法政大学
HOSEI University

Wordhyve:単語学習DXアプリ

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背景

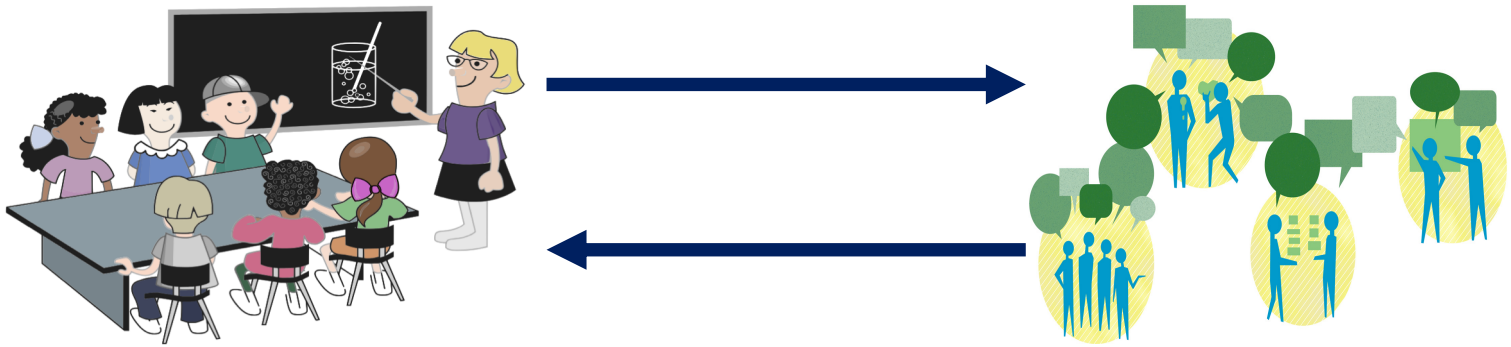
- **第二言語(L2)での語彙学習とは**
  - 第二言語（L2）における語彙学習、または第二言語語彙習得とは、第一言語（L1、「母語」または「母国語」とも呼ばれる）を習得した後に、別の言語の語彙を習得するプロセスを指します
- **語彙学習の重要性**
  - 語彙は言語のfoundationである
  - 語彙はどんな言語でもcore componentである(Richards et al. 2012)
  - 語彙は子どもたちの思考と学習を助ける
  - 語彙が少ないと、 自分のアイデアシェアリング、情報の共有、海外の友達と会話などができない
  - *“without grammar, very little can be conveyed; without vocabulary nothing can be conveyed”*(David A. Wilkins 1972)

L2の語彙学習は難しい

- 発音、書き方、綴り方、polysemyなど
- 語彙は教室ではなく授業後に暗記させる
- 新しく学んだ単語が忘れやすい(retention and transfer)
- 教室で学んだ単語を日常コンテキストで使うのが難しい

In-class activities

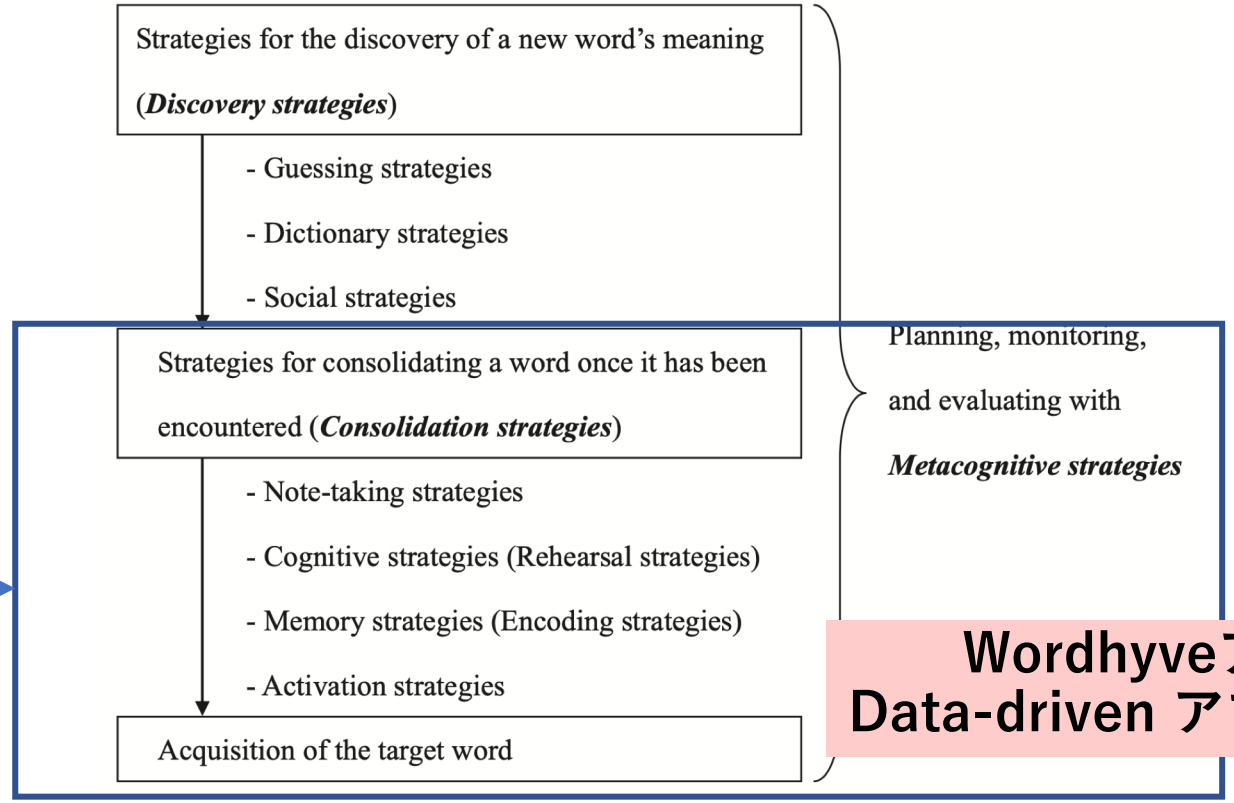
Out of-the class activity



語彙学習方略(VLS)

- 学習方略(leaning strategies)は、外国語教育の分野では 1975 年に初めて論文が発表され、過去40 年以上にわたって研究が進められてきた (水本篤 2017)
- 語彙学習方略(vocabulary learning strategies: VLS)は、多くの研究者・実践者の関心を惹きつけるものである

