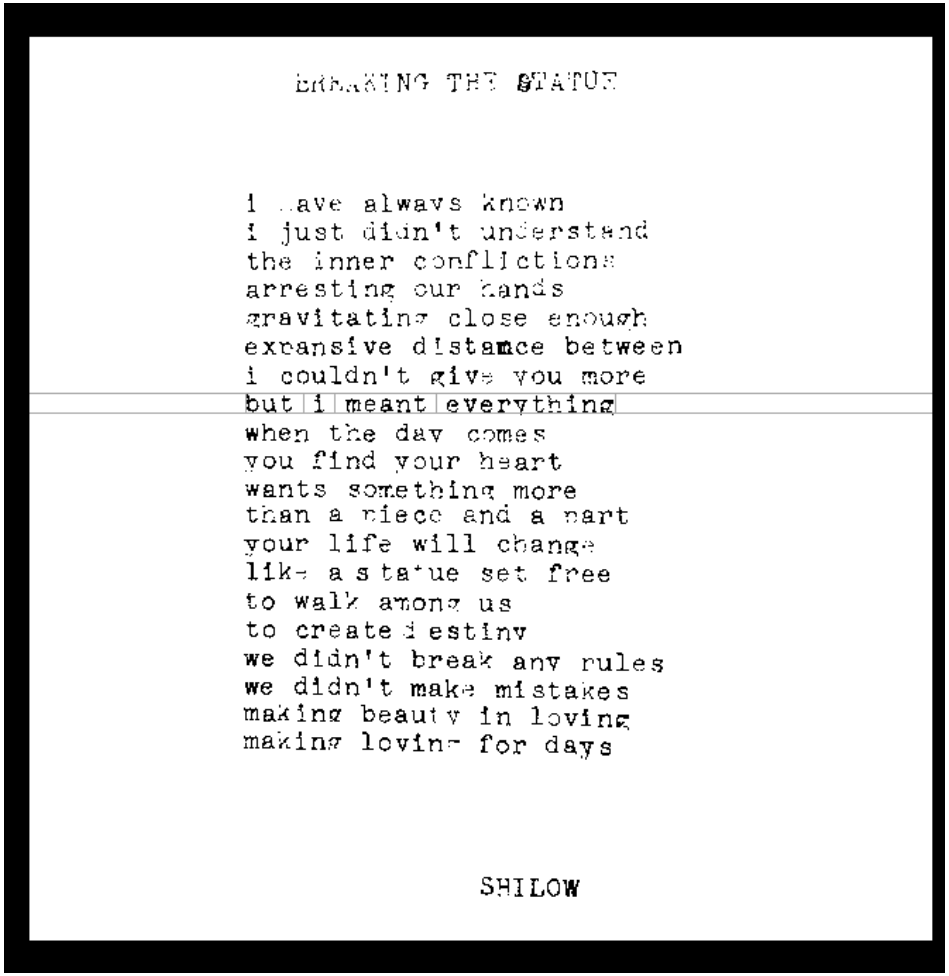


Here, then, is a wonderful machine for generating new solutions, with higher and lower energies—if we could just find *one* solution to get started! We call $\hat{a}_+$ **ladder operators**, because they allow us to climb up and down in energy: $\hat{a}_+$ is the **raising operator**, and $\hat{a}_-$ the **lowering operator**. The "ladder" of states is illustrated in Figure 2.5.

But wait! What if I apply the lowering operator repeatedly? Eventually I'm going to reach a state with energy less than zero, which (according to the general theorem in Problem 2.3) does not exist! At some point the machine must fail. How can that happen? We know that $\hat{a}_-\psi$ is a new solution to the Schrödinger equation, but *there is no guarantee that it will be normalizable*—it might be zero, or its square-integral might be infinite. In practice it is the former: There occurs a "lowest rung" (call it ψ_0) such that

Method

Step 2-1: When the number of black pixels on a row (of pixels) is below a threshold, the row is recognized as the boundary of the line.
Step 2-2: Detect the wider white columns to identify words.



Method

Step 3-1: Detect the words in the line, use the order to determine which word I selected. We get WordFromLine.
Step 3-2: Detect the word in the region I selected. We get WordFromWord.
Step 3-3: If the WordFromLine is similar to WordFromWord or len(WordFromWord)=0, return WordFromLine. Else, return WordFromWord.