Change Detection by Using Multitemporal Satellite Image for Region of Samara City

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ABSTRACT

Detecting changes is an immportant part in processing satellite images in remote sensing . The change detection method was applied to an area of the city of samaraa. These changes that occur during acertain peroid of time .Through this paper the changes in the study area were revealed using the subtraction method for two colored merged images for three band of 3,5,7 . The changes were observed by calculating the standard devition ,which increased in the second time compared to the first time ,as well as distinguishing the colors of the image that were colored in distinct colors such as blue which indicate low areas and pink indicates agricultural and wet areas.

Keywords: Change detection, satelite image ,multitemporal image , very high resolution ,image differnce

Introduction

Change detection defind the prosses which abserving the changes of features or phenomenato different time [1].Algorithem of change detection divided in to four types :

First is algebra mathods incloud view ratio ,view diffrence, view regresion and analysis of change vector [2,3].All these methods deppend on the difference between multitemporol images of remote sensing . Algorithem for image transformation to reduce the feature effect of multitemporal satttlite image by transforming and combining the image bands and culculate the principle component analysis (PCA)[4]. The classfication methods contain post and compound classfication depend on classffication to get land use varity [5,6]. There are advanced methods ,where their algorithems depend on wavelet ,markov random field and ather methods [7,8].change detection algorithem proposed multitemporal remote sensing image called deep slow feature analysis (DSFA),this model utilized for projecting [9].The change detection of earth observate by change detection in remote sensing to provide in to enviroment healthy global warming and city management .The platform of romte sensing get very high resolution (VHR) image for ground details ,these images can addearth detailes such as edges shapes and textures of earth features[10].

Expermintal Work

The change detection method was applied to an area of the city of samaraa, which is located in north western iraq at latitude 38 and longitude 169 .landsat 8 satellite images were used for two different times in 2013and 2020.This work used program Arc GIS .

Results And Discussion

The bands of 3,5and 7merged for both times to get false color image ,then subtract these for detect the changes throgh this peroid as illustrated in figure (1) . The hoistogram calculated with standared devition ,min,max and mean values of the three colors that make up the image (red, green and blue) as illustrated in tables (1), (2) and figure (2) . The

standared deviation increased by varying degrees. The most significant increase was the green color which represents the agricultural areas that are in the form of green circles . These images have been subtract as in the figure (1c). It is noted that there are areas in blue , and this may indicate that these areas are low or valleys and agricultural wet areas water appear in pink .
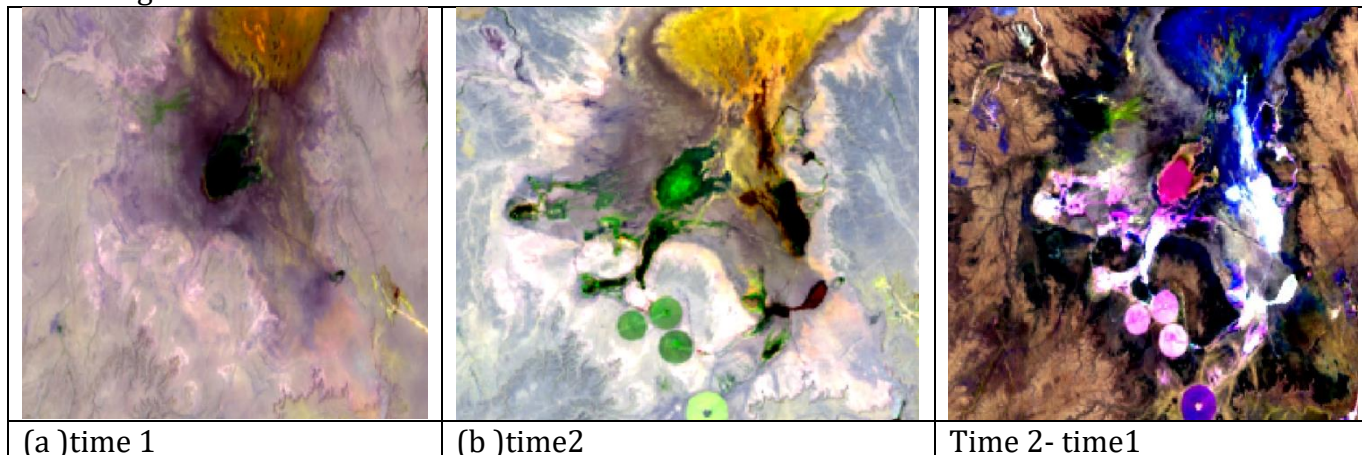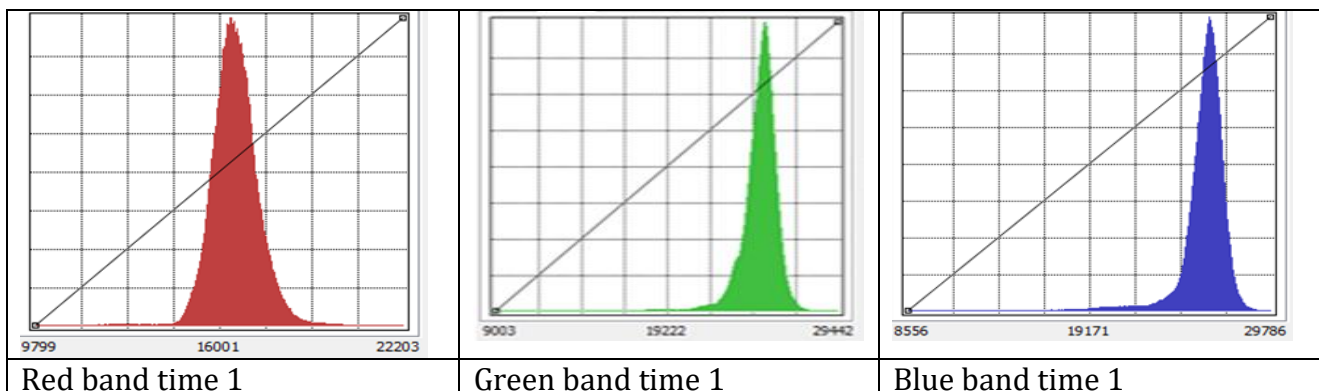