MarketplaceにあるAndroid・iOSアプリ



Wordhyveアプリでも Data-driven アプローチを採用

語彙学習方略(VLS)の分類(Mizumoto, 2010)

Data-drivenアプローチ

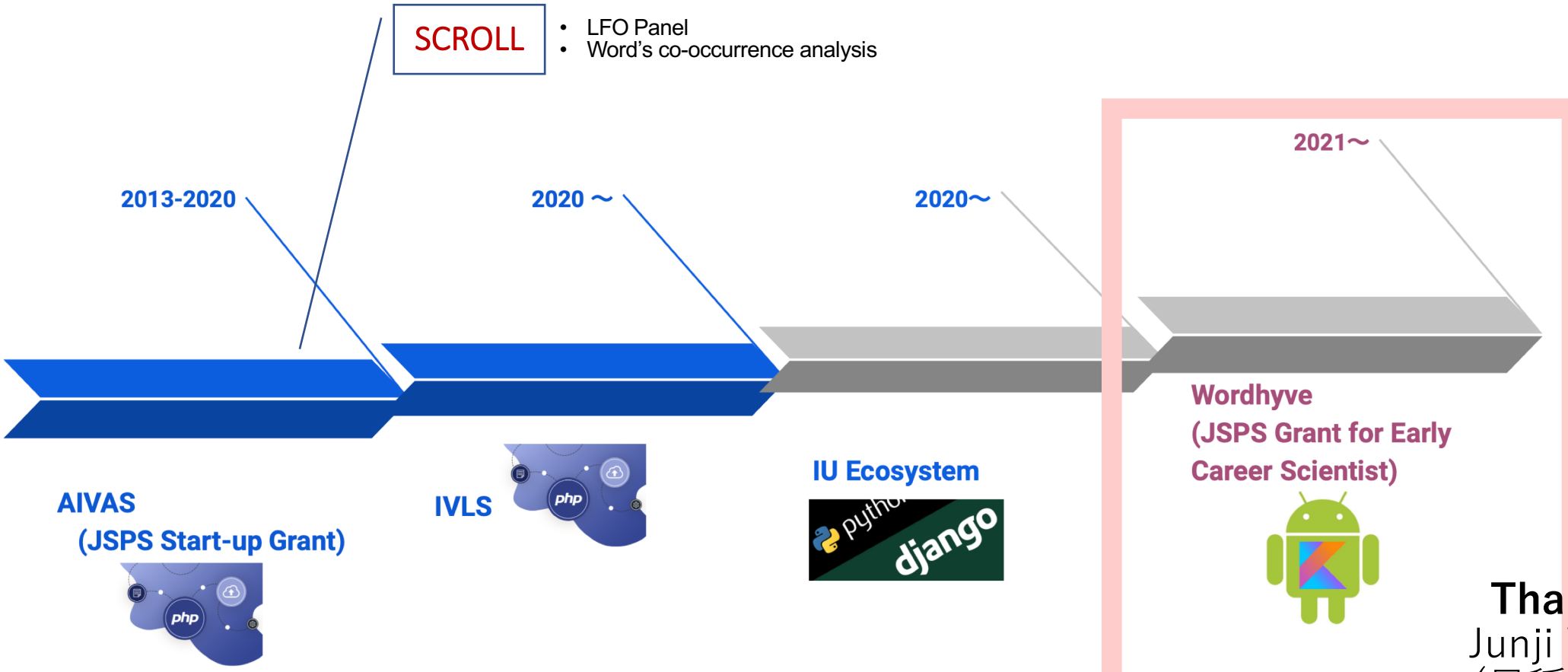
- **ユビキタスやセンサーテクノロジーを使用した語彙学習**

Anytime-anywhere学習

ラーニングログ

- **ラーニングログ(Learning log)とは**
  - 日常生活での学習の体験映像・画像・コメント・マルチメディアアノテーションなどをラーニングログとして蓄積し、他の学習者と共有することで、知識やスキルの獲得を支援する
  - 特に、その場所や時間など学習者の周囲の状況に適した情報を学習者に知らせ、学習者の環境やニーズと調和して適切な情報コンテンツを提供し、学習プロセスを支援する学習環境の構築を目指しています(毛利考佑 2011)

本研究では



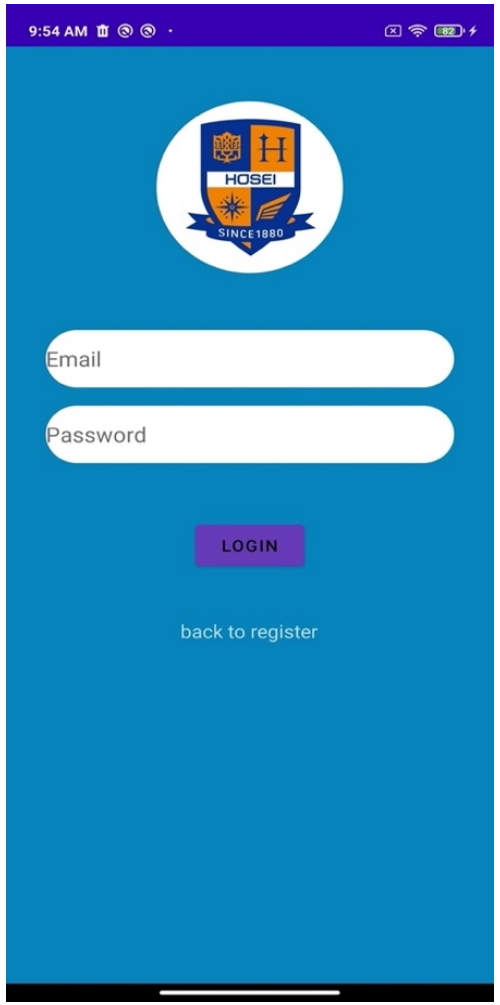
Thanks to
Junji Wuさん
(早稲田大学)

