

CHAPTER 1. INTRODUCTION

1.1 Introduction

Preschool education begins at age one and lasts until age four, this programme can assist kids in becoming ready to move on to the next grade level (A. Ansari et al., 2019). Learning is a series of communication activities between adult humans and students which are carried out face to face which has the aim of realizing the learning process so that they can develop their own potential, add to the experiences and abilities of students (Salamah, 2020). Several factors strongly influence learning success, for example, using learning media as an intermediary for learning (Educational Technology Program, Universitas Sebelas Maret, Indonesia, tp11010.yanuaridwi@gmail.com et al., 2019). The use of learning media can be useful as a process of conveying various kinds of knowledge which has the aim of assisting in the development of students (Rahman et al., 2016). According to the explanation above, it can be seen that an educator has demanded to develop competencies for students in the era of globalization.

Each child is unique in terms of their skills, passions, learning preferences, and other characteristics. Additionally, as toddlers enjoy fantasizing and imagining (Lestarinigrum & Lailiyah, n.d.), it is important to encourage their early growth by having objects around them and basing learning on tangible object experiences (Guslinda, 2018).

Individual learning styles are categorised into three groups, namely visual, auditory, and kinesthetic, according to DePorter and Hernacki (1992), depending on the sort of information displayed. Visual learning style is a learning style by seeing, observing, looking, and so on. Auditory learning style is a learning style by hearing while kinesthetic learning style is a learning style by using motion, touch or taking action (Ishartono et al., 2021).

To support the learning process and provide a higher-quality learning process, methods, media, and technology are required (Haryadi, 2021). Children's attention

spans are short, making it easy for other things to draw their attention and divert them from what they were doing. Alternative learning media are required to boost student learning motivation because the typical learning medium, which includes books, cards (flashcards), or other paper-based products, soon makes students bored (Educational Technology Program, Universitas Sebelas Maret, Indonesia, tp11010.yanuaridwi@gmail.com et al., 2019).

Information technology is constantly evolving. The development of science and technology in the learning process can be enriched as a source of learning and diversity of learning media. Learning media uses multimedia (a combination of many elements such as text, sound, graphics, and animation), which aids users in understanding the learning material, along with technical advancements (K. D. Ansari & Rosnelly, n.d.). Another strategy is to employ computer vision as an engaging educational tool for young children (Riyadi et al., 2021).

In the age of scientific and technological advancement and globalisation, alternative media can be utilised to teach learning patterns utilising computer vision with the primary objective of presenting fruit types (Ram, 2001).

1.2 Background Of the Project

The educational application of fruit classification for preschoolers is an important tool in helping them recognize and learn about different types of fruit. However, the application currently has several limitations that need improvement, namely the number of fruit labels is limited to only 10, the application base is limited to the desktop, and no option for other languages like Malay language.

The purpose of this study is to improve several important aspects of previous research, namely "Attractive Learning Media for Introduction to Popular Fruits Using Computer Vision". Aspects that will be improved include increasing the number of fruit labels from 10 to 36 including the vegetable labels, changing the application base from desktop to mobile, and adding Malay as an in-app language option. The goal is to provide a more complete, accessible and relevant learning

experience for Malay-speaking young children. Some of the steps that need to be taken in upgrading this application include:

i Data collection:

Gathered a dataset covering 36 different types of fruit and vegetables. This dataset will be used as a basis for training and testing a classification model using CNN.

ii Increased Number of Fruit Tags:

Increase the number of fruit labels that can be identified in the application from 10 to 36 types of fruit and vegetable. This will provide greater variety in learning and recognizing fruits and vegetables, as well as increasing children's understanding of the diversity of types of fruit that exist.

iii Application Base Change to Mobile:

Changing the application base from desktop to mobile. By developing a mobile version of the fruit classification application, children can access and use the application more flexibly through smartphone or tablet devices, which are commonly used by children today.

iv Added Malay Language:

Added Malay as a language option in the application interface. With the Malay language option, the application will be more familiar and accessible to Malay-speaking children, increasing their understanding and participation in the learning process.

v User Interface Development:

Design user interfaces that are interactive, attractive and easy to use for young children. This interface should be designed according to the level of understanding and interest of children, so that they can easily use the application and learn about different types of fruit and vegetable.

vi User Experience Evaluation:

Evaluating the user experience of using the fruit and vegetable classification educational app which has been improved through usage studies and feedback from children and parents. This evaluation will help identify the

strengths and weaknesses of the app and improve the learning experience of children.

