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Cognitive vision principle for conceptual learning of colors

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Color is a powerful form of communication among human beings. Sociable robots that live and coexist with humans must also learn colors from the society it lives. A lot of research has been performed to enable computer, as the brain of a robot, to learn colors. Most of them rely on modeling of human color perception and mathematical complexities. Differently, this work targets on developing the capability of the computer to use machine learning approaches to learn the colors through human interaction. The different colors which is being detected in the camera is processed by using image processing tool OpenCV and the most dominant color of the picture is identified and displayed in the system. The user can now teach the computer the difference between the appropriate colors using the RGB values. Therefore, although at the beginning, the computer does not know any colors, eventually through interaction, it learns numerous colors which will indicate the shared color learning with humans in the society. After teaching the computer a number of times, it is able to classify the colors by matching with RGB values for that particular color from the database. If the color does not exist, the computer identifies the closest possible color using the unsupervised machine learning technique k-means clustering. After learning colors from the society, the developed algorithm is implemented in the NTU Singaboat, which is an Unmanned Surface Vehicle (USV) built for competing in the Maritime RobotX Challenge.

Biography

Jagadeesh Shanmugam Hariharan Natarajan is currently pursuing Master of Science in Industrial Engineering at North Carolina State University and has completed his Bachelor's in Mechatronics Engineering from Anna University in India. He has spent his last semester of his under-graduate degree working as a Research Assistant at Nanyang Technological University in Singapore, during which he realized how insights from data can make important decision at various circumstances. Hence, he is currently focusing his career on Data Analytics. Also, he has actively participated in the Summer Research Fellowship at Indian Institute of Technology, Madras.

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