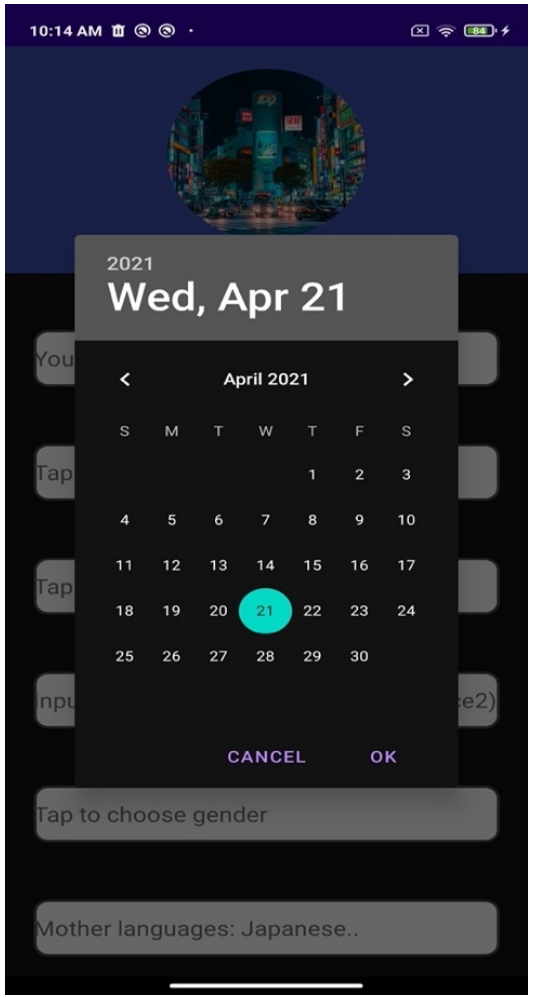
目的

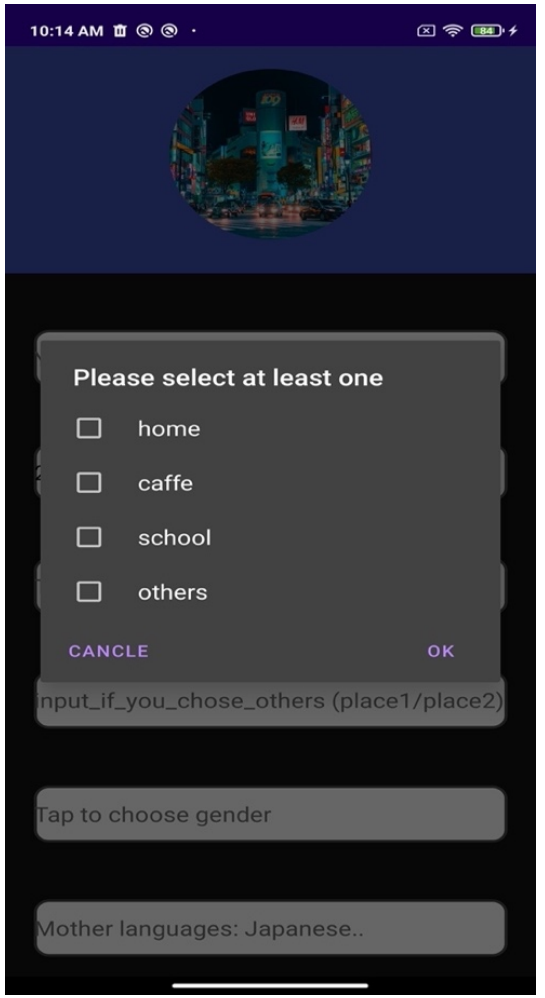
- **informalラーニングシステムの問題点**
  - あるアプリでは学びたい単語があればintentionalラーニングができる
  - incidentalラーニングまたはaccidentalラーニングの学習ができない
    - 単語のリストがアップデートされない場合学習が止まる

- **Wordhyveアプリでは、学習プロセスを支援する学習環境だけではなく単語学習スコープを高める**
  - 方法：主に、ライフログ画像・動画のシーン解析

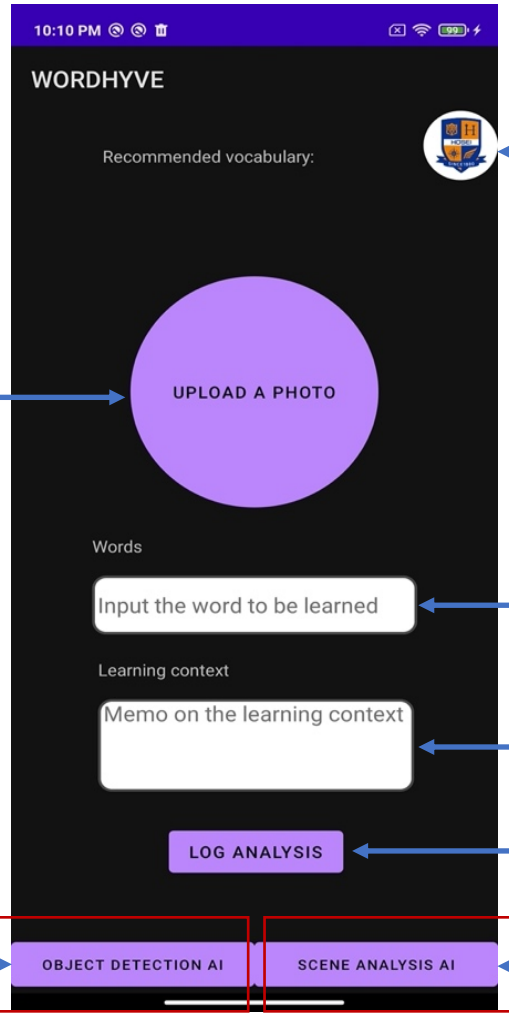
ユーザ登録画面


9:54 AM
HOSEI
SINCE1880
Email
Password
LOGIN
back to register


10:14 AM
2021
Wed, Apr 21
April 2021
S M T W T F S
1 2 3
4 5 6 7 8 9 10
11 12 13 14 15 16 17
18 19 20 21 22 23 24
25 26 27 28 29 30
CANCEL
OK
Tap to choose gender
Mother languages: Japanese..


10:14 AM
Please select at least one
home
caffe
school
others
CANCLE
OK
nput_if_you_chose_others (place1/place2)
Tap to choose gender
Mother languages: Japanese..

