UMass | Dartmouth
COLLEGE OF ENGINEERING

MASTER'S PROJECT (SPRING 2016)

TOPIC: *LRS: A Leaf Recognition System Using Image Processing*

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ADVISOR: Dr. Haiping Xu

DATE & TIME: Friday, April 29, 2016, 1:30 PM (CIS Day)

LOCATION: Woodland Commons, CR3

COMMITTEE MEMBERS: Dr. Firas Khatib and Dr. Iren Vavola

ABSTRACT

Studying botany can never be easy, especially when it involves exploring new plant species. A common way to identify a species is to investigate its leaves. However, to verify whether a leaf belongs to a known species not only requires expertise of a botanist, but also is a time-consuming process due to a large amount of leaf samples. In this project, we propose a Leaf Recognition System (LRS) using image processing, which can automatically verify the plant species by its leaves. In our approach, the LRS applies filtering and evaluation methods to process an input leaf image. Specifically, when a user uploads a leaf image, the LRS abstracts its leaf shape, using a process called background removal. Then the leaf shape is checked against preprocessed leaf images stored in a database. The LRS compares the input leaf with those from the database and indentifies the one with the highest matching ratio in terms of its leaf shape. To make the process more efficient, we tag the leaves from the database as fat, normal or thin. By classifying the input leaf into one of the three categories, the number of leaves to be compared can be significantly reduced. Once a highly matched leaf is identified, the LRS presents a user the information about the plant species to which the leaf belongs. To demonstrate the feasibility of our approach, a prototype LRS is developed in Java using Eclipse embedded with a powerful image processing tool, called OpenCV. The case studies show that with a sufficient number of sample leaves stored in the database, the LRS can efficiently and effectively identify the matching plant species for an input leaf image.