Arogya

An Inteligent ayurvedic herb management platform

Department of Software Engineering
Sri Lanka Institute of Information Technology
Mrs.Lokesha Weerasinghe
IT17129404 - N.J.Pathiranage
IT17145930 - Nilfa M.S.F
IT17089500 - R.A.Mithula Nithmali
IT17014250 - K.A.G.Y.Nadee Kumari

Background and Literature

Ayurvedic means a science of life and well-being with its unique approaches to social and spiritual life. Especially in Sri Lanka we have our own set of rare ayurvedic herbs which can be utilized by generations as medicinal treatments for a variety of diseases.

Absence of specialists in this area makes proper identification as well as classification of valuable herbal plants a tedious task, which is essential for better treatment. There are existing applications which can identify plants with low prediction accuracies. However, these applications are based on foreign plant data sets that do not include valuable herbs and shrubs with medicinal qualities.

Feature Comparison

	Agrobase	Plantex	PlantSnap	Pl@ntNet	MedLeaf	Arogya
Search Plants	✓	✓	✓	✓	✓	✓
Identify and classify plants	✓	✓	✓	✓	✓	✓
Filters whether the searched plant is a medical plant or not	✓	✓	✗	✗	✓	✓
Identify and classify plants offline	✗	✗	✗	✗	✗	✓
Mapping the locations of newly identified plants	✗	✗	✗	✗	✗	✓
Show directions from users' current location	✗	✗	✗	✗	✗	✓
Ability to share plant location	✗	✗	✗	✗	✗	✓
Gives more information and details about the classified plant	✓	✓	✓	✗	✓	✓
Gives user a novel social media experience limited to trees (upload/view/share posts only related to plants) and makes users aware of the importance of plants to our world	✗	✗	✗	✗	✗	✓

Research Problems

- Lack of technological research carried out on the classification of Ayurvedic herbs using ML & computer vision.
- Absence of a single platform for,
  - Detection
  - Classification
  - Summarization of herbal plant information
- Current mapping systems are used inaccurate.
- Lack of common GIS platform
- Analyzing Ayurveda related posts
- Dissemination of knowledge regarding herbal plants is restricted.

Objectives

01 Recognizing the herbal plant once the user inputs an image

02 Providing a description of the identified herbal plant.

03 Generating a summary of the plant through a web search.

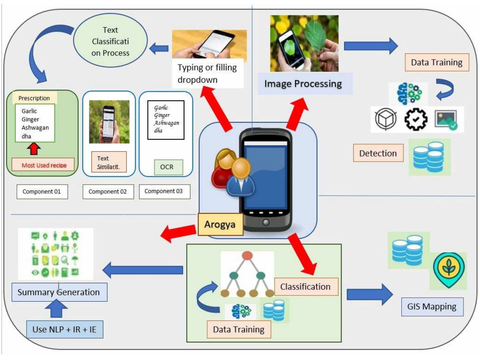
04 Traking the locations of the plants using GIS and adding the locations of newly identified plants into the map.

05 Identifing the category of diseased related to the herbal plant by giving its characteristics.

Methodology

- Selecting the most accurate and the highest performance segmentation technique using experimental outcomes
- Classification of Ayurvedic plants using transfer learning based on deep CNN using a mobile application in an online approach
- Extractive information summarization and location mapping with smart visualization on Ayurvedic plants using a mobile application in an online environment approach
- Analyzing the predicted type of diseases using machine learning algorithms and identifying ayurvedic related posts using image OCR techniques and cosine similarity

System Overview Diagram



Results and Discussion

- The most accurate algorithm for object detection in a complex background based on the dataset prepared from scratch is Marker-based Watershed algorithm
- The most accurate CNN pre-trained deep learning model used for plant classification purpose is VGG-16, which achieved a promising testing accuracy of 99.53%
- The best deep learning model for the purpose of abstractive information summarization with optimum accuracy is the Seq2Seq LSTM model
- The most accurate ML algorythem is SVM for analysing the predicted type of disease, which achived accuracy of 95%

Conclusion

The purpose of this research is to develop a centralized social media application which is mobile-based and unique to herbal plants. This solution would be a great chance for those who are keen to learn and use Ayurveda medicine and plants, but who do not have prior knowledge about the specific domain. The application mainly creates awareness among common people about Ayurveda plants, their medicinal usage and value, and about their growth and availability throughout the country. This proposed system has been tested in various situations and it is capable of providing the most reliable and accurate output to the user. The development strategy and methodology used in this approach will be able to be used and extended to identify any ayurvedic herb worldwide furthermore.

References

[1] B. R. Pushpa, C. Anand, and P. Mithun Nambiar, "169Ayurvedic plant species recognition using statistical parameters on leaf images," Int. J. Appl. Eng. Res., vol. 11, no. 7, pp. 5142–5147, 2016.
[2] M. R. Dileep and P. N. Pournami, "AyurLeaf: A Deep Learning Approach for Classification of Medicinal Plants," IEEE Reg. 10 Annu. Int. Conf. Proceedings/TENCON, vol. 2019-October, pp. 321–325, 2019, doi: 10.1109/TENCON.2019.8929394.
[3] A. K. Singh and M. Shashi, "Deep Learning Architecture for Multi-Document Summarization as a cascade of Abstractive and Extractive Summarization approaches," Int. J. Comput. Sci. Eng., 2019, doi: 10.26438/ijcse/v7i3.950954.
[4] S. S. Lakshmi and M. U. Rani, "Multi-Document Text Summarization Using Deep Learning Algorithm with Fuzzy Logic," SSRN Electron. J., 2018, doi: 10.2139/ssrn.3165331.
[5] G. Liu, J. C. Nouaze, P. L. T. Mbouembe, and J. H. Kim, "YOLO-tomato: A robust algorithm for tomato detection based on YOLOv3," Sensors (Switzerland), vol. 20, no. 7, pp. 1–20, 2020, doi: 10.3390/s20072145.