

# A More Productive and Efficient Approach for “Optimal” Manipulation and Management of Images on a Securely Accessed Private Cloud

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Received: October 14, 2016; Accepted: October 18, 2016; Published: January 05, 2017

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## Abstract

The world of technology is an ever evolving, having exciting technology every time. For the past few years, cloud computing has been the new exciting product in technology. The cloud is primarily used for data storage (private or public), therefore the security aspect of accessing the cloud is a very challenging topic. In this paper, the authors review the existing cloud security aspect, and offer approaches to enhance them as well as presenting a new user-friendly security interface for getting into the cloud that would put users at ease.

Data management and manipulation is a very challenging topic, and the cloud provides a great environment for such work. An example of data available on the cloud is images (i.e., fringe images). The authors also discuss the availability of images manipulation and analysis tools on the cloud, and offer a system model for images processing and analysis on a securely accessible cloud.

**Keywords :** Cloud Computing Security Fringe Images; Images Manipulations;

## Introduction

Managing and Manipulating data on a securely accessible Private cloud is a great challenge. Statistics depicts that the generation now is more into technology and the internet. Pew Research Center states that 93% of people of age ranging from 19 to 29 are online [1] Cloud Computing is taking its importance; they are now the center point of the technology world. It makes an easy life for each individual respective of their fields. People from different fields have migrated to cloud infrastructure, due to its comfortable and anytime anywhere accessible elasticity property, flexibility and the low cost. The rapid development and ease to use of the cloud encourage the companies to learn about the latest developments in Cloud.

Another reason the cloud is becoming so popular is the fact that it specially makes it easier for scientists to collaborate on researches regardless of their locations. The mini-review aims at utilizing the cloud to make images manipulation and analysis easier for scientists, and facilitate research collaboration. Image

manipulation and analysis is a widely used in the field of physics. Physicists from different continents work together on research projects, where they collect thousands of data (i.e., fringe images).

Adding embedded layers can strengthen the security of the cloud. The developed model is planned and presents the best to be user- friendly. The cloud Secured environment designed is having newer ideas and few improvements to the existing methods. One of the improved security layers is the two-step verification. According to an article written by Rosenblatt and Cipriani, two-factor authentication means adding an extra step to the log-in procedure, “The password is your single factor of authentication. The second factor makes your account more secure, in theory” [2]. The two-step authentication method is already in practice by some popular clouds such as Gmail, Yahoo mail and Outlook. Also, LMcPherson stated some common questions used for password reset in these known clouds are the following and said how easy the answers to these questions would be [3]. Here are few of them:

- What is the name of the road you grew up on?
- What is your mother’s maiden name?
- What was the first company that you worked for?
- Where did you go to high school/college?
- What is your mother’s maiden name?
- What was the first company that you worked for?
- Where did you go to high school/college?

The Goal of the mini-review is to present a software model for fringe image processing and analysis which can be implemented in a securely accessible private Cloud that is user friendly, in order to make research collaborations easier. The software should be hosted on a secured cloud infrastructure, making it easy to access by all party of research projects regardless of their location. An analysis of existing processing and analysis algorithm is being carried out, and the optimal algorithms chosen will be implemented and altered for an optimal result. The cloud

is so popular nowadays and is hosting millions of data. Data from the cloud is easily accessible (i.e., it can be retrieved from any smart device), therefore its security aspect is becoming more of a concern for the users. Security is an important aspect; data confidentiality is of greater concern when data is being stored in Cloud.

### Existing Image manipulation and analysis tools on the cloud

The cloud provides a great platform for application hosting and deployment thanks to PaaS(platform as a service) providers. Therefore, the cloud has become the favorite playground of application developers, having numerous applications being developed. But, surprisingly, it is extremely hard to find applications on the cloud with image processing and analysis capability. The need for image processing and analysis tools on the cloud in the scientific community is growing, and it is not being satisfied. The cloud has a few available applications for image processing. Those applications mostly offer basic image manipulation features (for web development purposes). However, there is one project called: Cloud-Based Image Analysis and Processing Toolbox Project that is attempting to solve the problem. The Idea is to provide improved access to the existing biomedical image processing and analysis software packages to research communities via remotely accessible user-interfaces. Although this is a great project, it does not provide tools for the entire scientific community. Therefore there is still a need for cloud based image processing and analysis tools for the scientific community.

### Method

#### Secure Image Storage

The user is expected to login to the account with the two step verification system. They will first have to provide User Id and the Password (step one) and the next step is to answer a security question. Another option of twostep security verification would be an implementation of the “MIST” algorithm [3]. Once logged in, the user can now upload images regardless of their size or format.

#### Image Processing

The second step is to process the image. First the selected image is uploaded into the application. It is then converted into the bitmap format (.bmp) if not already in that format. The image then goes through some filtering algorithms.

- DE-noising
  - Removes noise made by the machine used for the experiment
- Edge the image
  - Run an edging algorithm on the image (i.e., Laplace algorithm)
- Adjust image contrast to obtain better resolution.

#### Pattern and shape recognition

After processing the image for better quality, the application

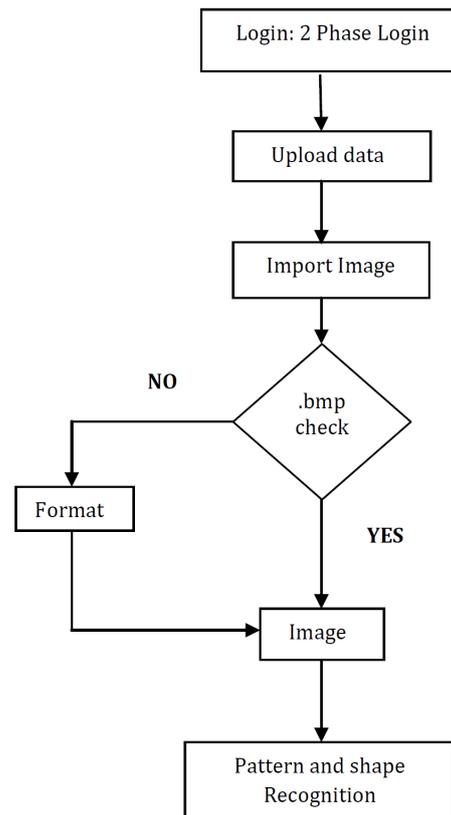
then checks the image for the known pattern and shapes, it then categorizes the images based on its shape and patterns.

### Image analysis algorithm

The image will then undergo an analysis phase. An example would be running a discrete Fourier algorithm.

### Save image and result

The final step would be to save the image and the result of the analysis back on the cloud under a different folder.



### Result

Our results will be populated and released to the public in approximately two months. Currently we are evaluating the statistics we calculated and computed based on a survey we’ve conducted. The survey is based on both the manipulation and management of images on the cloud(disregarding their dimensions or types (i.e. .jpg, .gif, .bmp, .tiff, .png)) , and the data transfer rate. We hope to run tests and release the results and conclusion in future publications.

### Acknowledgment

No funding was presented. However, we would like to thank Dr. Alkadi for his supervision and advice. We appreciate the time he has given us to help us accomplish what we have done so far.

### Conclusion

A model is developed to reduce the difficulty physicist face

while collecting thousands of fringe images, by having a faster upload rate of better quality images to a secure private cloud. The cloud security is managed in such a way to provide a secure and easily accessible environment (user friendly) to the users. The images can be uploaded once, and processed on the cloud without the need for every party to download the data on local computers.

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