

Snow Leopard Identification Using Digital Image Processing for Spot Pattern Recognition

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The purpose of this project is to develop digital image processing algorithms that would assist conservation biologists who study the location and behavior of snow leopards. Researchers use cameras placed in remote areas inhabited by snow leopards (so called *camera trapping*). Such cameras take photographs when a source of heat (i.e. snow leopard, fox, goat, or a large bird) passes in front of it. These pictures are then used to recognize specific cats in order to track populations and migration patterns. Because each snow leopard has a unique coat, snow leopards are identified based on the characteristics of their spot patterns such as their size, shape, orientation, and coloration. In this research, working alongside Dr. Agnieszka Miguel, I will use techniques from mathematics, image processing, pattern recognition, and machine learning to aid researchers in their work with camera pictures. Utilizing algorithms that have already been developed within this research project, I will sort the images obtained from one camera in order to eliminate images without leopards. I will develop a program that will analyze the sorted photos to search for matches among the many different spot patterns, characterized by mathematical models of each individual leopard's spots. Close match between an image and a known pattern will indicate the same individual. The goal of the program will be to classify each sorted image as representing a particular snow leopard.