By improving several important aspects of the fruit and vegetable classification educational application, including increasing the number of fruit labels, changing the application base to mobile, and adding the Malay language, it is hoped that it can provide a better, accessible, and relevant learning experience for young children. This enhancement will increase their understanding of different types of fruit and vegetable, stimulate their interest in healthy food, as well as facilitate wider participation in the learning process.

1.3 Problem Statement

- i There are only about 10 different types of fruits labels that can be identified. This reduces the potential for young children to learn about many types of fruits in more detailed and specific ways.
- ii The existing fruits classification application is limited to the desktop platform, which hinders its accessibility and usability for young children. By confining the application solely to desktop computers, young children are restricted in their ability to engage with the educational content and learn about various types of fruits in a more interactive and immersive manner.
- iii The current fruits classification educational application lacks language options, specifically the inclusion of the Malay language. This limitation hinders the accessibility and relevance of the application for young children who are fluent or more comfortable with the Malay language, limiting their ability to fully engage with and benefit from the educational content.

1.4 Objectives

- i To expand the range of fruits labels that can be identified by the application. By increasing and adding the number of fruits and vegetables labels, the application will provide a broader and more comprehensive

learning experience for young children, allowing them to learn about a greater variety of fruits and vegetables in a more detailed and specific manner.

- ii To adapt the existing desktop-based application to a mobile platform. By developing a mobile version of the application, it will enhance accessibility and convenience for young children, allowing them to access and use the application on smartphones or tablets, which are commonly used by children.
- iii To include Bahasa Melayu as a language option in the application. By incorporating Bahasa Melayu, the application will be more inclusive and cater to the needs of young children who are fluent in the language. This will enhance their engagement and understanding of the content, fostering a more personalized and effective learning experience.

1.5 Scope Of Project

1.5.1 User Scope

A. TEACHER

1. Can taking a picture with the camera.
2. Can upload an image from gallery/file manager.
3. Can scan fruit and vegetable photos using the application.
4. Can access to the classification results in the form of text information, animated images, and audio pronunciations.
5. Can access to a comprehensive list of fruits and vegetables that includes the fruit and vegetable names, animated images, and detailed information about each fruit and vegetable.
6. Can change between three languages namely Malay, Indonesian, and English in the application

1.5.2 System Scope

- i System can predict inserted fruits and vegetables image

- ii System can give an output in the form of text information, animated images, and audio pronunciations, for presenting fruit and vegetable-related content to users.
- iii System can modify content related to fruit and vegetable information, including text content and fruit pronunciations in audio format.

1.6 Project Assumptions And Limitations

1.6.1 Project Assumptions

- i By increasing and adding the number of fruits and vegetables labels, the application will provide a broader and more comprehensive learning experience for young children, allowing them to learn about a greater variety of fruits and vegetables in a more detailed and specific manner.
- ii By developing a mobile version of the application, it will enhance accessibility and convenience for young children, allowing them to access and use the application on smartphones or tablets, which are commonly used by children.
- iii By incorporating Bahasa Melayu, the application will be more inclusive and cater to the needs of young children who are fluent in the language. This will enhance their engagement and understanding of the content, fostering a more personalized and effective learning experience.

1.6.2 Project Limits

- i Limited Device Compatibility:
The mobile-based version of the educational fruit and vegetable classification application may have compatibility limitations with certain older or less popular mobile devices. The application may require specific operating system versions or hardware capabilities, which could restrict accessibility for some users.
- ii Language Localization Challenges:
While efforts will be made to include the Malay language in the application, there may be challenges in ensuring complete and accurate

language localization. Translations, audio pronunciations, and cultural nuances may not fully capture the intended meaning or context, leading to potential language barriers or inaccuracies.

iii Data Availability and Quality:

Obtaining a diverse and comprehensive dataset for the expanded set of fruit and vegetable labels (from 10 to 36) may pose challenges. The availability and quality of labeled images and associated features may vary, potentially impacting the accuracy and effectiveness of the fruit and vegetable classification model.

iv Technical Constraints:

The transition from a desktop-based to a mobile-based platform may introduce technical constraints. Mobile devices may have limited processing power, storage capacity, or network connectivity, which could affect the performance, responsiveness, or offline capabilities of the application.