A New Method for Detecting and Estimating Disasters using Cross Normalisation of Multitemporal Sar Images

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***Abstract*- This is the method used for remote sensing the disasters. Detection of disasters such as floods, Earthquakes, Explosions are quite complex in previous days and range of detection is inappropriate. But it came to possibilities by using Multi temporal visualization of Synthetic Aperture Radar (SAR) images. But to obtain the good SAR images perfect spatial registration and very precise calibration are necessary to specify changes that have occurred. Calibration of SAR is very complex and also a sensitive problem. Possibly errors may occur after calibration that involves data fusion and visualization process. Traditional image preprocessing cannot be used here due to the non-Gaussian of radar backscattering, but a processing method called "cross calibration/normalization" is used to solve this problem. The application generates a single disaster image called "fast-ready disaster map" from multi temporal SAR images. These maps are generated without user interaction and helps in providing immediate first aid to the people.This process also provides image enhancement and comparison between numerous images using data fusion and visualization process. This proposed processing includes filtering, histogram truncation and equalization steps.Theprocess also helps in identifying the permanentwatersand other classes by combined composition of pre-disaster and post-disaster images into a color image for better identity.**

***Index terms*-Disaster detection, Multi temporal Synthetic Aperture Radar (SAR)**

1 INTRODUCTION

Hazard monitoring technologies are very important in earth observation. Some hazards cannot be pre estimated and hence no preventions can be taken and only cure can be done. Here we invented the technology that helps in observing earth for hazard monitoring. In particular, Synthetic Aperture Radar (SAR) plays an important role by its all-weather capability. The damage can be investigated by using Multitemporal data from the same area at different times. This data can be used to understand the phenomenon. Which in turn helps the authorities to provide first aid and other help to the people. Unlike so many other methodsthis technology is used for a rapid response in emergency situations.

A set of images are necessary for the multi temporal analysis which re radiometrically and spatially accurately registered. For the subsequent processing steps an extremely precise calibration or cross-normalization is required.

In this paper, methods of data fusion and rendering for multi temporal images proposed for image preprocessing chain. The pre-event and post-event images are combined into color composite for better indication of changes that are caused by the post event. This transforms information into a single display. We can refer it as the "fast ready disaster map". This is a effected picture generated immediately after the disaster.

We can obtain more easily understandable visual results by the proposed preprocessing chain. Successive photo interpretation is done between the set of images for identifying the changes. The self-normalization is used for image analysis or classification purpose.

This method was the extended from the studies conducted by the "OPERA (Operational Evaluation of Damages in Flooded Areas Combining Cosmo-Skymed and multispectral optical images)-Civil protection from floods" funded by the Italian space agency in co-operation with the Italian department of civil protection. The main concept of their proposal was flood monitoring as the main focus. But this is extended to other disasters such as earth quakes, Tsunamis, and to carry out the continuous monitoring of a particular place.

FLOW CHART

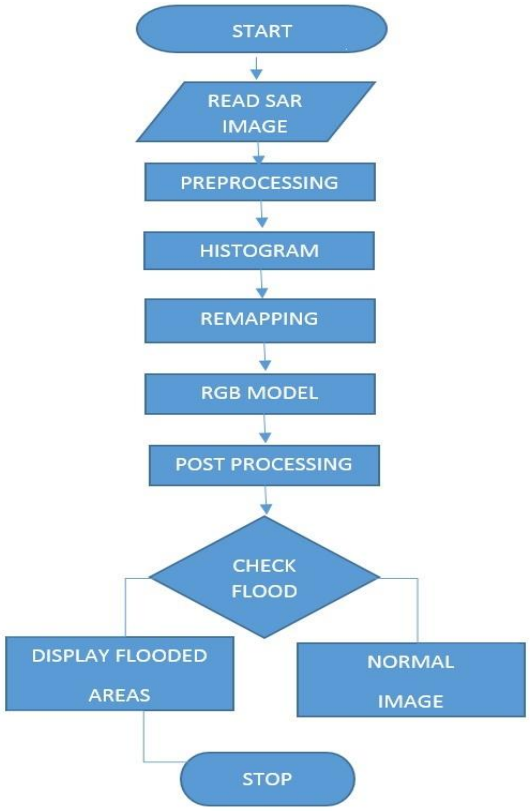

Fig 1.State of Art Diagram

CONVENTIONAL SYSTEM

In the recent past, a variety of methods have been used to delineate changed areas via SAR imagery. Usually, to support the mapping of changed areas, some relevant preprocessing operations must be performed. These operations must be completed for change information to be determined and then displayed by a Geographic Information System (GIS).

DISADVANTAGES

- Internal calibration is very difficult.
- Radiometric calibration chain is affected by measurement errors.
- Time period for computation is very high.

