

## **Abstract**

The main aim of the project is to use image processing techniques for the classification of medicinal plants found in Sikkim. Plants play a vital role in human life, they provide oxygen, food, shelter, medicine, and environmental protection. Many plants are rich in medicinal value and contain active ingredients for medicinal use. Manual identification of medicinal plants is a time-consuming process and needs the help of experts for plant identification. To overcome this problem, automatic identification and classification of medicinal plants are needed for greater benefit to humankind. In today's era, the automatic identification and classification of medicinal plants is an active research area in the field of image processing. Feature extraction and classification are the main steps in the identification of medicinal plants and the classification process which affect the overall accuracy of the classification system.

**Keywords:** - *Image processing, Medicinal Plants, Classification.*

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## 1.2 Feasibility Study

The feasibility study is an evaluation of the viability of a given project or system and takes into account technical, operational, economical and schedule considerations to determine the possibility of completing the project. In the process of a feasibility study, many aspects and constraints are considered and these are listed below:

- **Technical Feasibility:**

This project is technically feasible as uses open-source software. This project requires Python as the programming language and datasets which will be used to train the model. Since Python is the most user-friendly and 3 efficient programming language to handle large-scale data, therefore the proposed work is technically feasible.

- **Operational Feasibility:**

This project is supposed to provide a user-friendly interface and will be easy to operate and maintain. The project will not have much maintenance and will be easy to operate although updating datasets would be required; thus, allowing it operational feasible.

- **Economic Feasibility:**

This project is economic with respect to use within any organization. Economic feasibility is the most important and frequently used method for evaluating the effectiveness of the proposed system. It is economically feasible as it is developed using the tools which are available for free and can run on any device thus reducing the cost.

## **CHAPTER: 2**

### **LITRATURE REVIEW**

#### **2.1 Introduction**

It is an important area which is the backbone for any research as it provides the entire information, problem and objectives. And to gain an understanding of the existing research and debates to a relevant particular topics or area of study and to present that knowledge in form of written report.

#### **2.2 Existing System**

G. Prem Rishi Kranth, M. Hema Lalitha, Laharika Basava, and Anjali Mathur et al. [1] proposed a model to identify and classify medicinal plants, that uses SVK, KNN, and Random Forest Algorithm to classify different plant's leaves. It was published in the International Journal of Advances in Science Engineering and Technology. Leaves features taken were colour, shape, and texture, and an accuracy of 89% was achieved. Ernest Mwebaze, Timnit Gebru, Andrea Frome, Solomon Nsumba, Jeremy Tusubira, and Chris Omongo et al. [2] proposed a model to identify and classify medicinal plants, Deep Learning Neural Network, CNN to classify different plant leaves. It was published in ", IEEE International Conference on Advanced Electronic Systems (ISAES), pp. 238- 242, Sept. 2018. Leaves features taken were colour shape and veins and findings of this paper were Comparing various Machine Learning Algorithm to find the best accuracy and the accuracy of 87% was achieved. C.Amuthalingeswaran, Dr. P.Renuga, et al. [3] proposed a model to identify and classify medicinal plants, that uses Deep Learning, ANN, and CNN to classify different plant leaves. It was published in Third International Conference on Trends in Electronics and Informatics (ICOEI 2019) IEEE Xplore. Leaves features taken were colour, shape, and texture findings of this paper was Leaves sample testes was 8259 out of which 1010 leaves sample was not identified and the accuracy of 81% was achieved Banita Pukhrambam, Dr. R.Rathna, et al.

. [4] Proposed a model to identify and classify medicinal plants, that uses Probabilistic Neural Network (PNN), a convolutional neural network (CNN) to classify different plant leaves. It was published in Dept. of Computer Science and engineering Vels Institute of Science, Technology & Advanced Studies Chennai, India [2020] Leaves features taken were colour, shape, and texture, and the findings of this paper were focused S. G. F. Wu, S. Bao, E. Y. Y. Xu, X. Y. Wang, F. Chang, and Q. L. Xiang et al [5] proposed a model to identify and classify medicinal plants, that uses a convolutional neural network (CNN) to classify different plants leaves. It was published under the title "A Leaf Recognition Algorithm for Plant Classification using Probabilistic Neural Network", The 7th IEEE International Symposium on Signal Processing and Information Technology, 2018. Pavan Kumar Mishra, Sanjay Kumar Maurya, et al. [6] proposed a model to identify and classify medicinal plants, that uses Deep Learning techniques to classify different plant leaves. It was published under the title "Identification of Selected Medicinal Plant Leaves Using Image Features and ANN", IEEE International Conference on Advanced Electronic Systems (ISAES), pp. 238- 242, Sept. 2018. Leaves features taken were a colour, shape, and veins and the findings of this paper were using a convolutional network to find the best accuracy, and the accuracy of 92% was achieved. Pavan Kumar Mishra, Sanjay Kumar Maurya, et al. [7] proposed a model to identify and classify medicinal plants, that uses deep Learning techniques to classify different plant leaves. It was published under the title "A semiautomatic plant identification based on digital leaf and flower Images," IEEE-International Conference on Advances in Engineering, Science and Management (ICAESM -2012) March 30, 31, 2012. B.S. Harish, Aditi Hedge, et al. [7] proposed a model to identify and classify medicinal plants, that uses a Deep learning technique to classify different plant leaves. It was published in the title "Classification of Plant Leaves Using Morphological Features and Zernike Moments",

International Conference on Advances in Computing, Communications, and Informatics (ICACCI), 2013. Leaves features taken were colour, shape, and veins, and the findings of this paper were to explore various using Morphological Features and to classify using Convolutional Networks to find the best accuracy, and the accuracy of 90% was achieved. Banita Pukhrambam, Dr. R.Rathna, et al. [8] proposed a model to identify and classify medicinal plants, that uses Probabilistic Neural Network (PNN), a convolutional neural network (CNN) to classify different plant leaves. It was published in Dept. of Computer Science and engineering Vels Institute of Science, Technology & Advanced Studies Chennai, India [2020] Leaves features taken were colour, shape, and texture, and the findings of this paper were focused. C.Amuthalingeswaran, Dr. P.Renuga, et al. [9] proposed a model to identify and classify medicinal plants, that uses Deep Learning, ANN, and CNN to classify different plant leaves. It was published in Third International Conference on Trends in Electronics and Informatics (ICOEI 2019) IEEE Xplore. Leaves features taken were colour, shape, and texture findings of this paper was Leaves sample testes was 8259 out of which 1010 leaves sample was not identified and the accuracy of 81% was achieved.

Table 1. Summary of Literature Reviewed.

Title of the Paper	Methodology	Findings	Research Gap
Study On Identification and Classification Of Medicinal Plants	SVK, Random Algorithm	Used different Algorithms like SVK, K-NN, and Random Forest.	Slow training of Datasets.
Identification Of Ayurvedic Medicinal Plants by Image Processing of Leaf Samples.	Deep Learning Neural Network, CNN	Comparing various Machine Learning algorithms to find the best accuracy.	They rely heavily on the internet and are unable to function effectively without it.
Identification Of Medicinal Plants And Their Usage by Using Deep Learning.	Deep Learning Neural Network, CNN	Created a model MNN (Medicinal Neural Networks) which is trained with the dataset, and collected manually.	Leaves sample tested were 8259 out of which 1010 leaves samples were not identified.