ライフロギング画面



画像のアップロード
（カメラからでもOK）

プロファイル設定

学びたい単語
（native・L2でもOK）

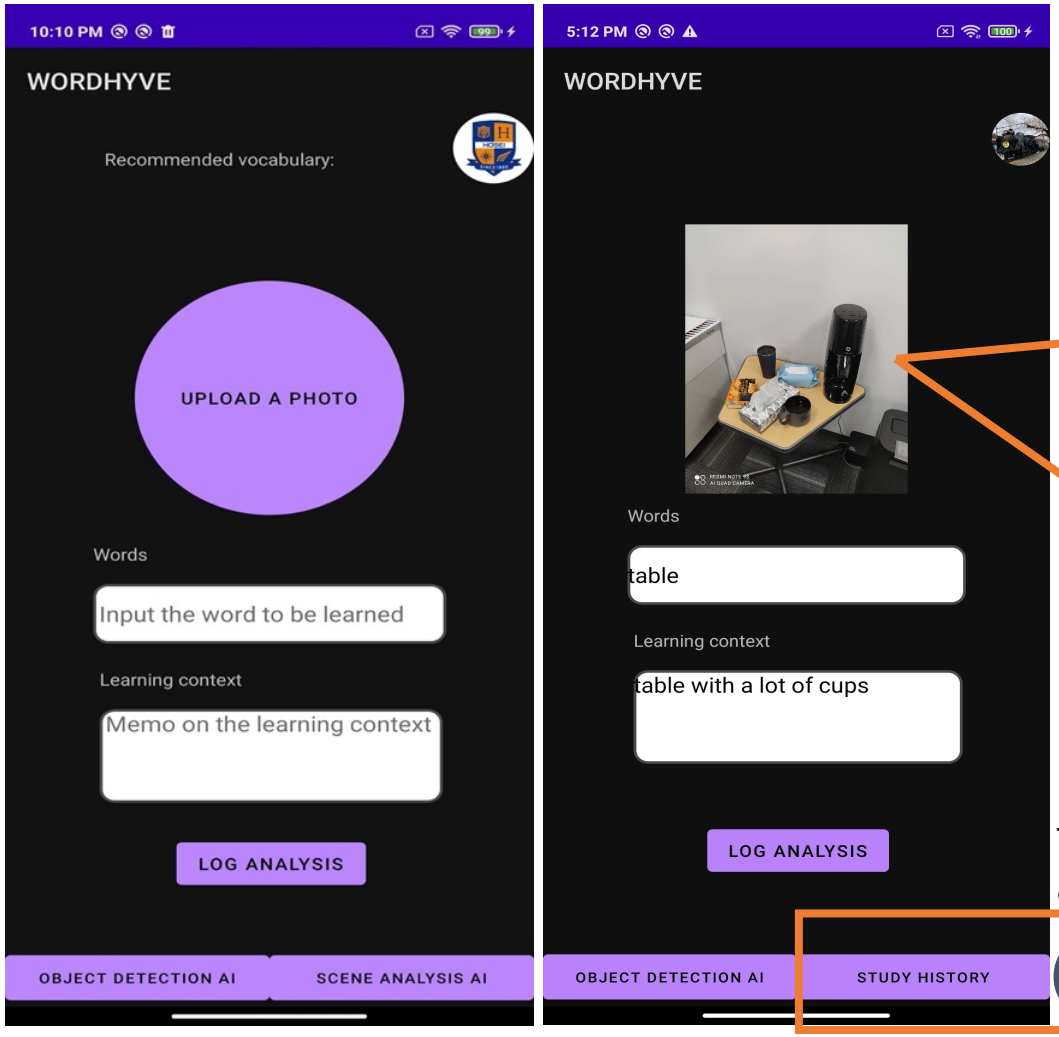
メモ

ログ分析

リアルタイムで
object detectionの機能

リアルタイムで
scene analysisの機能

ラーニングログの作成

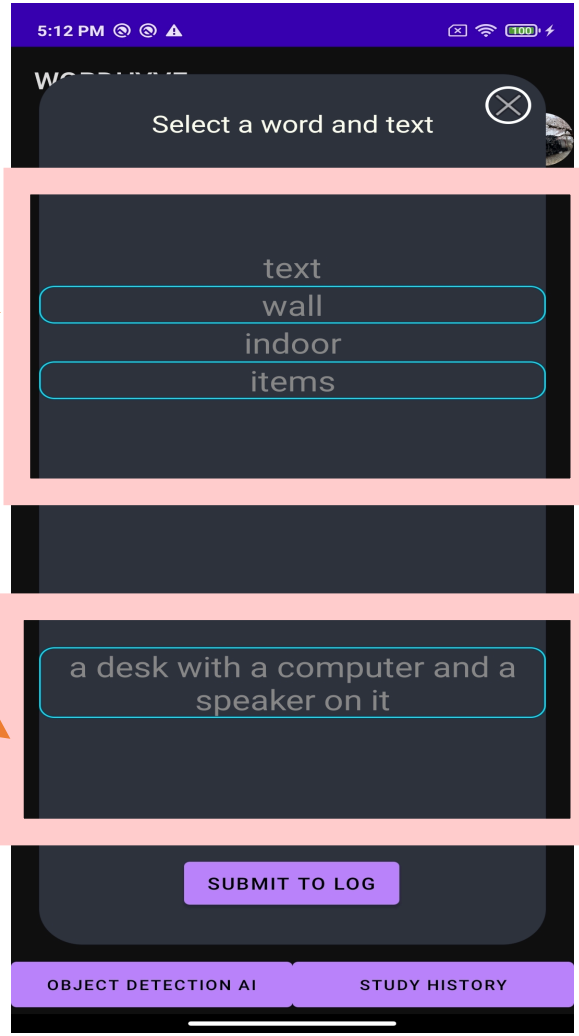


❶

ラーニングログとして保存する

Microsoft cognitive visionやMegviのサービス

❷ Wordhyve recommendationパネル



