

Project On

Secure Image Comparison with Hashing and Signature

Submitted By

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Goal Statement:

A system has to be created where two images can be compared to see if they are identical or not, given that the images themselves may be private and not subject to open exchange in viewing.

Requirement:

- If given two images are same then system will report them as similar images.
- If given two images are dissimilar then system will report it as dissimilar.
- At any instance of time image should not be disclosed to others.
- Given two images and one of the image is derived by applying rotation less than equal to 90 degree on the other image, then system should recognize them as similar image.
- Given two images, if one image is derived from other image by applying scaling with factor of 0.5 to 2 then system should recognize them as similar image.
- Given two images, if one image is derived from other image by cropping it up to 10%, then system should recognize them as similar image.
- Given two images, if one image is derived by random removal up to 5% pixel data from other image, then system should recognize them as similar image.
- Given two images, if one image is derived by adding noise on other image, then system should recognize them as similar image.
- For any given input system should give output within 2minute.

Existing System:

- **www.phash.org**

In this website, we can compare images. In this website they have used pHash open source software library that implements several perceptual hashing algorithm.

Following are the three algorithms used by pHash :

- Radish(Radial hash)
- DCT hash
- Marr/Mexican hat wavelet

- **BlockHash.io**

BlockHash implements variation of perceptual image hashing algorithm described by Bian Yang, Fan Gu and Xiamu Niu in their paper *Block Mean Value Based Image Perceptual Hashing*.

Proposed System:

The system should be robust enough to take into account attacks on a given input and yet be flexible to give correct output. Attacks included in the system are rotation, skew, scaling and random removal of pixel.

In this system we will implement perceptual image hashing algorithm described by Bian Yang, Fan Gu and Xiamu Niu in their paper “*Block Mean Value Based Image Perceptual Hashing*”.

System Architecture:

