

Modern Detection and Description Methods for Natural Plants Recognition

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Abstract : Green planet is one of the Earth's names which is known as a terrestrial planet and also can be named the fifth largest planet of the solar system as another scientific interpretation. Plants do not have a constant and steady distribution all around the world, and even plant species' variations are not the same in one specific region. Presence of plants is not only limited to one field like botany; they exist in different fields such as literature and mythology and they hold useful and inestimable historical records. No one can imagine the world without oxygen which is produced mostly by plants. Their influences become more manifest since no other live species can exist on earth without plants as they form the basic food staples too. Regulation of water cycle and oxygen production are the other roles of plants. The roles affect environment and climate. Plants are the main components of agricultural activities. Many countries benefit from these activities. Therefore, plants have impacts on political and economic situations and future of countries. Due to importance of plants and their roles, study of plants is essential in various fields. Consideration of their different applications leads to focus on details of them too. Automatic recognition of plants is a novel field to contribute other researches and future of studies. Moreover, plants can survive their life in different places and regions by means of adaptations. Therefore, adaptations are their special factors to help them in hard life situations. Weather condition is one of the parameters which affect plants life and their existence in one area. Recognition of plants in different weather conditions is a new window of research in the field. Only natural images are usable to consider weather conditions as new factors. Thus, it will be a generalized and useful system. In order to have a general system, distance from the camera to plants is considered as another factor. The other considered factor is change of light intensity in environment as it changes during the day. Adding these factors leads to a huge challenge to invent an accurate and secure system. Development of an efficient plant recognition system is essential and effective. One important component of plant is leaf which can be used to implement automatic systems for plant recognition without any human interface and interaction. Due to the nature of used images, characteristic investigation of plants is done. Leaves of plants are the first characteristics to select as trusty parts. Four different plant species are specified for the goal to classify them with an accurate system. The current paper is devoted to principal directions of the proposed methods and implemented system, image dataset, and results. The procedure of algorithm and classification is explained in details. First steps, feature detection and description of visual information, are outperformed by using Scale invariant feature transform (SIFT), HARRIS-SIFT, and FAST-SIFT methods. The accuracy of the implemented methods is computed. In addition to comparison, robustness and efficiency of results in different conditions are investigated and explained.

Keywords : SIFT combination, feature extraction, feature detection, natural images, natural plant recognition, HARRIS-SIFT, FAST-SIFT

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