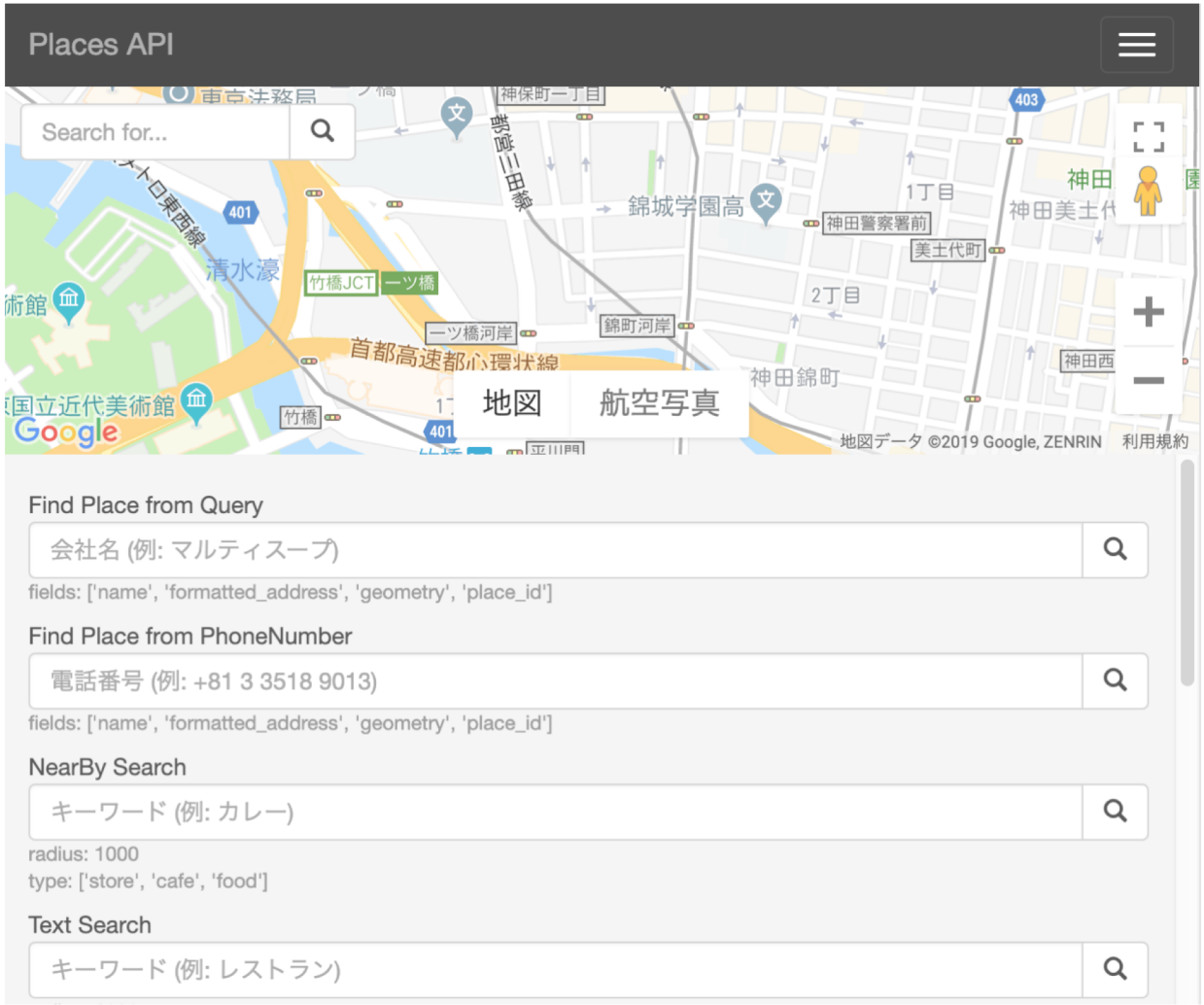
Incidental単語の推薦

Smartly-generated learning context(SLC)の推薦

ラーニングログ・データについて

- **学習者のDemographics情報**
  - 国籍
  - 年齢
  - 職業
  - いままでのL2経験
  - 目的など
- **Location情報**
  - どこで、何時、何を勉強しているか
  - 200メートルradiusのplace details
- **学習ログ**
  - 学びたい単語
  - 画像のEXIF情報
  - 画像のvisual scene情報
  - context情報など

