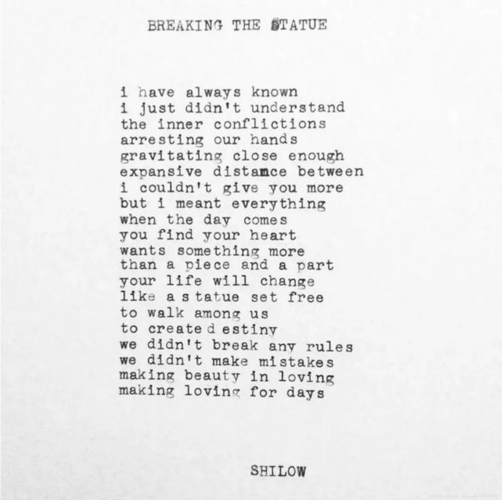
January 6, 2020

Image Recognization

Goal: Indentify the word in the picture and use it to generate the card.



BREAKING THE STATUE

i have always known
i just didn't understand
the inner conflictions
arresting our hands
gravitating close enough
expansive distance 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 s tatue 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

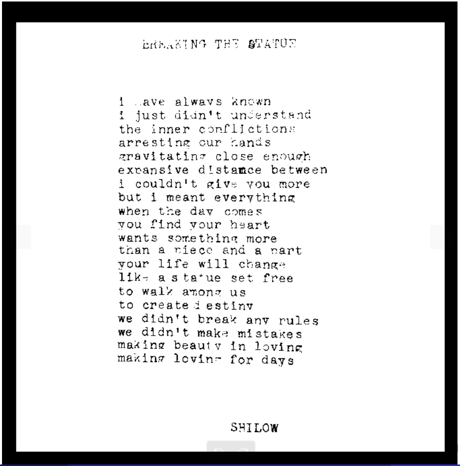
SHILOW

Figure: Target picture

Method

Step1: Convert the picture to gray color. Then, set the blacker one to total black, whiter one to total white.

Step1-1: To realize step1, we would turn the picture into array to deal with it.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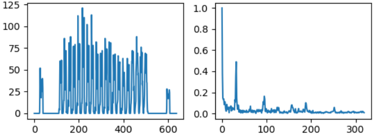
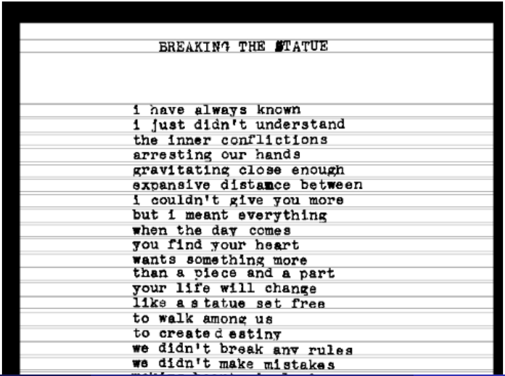
Task

How computer see a word?

Fourier Transform

It seems good but awful.





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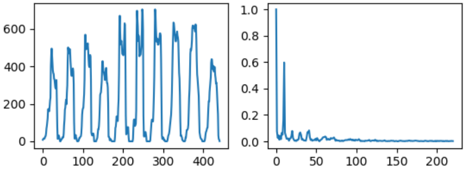
Fewer data lead to less precision.

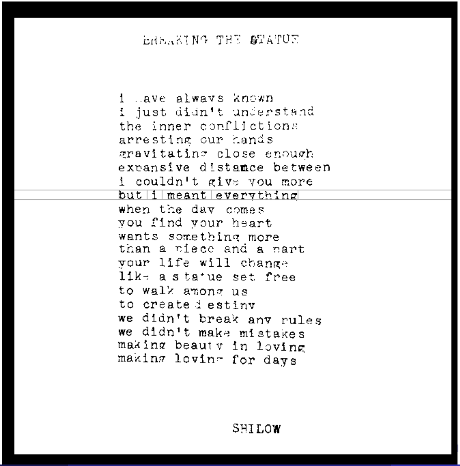


Here, then, is a wonderful machine for generating new solutions, with higher and lower energies—if we could just find *one* solution, to get started! We call $\hat{a}_\pm$ **ladder operators**, because they allow us to climb up and down in energy; $\hat{a}_+$ is the **raising operator**, and $\hat{a}_-$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

Step2-1: When the black pixels number is below the threshold number, recognize it as a white raw. This can help us detect the line.
Step2-2: Analyze the line, detect the wider white column to recognize the word.



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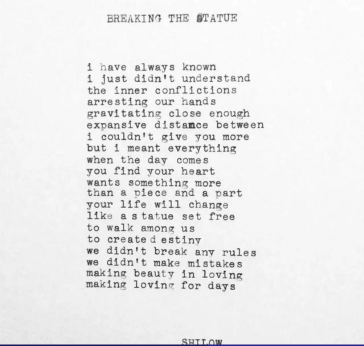
Method

Step3-1: Detect the words in the line, use the order to determine which word I selected. We get WordFromLine.
Step3-2: Detect the word in the region I selected. We get WordFromWord.
Step3-3: If the WordFromLine is similar to WordFromWord or len(WordFromWord)=0, return WordFromLine. Else, return WordFromWord.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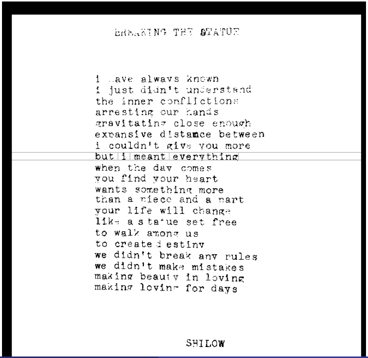
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