

## ABSTRACT

Identifying medicinal plants using machine learning for authenticity and supply chain integrity faces multifaceted challenges. The diverse morphology of plants, limited availability of image datasets, and intraspecific variability pose hurdles in training models to accurately discern between different species. Adulteration and contamination concerns require the inclusion of such scenarios in training data, ensuring the model's robustness. Environmental factors, including varying conditions during image capture, necessitate resilience in the model for consistent identification. This project introduces an innovative image processing software leveraging machine learning for the identification of medicinal plants, aiming to enhance authenticity and uphold supply chain integrity in the herbal medicine industry. The software employs advanced machine learning algorithms to analyze botanical images, extracting distinctive features and patterns to accurately identify various medicinal plant species. The integration of this technology serves as a robust tool for herbalists, suppliers, and regulatory bodies, ensuring the authenticity of medicinal plants from cultivation to distribution. Additionally, it facilitates a transparent and trustworthy supply chain, fostering consumer confidence and supporting sustainable practices within the herbal medicine sector. Through the convergence of image processing and machine learning, this project strives to redefine standards in medicinal plant identification, offering a transformative solution for the industry's authentication challenges.