

# DSP 2020 Homework 3

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I break the viterbi algorithm for bi-gram into two parts, Forward and Backward parts. Besides, the mapping algorithm is listed in the third part.

## 1 Forward

I write forward algorithm according to equation of the derivation from the Q&A. In order to calculate and record the graph of the results, I use two vector score and path to record the details of the dynamic programming. While calculating the score of the viterbi algorithm, I also record the path for backward to trace the route and get the correct sequence that have the maximum probability..

The issue that I ran into is the encoding problem. I accidentally open the file with UTF-8 encoding and the mandarin character size of the UTF-8 is 3, instead of 2, letting me stuck in this bug for at least 4 hours until I see the follow up Q&A to check the file type. Furthermore, It's also hard to design the way to load the mapping files to transform different Zhuyin into different BIG5 character the correct character However, this time I learn the lesson from HW1 that I have to initialize the parameters every time calculating for dynamic programming.

## 2 Backward

After calculating the forward part of the viterbi algorithm, I write a backward algorithm to trace the route from the vector path to get the correct sequence.

## 3 Mapping

I write the source code of mapping Zhuyin to BIG5 with python, using dictionary and set data-structures to convert the mapping back.