


Chapter 2

House Plant Leaf Disease Detection and Classification Using Machine Learning

Bhimavarapu Usharani

 <https://orcid.org/0000-0001-5050-0415>

Department of Computer Science and Engineering, Koneru Lakshmaiah Education Foundation, Vaddeswaram, India

ABSTRACT

Hibiscus is a fantastic herb, and in Ayurveda, it is one of the most renowned herbs that have extraordinary healing properties. Hibiscus is rich in vitamin C, flavonoids, amino acids, mucilage fiber, moisture content, and antioxidants. Hibiscus can help with weight loss, cancer treatment, bacterial infections, fever, high blood pressure, lower body temperature, treat heart and nerve diseases. Automatic leaf disease detection is an essential task. Image processing is one of the popular techniques for the plant leaf disease detection and categorization. In this chapter, the diseased leaf is identified by concurrent k-means clustering algorithm and then features are extracted. Finally, reweighted KNN linear classification algorithms have been used to detect the diseased leaves categories.

I. INTRODUCTION

Hibiscus is widely known for its beautiful flowers which lack aroma. Hibiscus belongs to the Malvaceae group, and its scientific name is *Hibiscus rosa-sinensis*. A popular name for hibiscus in ayurvedic is Japa. This hibiscus plant does not have

DOI: 10.4018/978-1-7998-8161-2.ch002

any fruit. Hibiscus flowers are in various shades like red, white, yellow, pink. The bark, leaves and flowers are known to have medical properties.

Hibiscus is a famous herb found all over India in the temperature climates and its other types are found all over the world. Hibiscus reduces high blood pressure, using for cancer treatment and as a weight loss aid, along with other uses. Research has revealed a variety of health benefits linked to drinking hibiscus tea, lowers blood pressure, fight bacteria and even aid weight loss. Hibiscus extracts boosted the number of antioxidant enzymes and lessened the damaging impacts of available radical by up to 92% (Taofeek, et al., 2011). The article (Abbas Mohagheghi, et al., 2011) associated the outcomes of drinking hibiscus contrasted with black tea on fat stages. The authors in (Hong-Chou, et al., 2014) presented that hibiscus followed in a body mass index (BMI), weight of a person, overweight of a person. The authors of (Diane L, et al., 2018, Corina Serban, et al., 2015) originate that drinking hibiscus decoction dropped blood pressure in people at risk of high blood pressure and those with slightly high blood pressure. The authors in (Zeinab, et al., 2012) discussed that this herbal is used to treat lice (Chun-Tang, et al., 2005). The results of (Hui-Hsuan Lin, et al., 2015) proved that hibiscus leaf extract prevented human prostate cancer. Hibiscus leaves extract inhibits stomach cancer cell by up to 52%. Hibiscus extracts are used in many medical applications like cramping, gas, diarrhea (EunKyung Jung, YoungJun Kim et al., 2015, Nami Joo., et al., 2015), to treat bacterial infections (Emad Mohamed, et al., 2016).

Rest of this chapter is categorized as following sections: Section II of this article briefly discusses about existing work for the plant disease detection. Section III presents the proposed model i.e., Automatic Hibiscus Leaf Disease Detection and Classification Using Unsupervised Learning Techniques. Section IV presents experimental and performance results and finally section V presents the concluding remarks.

II. LITERATURE SURVEY

Leaf images are one of the most important resources for the recognition and categorisation of plant groups and their diseases. WanMohdFadzil et al (Emad Mohamed, et al., 2014) conversed a bug identification process for orchid plant shrubberies. The proposed procedure used the combination of several approaches of edge segmentation methods, morphological and filtering procedures cast-off for classifying given images into two bug class as black leaf spot and solar scorch.

Rong Zhou et al (Rong Zhou, et al., 2013), explained method to identity leaflet patch in sugar beet. The procedure implements cross methods for corresponding and

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