COUNTERFEIT ARDUINO BOARD DETECTION USING IMAGE PROCESSING

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Counterfeit electronic products may cause many issues like poor-selling services, poor quality, poor technical support, and also health problems to the customers. Especially nowadays the usage of inter-connected electronics items, which's called the Internet of Things (IoT) was increased a lot. In this research, we have focused on a commonly used IoT microcontroller board called Arduino. Arduino is a prototyping device with a microcontroller that can build various circuits of your own with dedicated ideas. Counterfeits are with some attributes like the same brand logo, and sold with similar names but having some changes or spelling changes on the brand name, but with the same manufacturing designs or patterns. These kinds of copying are visible and can be identified normally, but only the expert who knows about the original product's attributes can identify the counterfeit items perfectly. The method of finding a counterfeit product can be categorized into three types: electrical inspection, device fingerprinting, and physical inspection. We have chosen the optical-based method using image processing techniques because it's easier than other methods, least cost, and more efficient. Optically, Arduino Board has some original features and it can be assessed to find the originality of the board. We found nine features to detect the counterfeit board. We used OCR, Line Canny, Threshold, SIFT, Multiscale Matching K-means Clustering algorithms to extract the features from the Arduino board images. The front view image of the board is enough to detect the counterfeit board. We have devised five steps to find calculate the originality percentage. We have used around 80 images for testing among that 30 were original, 30 were fake, and 20 non-Arduino board images. Approximately 93 % of accuracy on original, 100% accuracy in fake, and 100% in detecting non -Arduino boards. Our method is rule-based, simple, and efficient. Further, this method will work for different versions of boards too. The project is comparatively better and the future work is planned to implement a hardware system to detect the fake Arduino boards using cameras and embedded devices.

Keywords: Arduino, Counterfeit, Image Processing, IoT, Feature extraction