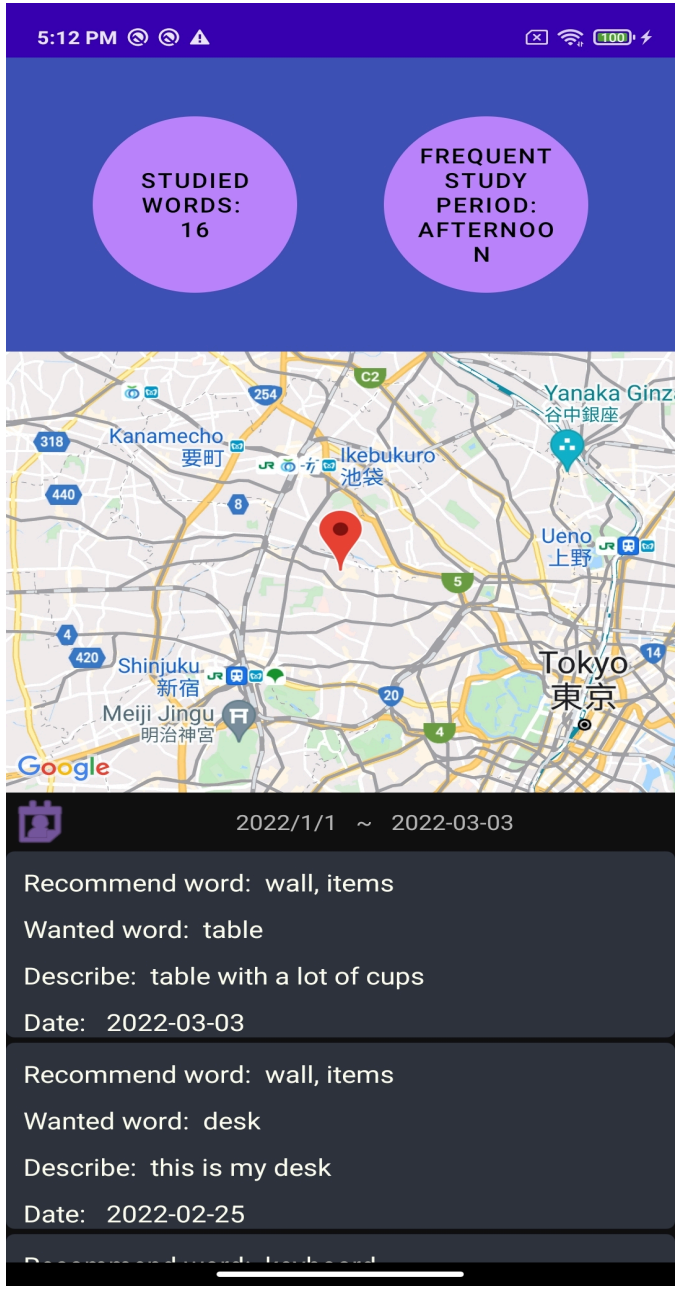
デモサイト



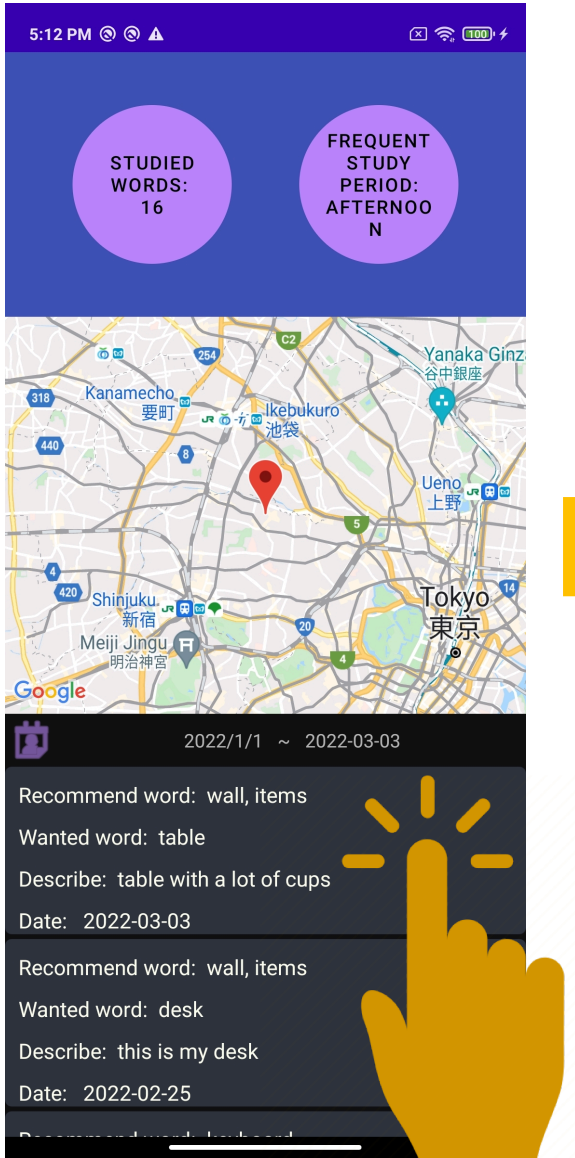
https://maps.multisoup.co.jp/blog/3211/

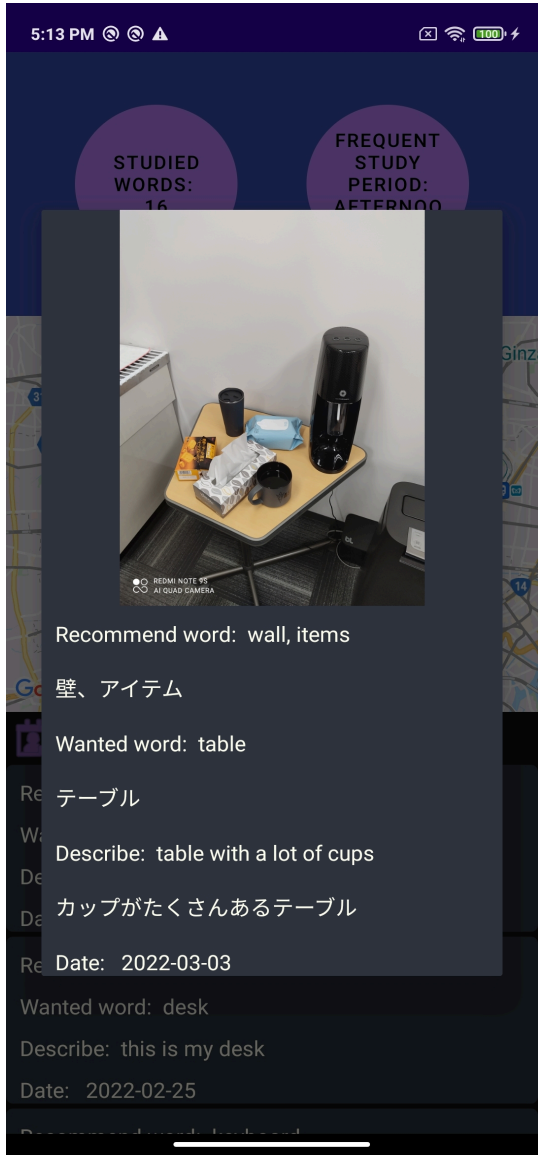
学習者へFeedback

- **Wordhyveアナリティクスダッシュボード**
  - いままで学んだ単語の統計
  - 学習したタイミング(例えば、朝、昼、夜)
  - Mapの上でログを見る
  - Zoom-inとZoom-outで場所のカスタマイズ
  - 単語カード
  - 学習期間のカスタマイズ