PROPOSED SYSTEM

In this paper, data fusion andrendering of multi temporal images is proposed by using a novel image preprocessing chain. The pre-event and post-event images mixed together into a color composite
for better indication of changes. Here Synthetic Aperture Radar (SAR) imagery is used.Some preprocessed operations like co-registration, geolocation and ortho-rectification of SAR can be performed and changes are displayed. Noise or speckles in SAR images is reduced by using most advanced SARD filters. Appropriate preprocessing steps are executed on the given images before RGB composition for better results. The information is transferred to a single display. Better and easily understandable visual results are generated by the proposed preprocessing chain. The changes that have occurred in the set of images can be observed by successive photo interpretation analysis. In this proposed self-normalization procedure, image classification and analysis, as well as during the training and modeling phases can be done using two or more images.

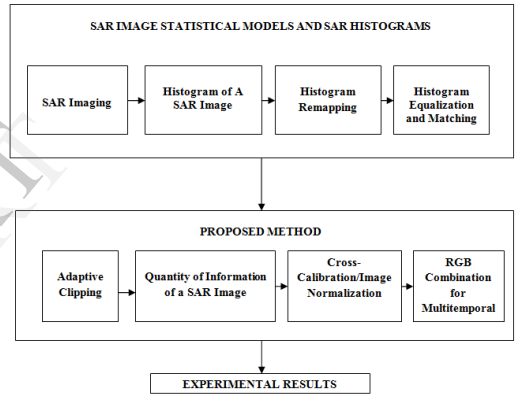

Fig 2 Block Diagram

ADVANTAGES

 Time complexity is low.
 It involves an automatic adaptive self-normalization procedure that works with various sensor settings, so it didn't make calibration unnecessary and it didn't produce calibration errors.
 Fast response

APPLICATIONS

 Used to find out the disaster effected areas.
 Depth of water levels in seas, rivers etc.. can be determined.

Result Analysis

Fig 3 Before flood image

FIG.4 After flood image

Fig.5Before flood preprocessed image

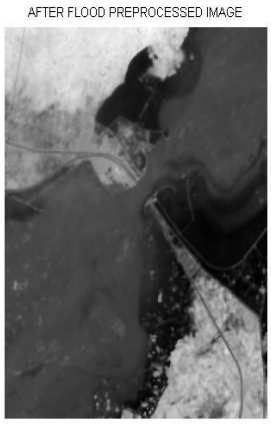

Fig.6 After flood pre processed image

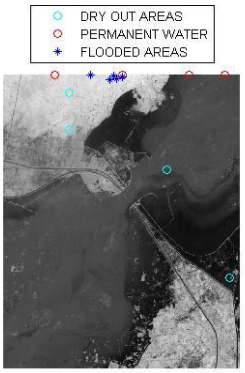

Fig.7 Fast flood map

Fig.8 RGB composite image

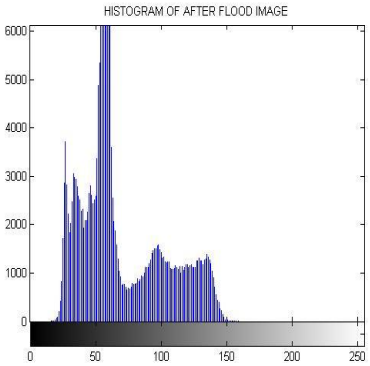

Fig.9

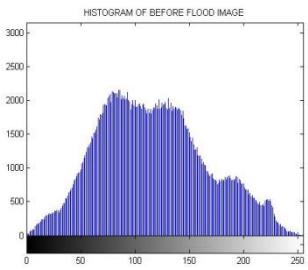

Fig.10

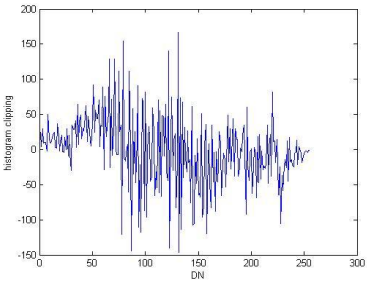

Fig.11 Histogram Clipping

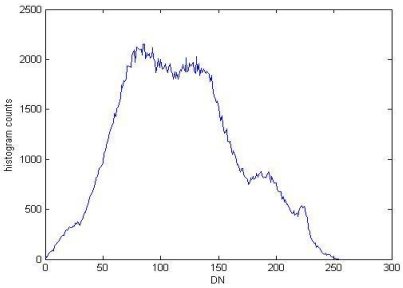

Fig12 Histogram counts

An image histogram is a type of histogram that acts as a graphical representation of the tonal distribution in a digital image. It plots the number of pixels for each tonal value.

Horizontal axis represents tonal variations and the vertical axis represents the pixels in that particular tone.

CONCLUSION

In this paper we have proposed a new technique for detecting and estimating changes between multitemporal images using cross normalization of SAR images. The main objective here was to develop an independent method of processing acquisition parameters. The ultimate aim of this work to generate fast, automatic and repetitive images of RGB composition that helps the authorities for easy scene understanding and fast response for first-aid.

FUTURE ENHANCEMENTS

In future we segment the image by seed growing algorithm. SAR images can be segmented accurately using this process.

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