

Helping Mobile Learners Know Unknown Words through their Reading Behavior

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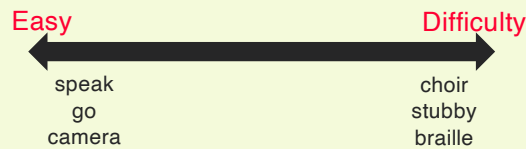
Osaka Prefecture University, Japan (and then Osaka Metropolitan University from April 1st, 2022)

1. Introduction

Vocabulary acquisition is a fundamental part of learning a new language

◆ Conventional

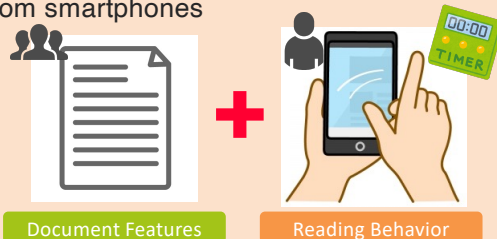
Estimation of unknown words based on **document features** such as frequency of occurrence, which indicates the difficulty of the word



✗ This approach can lead to missed unknown words

◆ Proposed

Estimation of unknown words based on document features & **reading activity data** from smartphones

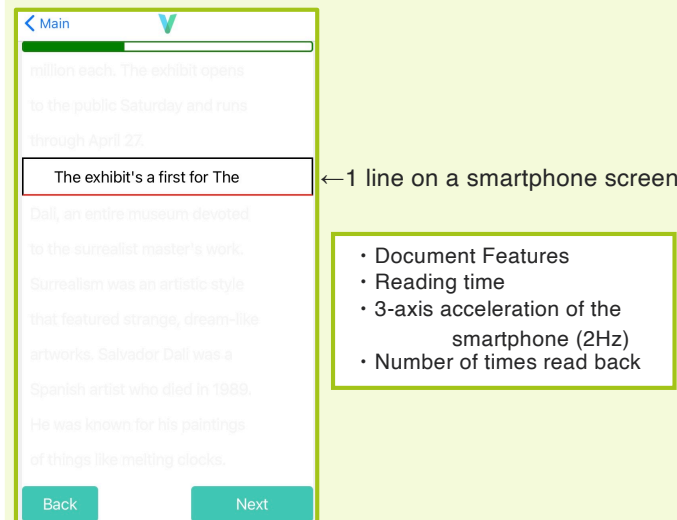


○ Using individual reading activity data, we can estimate unknown words for individual learners

2. Methods

Estimate unknown words by using reading activity data obtained from smartphone sensors

◆ Special Quantity Acquisition



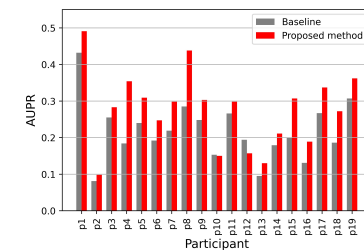
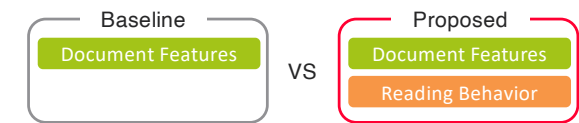
◆ Estimation

Support Vector Machine (Kernel : RBF)

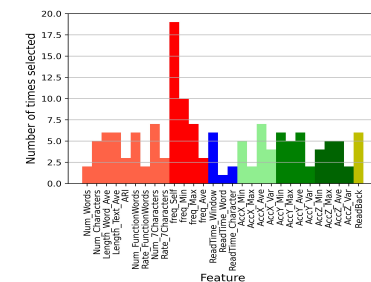
- Binary Classification
- Unknown word
 - Known word

3. Result

Evaluate using **AUC of precision-recall curve** under participant dependent conditions



- Effective for 17 out of 19
- Significant difference in the paired t-test



- 3-axis acceleration (2 Hz) of a smartphone is as effective as reading time

4. Conclusion

Using **reading activity data** obtained from smartphones, we can estimate **unknown words** according to individual learners.