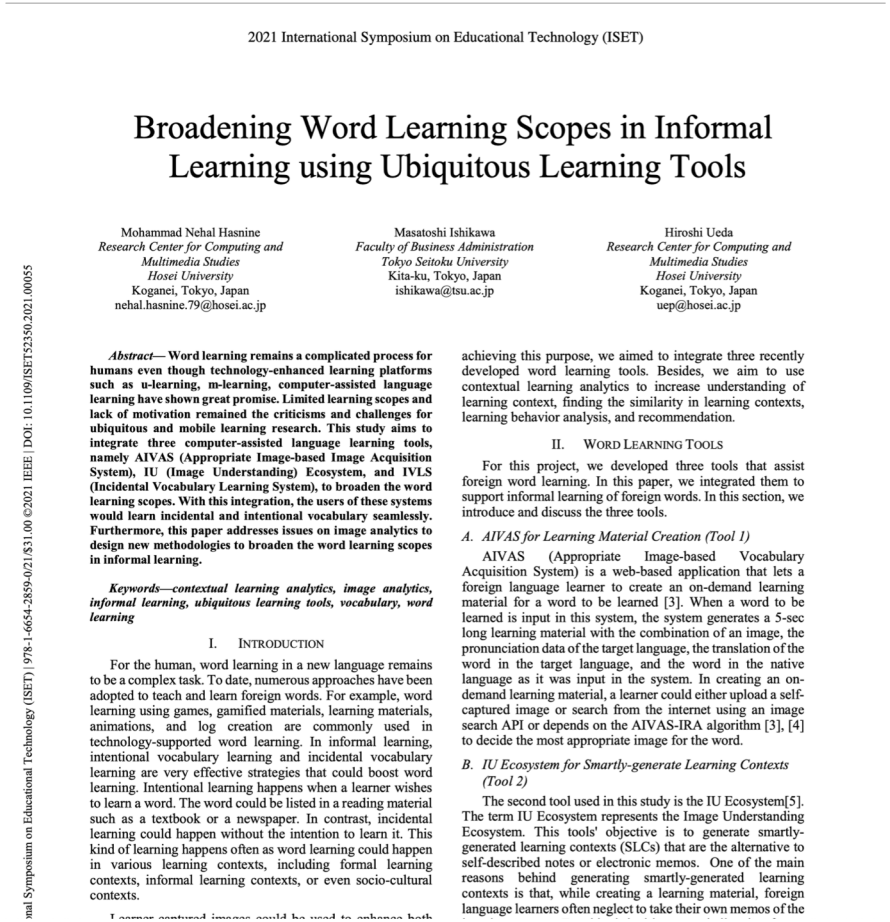
学習者へFeedback





まとめ

- 今年、Wordhyveという単語学習DXアプリを開発しました
  - 論文：3本



2021 International Symposium on Educational Technology (ISET)

Broadening Word Learning Scopes in Informal Learning using Ubiquitous Learning Tools

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***Abstract*— Word learning remains a complicated process for humans even though technology-enhanced learning platforms such as u-learning, m-learning, computer-assisted language learning have shown great promise. Limited learning scopes and lack of motivation remained the criticisms and challenges for ubiquitous and mobile learning research. This study aims to integrate three computer-assisted language learning tools, namely AIVAS (Appropriate Image-based Image Acquisition System), IU (Image Understanding) Ecosystem, and IVLS (Incidental Vocabulary Learning System), to broaden the word learning scopes. With this integration, the users of these systems would learn incidental and intentional vocabulary seamlessly. Furthermore, this paper addresses issues on image analytics to design new methodologies to broaden the word learning scopes in informal learning.**

Keywords—contextual learning analytics, image analytics, informal learning, ubiquitous learning tools, vocabulary, word learning

I. Introduction

For the human, word learning in a new language remains to be a complex task. To date, numerous approaches have been adopted to teach and learn foreign words. For example, word learning using games, gamified materials, learning materials, animations, and log creation are commonly used in technology-supported word learning. In informal learning, intentional vocabulary learning and incidental vocabulary learning are very effective strategies that could boost word learning. Intentional learning happens when a learner wishes to learn a word. The word could be listed in a reading material such as a textbook or a newspaper. In contrast, incidental learning could happen without the intention to learn it. This kind of learning happens often as word learning could happen in various learning contexts, including formal learning contexts, informal learning contexts, or even socio-cultural contexts.

I learner-captured images could be used to enhance both achieving this purpose, we aimed to integrate three recently developed word learning tools. Besides, we aim to use contextual learning analytics to increase understanding of learning context, finding the similarity in learning contexts, learning behavior analysis, and recommendation.

II. Word Learning Tools

For this project, we developed three tools that assist foreign word learning. In this paper, we integrated them to support informal learning of foreign words. In this section, we introduce and discuss the three tools.

A. AIVAS for Learning Material Creation (Tool 1)

AIVAS (Appropriate Image-based Vocabulary Acquisition System) is a web-based application that lets a foreign language learner to create an on-demand learning material for a word to be learned [3]. When a word to be learned is input in this system, the system generates a 5-sec long learning material with the combination of an image, the pronunciation data of the target language, the translation of the word in the target language, and the word in the native language as it was input in the system. In creating an on-demand learning material, a learner could either upload a self-captured image or search from the internet using an image search API or depends on the AIVAS-IRA algorithm [3], [4] to decide the most appropriate image for the word.

B. IU Ecosystem for Smartly-generate Learning Contexts (Tool 2)

The second tool used in this study is the IU Ecosystem[5]. The term IU Ecosystem represents the Image Understanding Ecosystem. This tools' objective is to generate smartly-generated learning contexts (SLCs) that are the alternative to self-described notes or electronic memos. One of the main reasons behind generating smartly-generated learning contexts is that, while creating a learning material, foreign language learners often neglect to take their own memos of the

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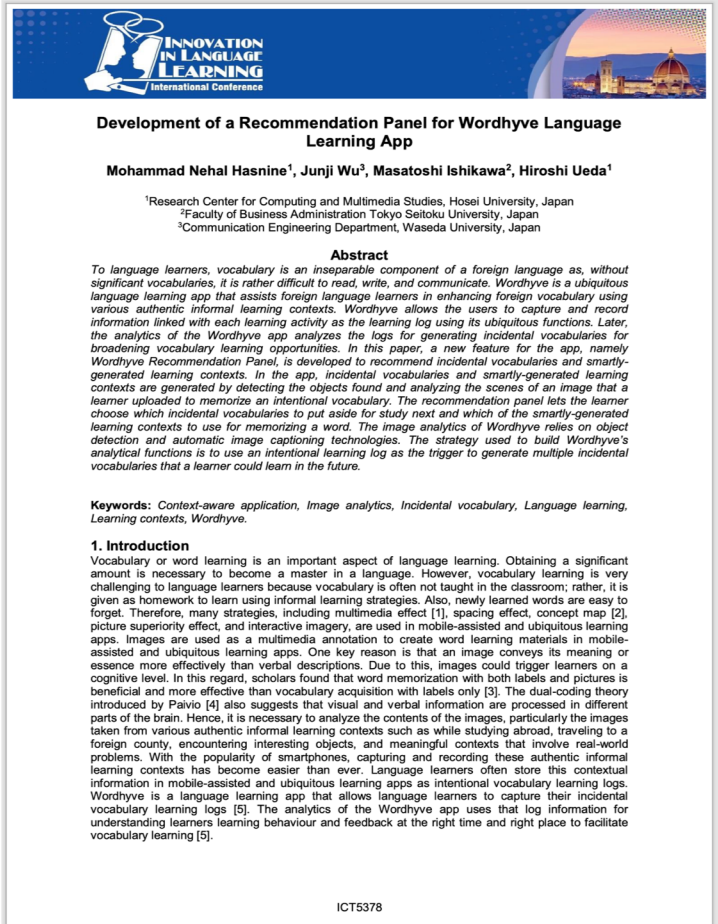

