



## RESEARCH ARTICLE

# A New Scheme for Removing Duplicate Files from Smart Mobile Devices: Images as a Case Study

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## ABSTRACT

The continuous development of the information technology and mobile communication world and the potentials available in the smart devices make these devices widely used in daily life. The mobile applications with the internet are distinguished simple, easy to use in any time/anywhere, communication between relatives and friends in different places in the world. The social application networks make these devices receive several of the duplicate files daily which lead to many drawbacks such as inefficient use of storage, low performance of CPU, RAM, and increasing consumption of battery. In this paper, we present a good scheme to remove the duplicate files, and we focus on image files as a common case in social apps. Our work overcomes the above-mentioned issues and focuses on using hash function and Huffman code to build a unique code for each image. Our experiments improve the performance from 1046770, 1995808 ns to 950000, and 1981154 ns in Galaxy and HUAWEI, respectively. In the storage side, the proposed scheme saves storage space from 1.9 GB, 1.24 GB to 2 GB, and 1.54 GB, respectively.

**Keywords:** Duplicating images, hash code, mobile device, performance, storage management

## INTRODUCTION

One of the key things that can help us to build a scheme to get rid of this issue is the features extracted from images. It is difficult to observe and understand these features by a human (Shyu, 1998 #2343). These features divide into two types: global and local.<sup>[1]</sup> Image matching is the method used either global features which describe the whole image and can describe a whole image by only one vector, or local features, which focus on important details in the image and it is more powerful. To apply both methods, we need to deal with the content of the images and extract information from them; this means that both methods consume time to treat with images and need hardware that has ability and efficiency to get these features. This leads us to the fact that the features extraction in the mobile device will consume a lot of time, random memory, and CPU time thus increasing the consumption of the battery; as a result, effect on daily use for the user.<sup>[2]</sup> Hence, the process of finding the best and most efficient methods of retrieval and matching files is the most important research topic in the era of mobile applied technology.<sup>[3]</sup> Matching is one of the essential tasks that are used to remove duplicated files. Mostly, it is selected the appropriate features to reduce the computational time, and it denotes to find the same file/s (image) save(s) in a database that is/are same to an input file. Matching is one of the indispensable processes in several applications.<sup>[4]</sup> In the past decade, mobile technology and internet have become a hotspot in scientific research and daily life.<sup>[5]</sup> Social media consider a

common element between internet and mobile devices; it plays the main role to keep in touch with our colleagues/relatives and discovering new persons.<sup>[6]</sup> In the past few years, social network was not used in mobile devices in a widely manner, but with the rapid development in the internet and mobile technologies, the social media become one of the important factors in human life.<sup>[7]</sup> At present, there are several social networks that work in mobile devices and personal computers such as Facebook, WhatsApp, Twitter, Viber, and others called mobile apps.<sup>[5]</sup> The users of these apps exchange many types of files such as photos, audios, and videos. Ultimately, these files are stored in a duplicity way led to loss of storage space of the mobile device. In this paper, we focus on the removal of duplicate images issued from social media apps to mobile device based on the proposed image matching scheme that suits with the mobile environment and deals with the whole image. The main objectives of our purpose scheme are as follows:

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**Received:** Apr 08, 2019

**Accepted:** Apr 14, 2019

**Published:** Aug 20, 2019

**DOI:** 10.24086/cuesj.v3n2y2019.pp5-13

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