

2. VITERBI DECODING

2.1 PSEUDOCODE FOR VITERBI ALGORITHM

The pseudocode for the Viterbi algorithm is as follows:

Let 'L' be the set of all labels/POS tags
Let 'N' be the tokens of a sentence
Let 'start' be the list of start probabilities
Let 'end' be the list of end probabilities
Let 'viterbi' be the numpy matrix to hold the best POS tag sequence values
Let 'backpointer' be the numpy matrix to hold back pointers

```
// Initialization: first column
for i (1..L):
    viterbi_table[i][0] = start[i] + emission[0][i]

// Recursion: all other columns
for j (1, N):
    for i (0, L):
        for x (1, L):
            temp = list((viterbi[x][j - 1] + trans[x][i]))
            viterbi[i][j] = emission[j][i] + max(temp)
            backpointer[i][j] = argmax(temp)

// Last Column
for i (1, L):
    end = list((viterbi[i][N - 1] + end[i]))
    last_seq = np.argmax(end)
    best_score = max(end_prob)

// Construct best sequence
best_sequence = [last_seq]
best_index = last_seq
for i reversed(1, N):
    best_index = backpointer[best_index][i]
    best_sequence += (best_index)

return best_score, best_sequence
```