| (a)time 1 | (b)time2 | Time 2- time1 |

Figure 1: show ,a: image at time 1,b:image at time 2, c:image

Table (1) standared deviation values for time1 ,time 2 and time 2-time1

	St dv red band	Stdv green band	Stdv blue band
Time 1	769.85	1043.33	1441.14
Time 2	808.35	1142.84	1446.76
Diff time2-time1	462.29	755.74	857.87

Table(2) min,max and mean values for time1,time2 and time 2-time1

	Red band			Green band			Blue band		
	Min	max	mean	Min	max	mean	Min	max	mean
Time 1	9799	22203	16567	9003	29442	24838	8556	29786	25945
Time2	7823	25896	16535	7020	32758	24052	7925	30625	24790
Diff time2-time1	-7364	9616	32	-11336	15611	782.29	-11111	15281	1144.7

| Red band time 1 | Green band time 1 | Blue band time 1 |

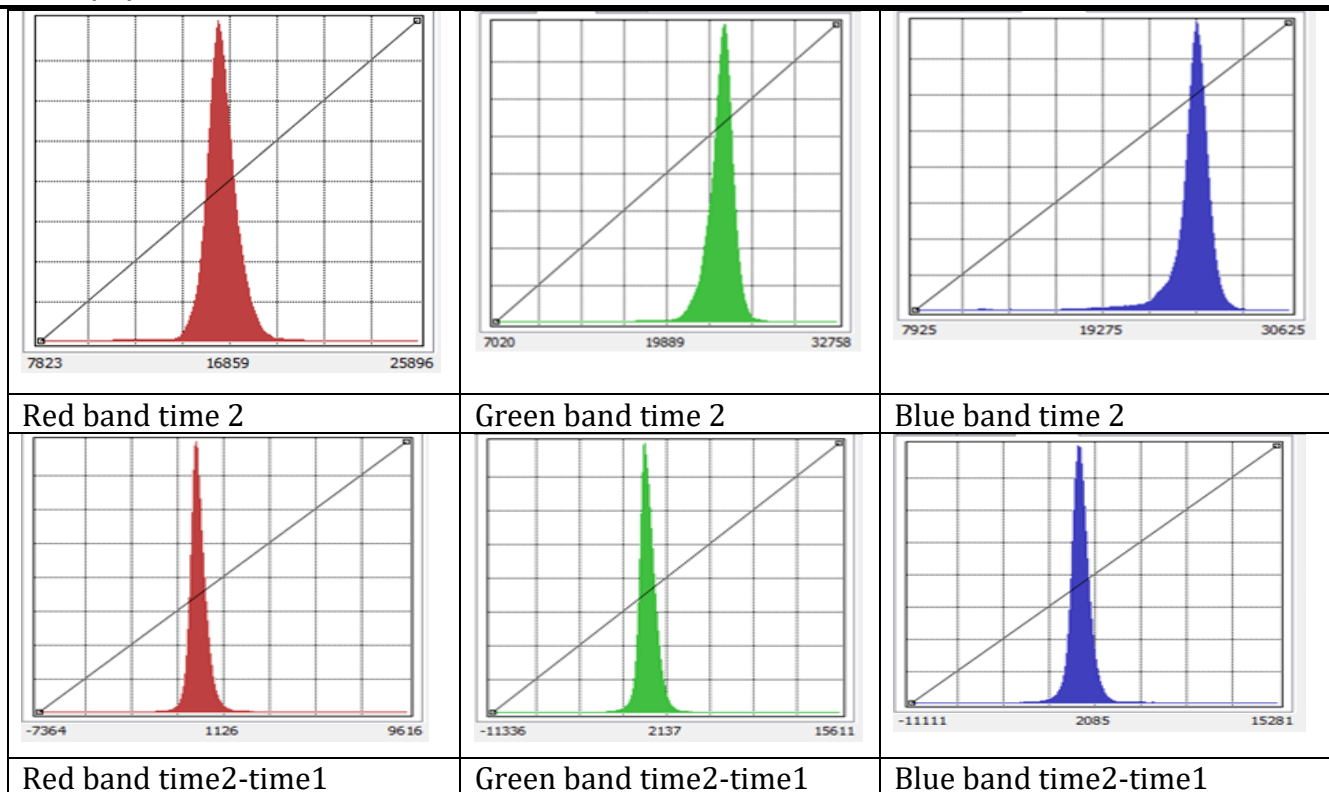| Red band time 2 | Green band time 2 | Blue band time 2 |
| Red band time2-time1 | Green band time2-time1 | Blue band time2-time1 |

Figure (2):the histograms for time1,time2 and time 2-time1

Conclusion

Detecting changes is an immportant part in processing satellite images in remote sensing . These changes that occur during acertain peroid of time .Through this paper the changes in the study area were revealed using the subtraction method for two colored merged images for three band of 3,5,7 . The changes were observed by calculating the standard devition ,which increased in the second time compared to the first time ,as well as distinguishing the colors of the image that were colored in distinct colors such as blue which indicate low areas and pink indicates agricultural and wet areas.

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