INNOVATION IN LANGUAGE LEARNING International Conference

Development of a Recommendation Panel for Wordhyve Language Learning App

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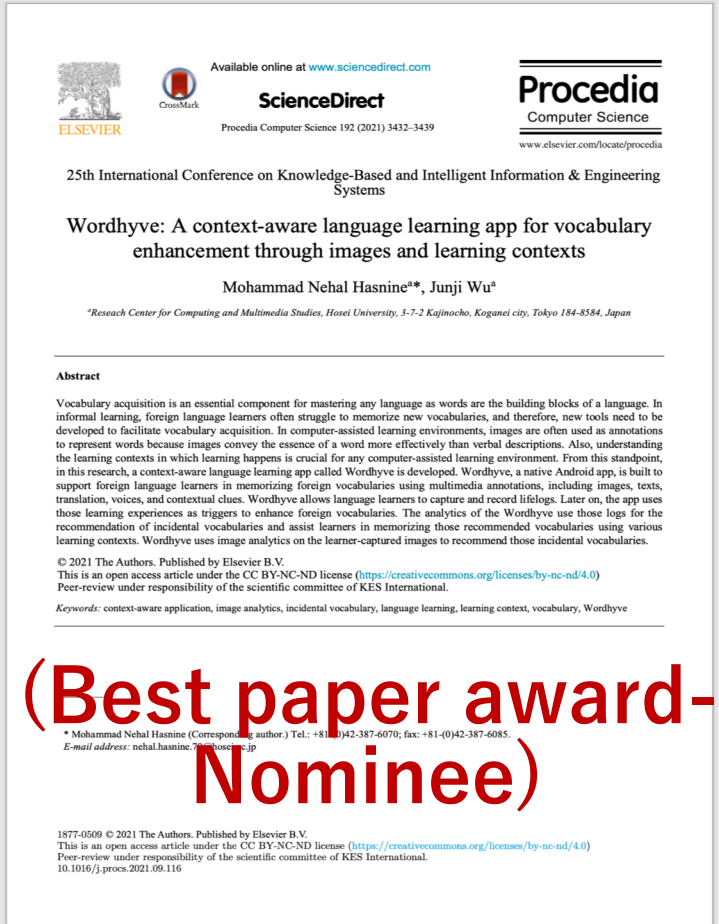
Abstract

To language learners, vocabulary is an inseparable component of a foreign language as, without significant vocabularies, it is rather difficult to read, write, and communicate. Wordhyve is a ubiquitous language learning app that assists foreign language learners in enhancing foreign vocabulary using various authentic informal learning contexts. Wordhyve allows the users to capture and record information linked with each learning activity as the learning log using its ubiquitous functions. Later, the analytics of the Wordhyve app analyzes the logs for generating incidental vocabularies for broadening vocabulary learning opportunities. In this paper, a new feature for the app, namely Wordhyve Recommendation Panel, is developed to recommend incidental vocabularies and smartly-generated learning contexts. In the app, incidental vocabularies and smartly-generated learning contexts are generated by detecting the objects found and analyzing the scenes of an image that a learner uploaded to memorize an intentional vocabulary. The recommendation panel lets the learner choose which incidental vocabularies to put aside for study next and which of the smartly-generated learning contexts to use for memorizing a word. The image analytics of Wordhyve relies on object detection and automatic image captioning technologies. The strategy used to build Wordhyve's analytical functions is to use an intentional learning log as the trigger to generate multiple incidental vocabularies that a learner could learn in the future.

Keywords: *Context-aware application, Image analytics, Incidental vocabulary, Language learning, Learning contexts, Wordhyve.*

1. Introduction

Vocabulary or word learning is an important aspect of language learning. Obtaining a significant amount is necessary to become a master in a language. However, vocabulary learning is very challenging to language learners because vocabulary is often not taught in the classroom; rather, it is given as homework to learn using informal learning strategies. Also, newly learned words are easy to forget. Therefore, many strategies, including multimedia effect [1], spacing effect, concept map [2], picture superiority effect, and interactive imagery, are used in mobile-assisted and ubiquitous learning apps. Images are used as a multimedia annotation to create word learning materials in mobile-assisted and ubiquitous learning apps. One key reason is that an image conveys its meaning or essence more effectively than verbal descriptions. Due to this, images could trigger learners on a cognitive level. In this regard, scholars found that word memorization with both labels and pictures is beneficial and more effective than vocabulary acquisition with labels only [3]. The dual-coding theory introduced by Paivio [4] also suggests that visual and verbal information are processed in different parts of the brain. Hence, it is necessary to analyze the contents of the images, particularly the images taken from various authentic informal learning contexts such as while studying abroad, traveling to a foreign county, encountering interesting objects, and meaningful contexts that involve real-world problems. With the popularity of smartphones, capturing and recording these authentic informal learning contexts has become easier than ever. Language learners often store this contextual information in mobile-assisted and ubiquitous learning apps as intentional vocabulary learning logs. Wordhyve is a language learning app that allows language learners to capture their incidental vocabulary learning logs [5]. The analytics of the Wordhyve app uses that log information for understanding learners learning behaviour and feedback at the right time and right place to facilitate vocabulary learning [5].



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25th International Conference on Knowledge-Based and Intelligent Information & Engineering Systems

Wordhyve: A context-aware language learning app for vocabulary enhancement through images and learning contexts

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Abstract

Vocabulary acquisition is an essential component for mastering any language as words are the building blocks of a language. In informal learning, foreign language learners often struggle to memorize new vocabularies, and therefore, new tools need to be developed to facilitate vocabulary acquisition. In computer-assisted learning environments, images are often used as annotations to represent words because images convey the essence of a word more effectively than verbal descriptions. Also, understanding the learning contexts in which learning happens is crucial for any computer-assisted learning environment. From this standpoint, in this research, a context-aware language learning app called Wordhyve is developed. Wordhyve, a native Android app, is built to support foreign language learners in memorizing foreign vocabularies using multimedia annotations, including images, texts, translation, voices, and contextual clues. Wordhyve allows language learners to capture and record lifelogs. Later on, the app uses those learning experiences as triggers to enhance foreign vocabularies. The analytics of the Wordhyve use those logs for the recommendation of incidental vocabularies and assist learners in memorizing those recommended vocabularies using various learning contexts. Wordhyve uses image analytics on the learner-captured images to recommend those incidental vocabularies.

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Keywords: context-aware application, image analytics, incidental vocabulary, language learning, learning context, vocabulary, Wordhyve

(Best paper award-Nominee)

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今後の予定

- GooglePlayでアプリをリリースすること
- 評価実験
- Quiz機能を作成
- Wordhyveアプリをspace repetition basedアプリにする