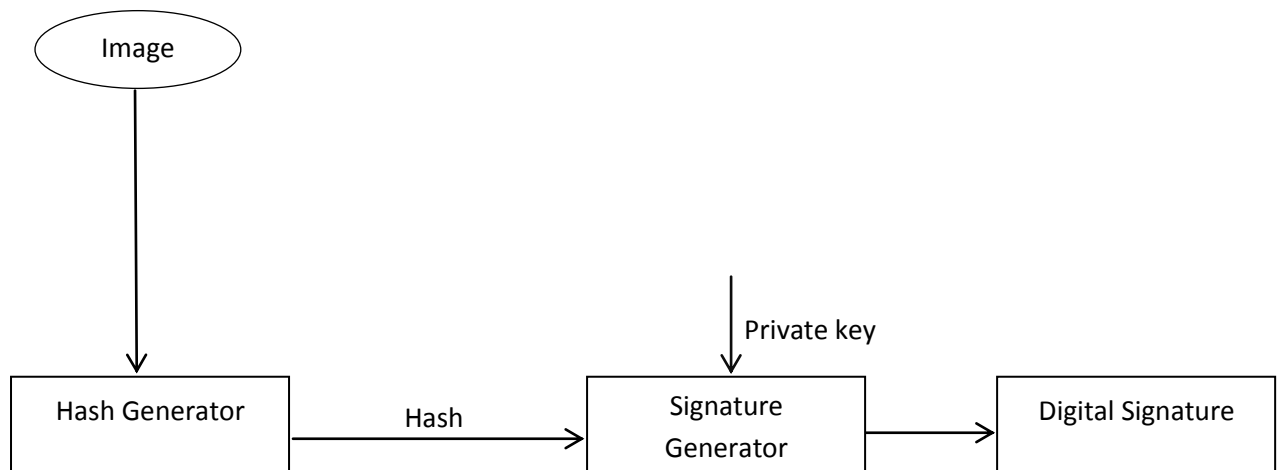


Figure 1: Hash and Signature Generator

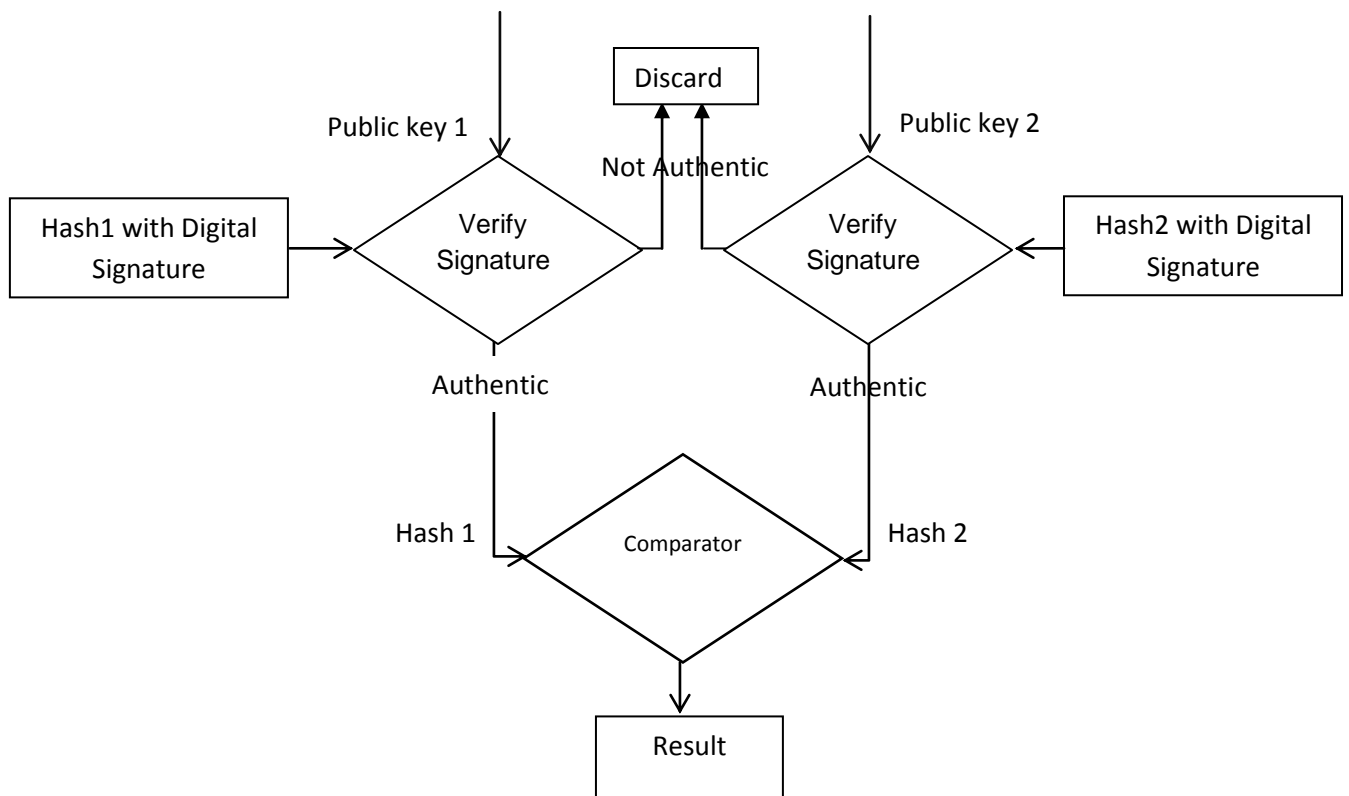


Figure 2: Comparator Module for comparison

Technologies to be Used:

- C++, QT for GUI, gnupg

Gap Analysis:

- Existing system does not support integrity of image hash.
- Existing system does not support rotation more than 20 degrees.

Milestones:

Work	Expected Finish Date
Requirement Analysis	09/March/2016
Image Reading	23/March/2016
Computing hash from Image	30/March/2016
Generating Digital Signature	06/April/2016
Comparison Module	14/April/2016

References:

- [1] Yang, B., Gu, F., and Niu, X.: Block mean value based image perceptual hashing. In Proceedings of the International Conference on Intelligent Information Hiding and Multimedia Multimedia Signal Processing (IIH- MSP), pp. 167–172. IEEE, 2006, ISBN 0-7695-2745-0.
- [2] Zauner, Christoph: Implementation and Benchmarking of Perceptual Image Hash Functions. Master's thesis, Upper Austria University of Applied Sciences Hagenberg Campus, 2010.