BAB I
PENDAHULUAN

1.1 Project Background

Indonesia is one of the countries rich in biodiversity, with an abundance of medicinal plants. This diversity is a blessing for Indonesia, making it a highly respected country in the world of herbal medicine (Suliasih & Mun'im, 2022). Medicinal plants in the surrounding environment hold great value, especially for families who have limited access to medical services. The presence of medicinal plants serves as a reliable solution for providing alternative healthcare to relieve common symptoms, treat minor wounds, or maintain general health (Siregar, 2023).

Communities in rural and remote areas often rely on their traditional knowledge to use these plants. However, without proper validation, mistakes in identifying or processing herbal plants can lead to serious or even fatal outcomes (Saputra & Perangin-Angin, 2018). For this reason, accurate identification and safe preparation methods must be validated by healthcare professionals to ensure the remedies are effective and do not pose health risks.

A manual identification method based on morphological characteristics is still commonly used, but it heavily depends on individual expertise and is prone to error (Pujiati & Rochmawati, 2022). Therefore, the use of image-based AI systems such as Convolutional Neural Networks (CNN) can improve plant recognition accuracy and provide standardized information.

In this project, CNN will be used to classify wild medicinal plant leaves, and all information regarding their use and processing will be validated through consultation with medical professionals to ensure its relevance, safety, and accuracy.

1.2 Problem Statement

The following are the research questions formulated based on the background of this study:

a. How can a classification system be designed to help communities in remote areas accurately identify medicinal plants despite limited knowledge and unstable internet access?
b. How can clear and practical guidance be provided for processing medicinal plants safely and effectively for daily healthcare use?
c. How can a real-time plant detection feature be developed to help users easily locate medicinal plants in their surroundings?

1.3 Project Objectives

Based on the research questions above, the objectives of this study are:

a. To identify various medicinal plants commonly found in Indonesia.
b. To provide an application feature that offers step-by-step processing instructions for medicinal plants, enabling users in remote areas to safely and effectively prepare herbal remedies for daily healthcare needs.
c. To implement a realtime location feature in the application that automatically updates the user's position and detects nearby medicinal plants, assisting users in remote areas to locate and access natural resources efficiently.

1.4 Benefits of research

This study aims to support communities in remote areas by providing an offline mobile application for accurate medicinal plant identification and basic herbal processing guidance, while also contributing to the development of AI-based health technologies and research in image classification using CNN.

1.5 Scope of problem

This study has the following limitations:

1. The classification is limited to only six types of wild medicinal plants, namely: Pegagan (Centella asiatica), Brotowali (Tinospora crispa), Rumput Minjangan (Chromolaena odorata), Sembung Rambat, Rambusa (Passiflora foetida), and Tumpang Air (Peperomia pellucida).

2. The image data used consists of leaf photos collected manually from the environment around Jember and its surrounding areas.
3. The classification model only uses the DenseNet121 architecture without comparison to other CNN architectures.
4. The mobile application functions solely to display classification results and basic information about the medicinal plants, without any medical consultation feature.