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Educational Tools in Herbal Medicine: A Streamlit-Based AI Decision Tree Classifier for South Indian Medicinal Herb Identification ("PLANTIFY")

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AIM:

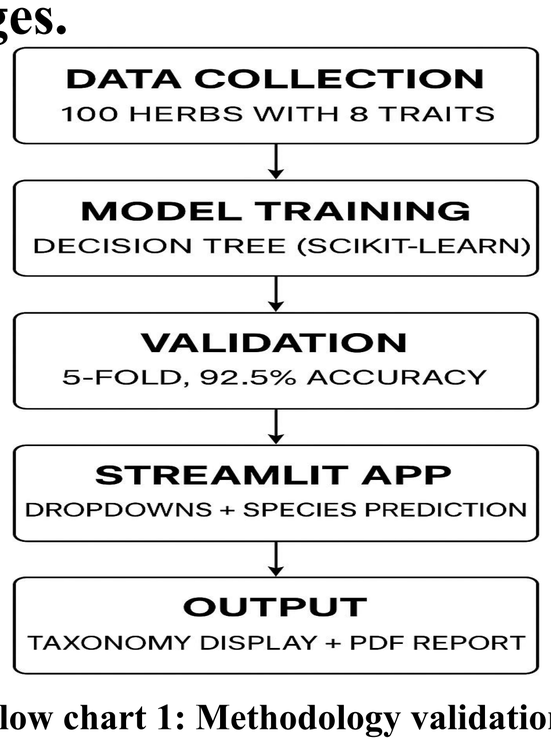
To create an AI-based app that identifies South Indian medicinal herbs using morphological features for educational purposes.

INTRODUCTION:

South India hosts diverse medicinal herbs vital to Ayurveda and Siddha. Identifying these herbs is challenging due to complex traits. This study introduces an AI-based Streamlit app (Figure 1)using a Decision Tree Classifier to identify 100 herbs from eight morphological features, enhancing herbal education.A user study showed 90% rated it user-friendly, making it an effective educational tool.

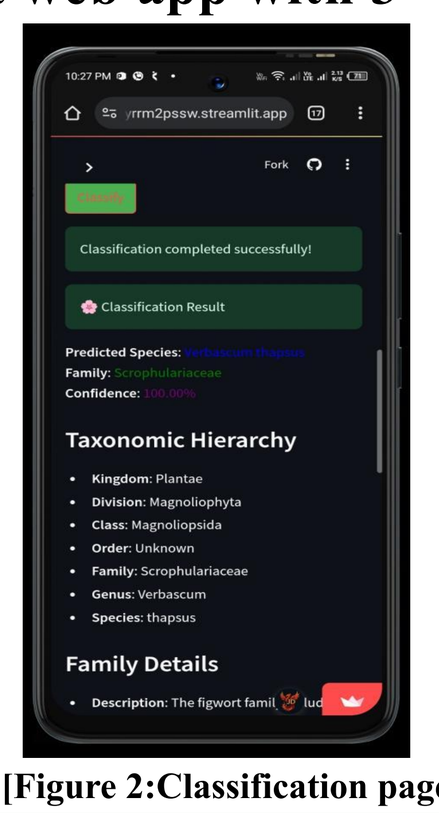
METHOD

A dataset of 100 South Indian medicinal herbs was curated using eight key morphological traits (leaf arrangement, flower symmetry, petal number, ovary position, habit, fruit type, leaf shape, and inflorescence type). Each record includes the species name, family, taxonomy. A Decision Tree Classifier built by scikit-learn was trained ,encoded features with 5-fold cross-validation, achieving robust accuracy(Flow chart 1). Feature importance identified key traits influencing classification(Figure 2).The model was integrated into a Streamlit web app with 3 pages.



[Flow chart 1: Methodology validation]

[Figure 1:Front page]



[Figure 2:Classification page]

[Figure 3:Family details page]

[Figure 4: Contact page]

RESULT

Classifier Performance,
The decision tree classifier achieved a 5-fold cross-validation accuracy of 92.5%, demonstrating strong reliability in identifying South Indian medicinal herbs(Figure 3). The standard deviation of 2.3% across folds indicates consistent model performance despite the limited dataset. Feature importance analysis revealed that inflorescence type (25%), leaf arrangement (20%), and fruit type (18%) were the most influential traits guiding classification.

DISCUSSION

The Streamlit-based classifier app performed efficiently, averaging 25 seconds per herb for input and prediction display.shows the classifier page with dropdown, results, and a PDF download option with contact page(Figure 4).User testing among20 participants yielded highly positive feedback.

CONCLUSION

The South Indian Medicinal Herb Classifier effectively combines AI and botany for accurate herb identification, achieving 92.5% accuracy using key morphological traits.

FUTURE WORK:

The system can be expanded with more herb data, image recognition, and mobile app integration to enable real-time identification and enhanced learning.

REFERENCES

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