NOVATEUR PUBLICATIONS
INTERNATIONAL JOURNAL OF INNOVATIONS IN ENGINEERING RESEARCH AND TECHNOLOGY [IJIERT]
ISSN: 2394-3696
VOLUME 2, ISSUE 4APR.-2015

K-MEANS CLUSTERING ANDSNAKES PATTERN USED FOR ROAD EXTRACTION

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ABSTRACT

The road extraction from digital images or satellite images has become topic to be dealt with in the recent past. Numerous methods have been discovered such as semi automatic extraction of road as well as automatic extraction road. Now in this paper, we are proposing the method for extracting road from urban part as well as non urban part from an image.

INTRODUCTION

What Is Road Extraction?
Basically, Road Extraction deals with extracting the road from given satellite image, that means we are accepting digital image as input image of digitalsatellite process and shows only extracted part of the road as output image. There are a lot of new methods have been discovered involving semi automatic method which requires user interaction and Automatic methods which does not require any user interaction. Automated road network extraction from remotely sensed imagery is of importance in the context of road databasescreation, refinement and updating. Substantial amount of research has been carried out to extract road network fromsatellite imagery in the photogrammetric and computer vision communities.Generating extracted part of the road has plays very important role in the planning of development in cities as well asvehicle mobility system and disaster prevention.

Fig 1: Road Extraction System

We designed a system that is known as “Road Extraction System” which will accept satellite image of road area as a input image and identify road area and non road area such as buildings, parkinglots, cropfields.To carried out this operation , we have to provide very high resolution satellite image as input image to get extracted road as output image. As we can easily think this system will consist of different operations that should be performed sequentially on input image. In next data flow diagram we further extend the road extraction system consisting of different operations.

RELATED WORK

DishaTiwari ,G.P.Saroha,UrvashiBhushan (2012) have developed the method based on automatic and semi automaticroad detection algorithms. Semi automatic road extraction comprises of pre-processing the image via a gauss filter andreducing the yielding data into a single image which is of the same size as the original optical gray scale satellite image,then find the image gradient in x and y direction [1].In the existing method of road extraction various semi automatic and automatic methods have been developed. Karin K.Hedman, U. Stilla, G. Lisini, P. Gamba (2010) have used two road extractors one for rural areas and another for urban areas. They used two steps for road extraction first step includes Line extraction followed by a smoothening and splittingstep and second step include Linear features evaluation on their attributes using Bayesian probability theory [2].Anil and Natarajan (2010)have developed the method based upon statistical region merging for image segmentation androad network is extracted based upon skeleton pruning method based on discrete curve evaluation[3].Tomoko Tateyama, ZenshoNakao, Xian Yan Zeng, Yen-Wei Chen (2004) have proposed a method which combinescolor, texture information and shape information for segmentation of high resolution images and a new direction filterwhich focuses on road features having information on specific directionality. The method uses color and textureinformation for global segmentation and shape information for local analysis [4].Yinghua He, Hong Wang, Bo Zhang (2003) have developed an algorithm consists of two major points: boundaries areestimated based on the intensity image and road areas are detected based on the full color image [5].OnurTuncer (2007) has proposed a method which consists of preprocessing the image via the series of wavelet basedfilter banks and reducing the yielding data into a single image, then utilizing a fuzzy inference algorithm to find roadareas [6].Q. Zhang and I. Couloigner (2006) have proposed a method which starts with an image segmentation using a spectralclustering algorithm. This step focuses on the exploitation of the spectral information for feature extraction. The roadclusters are automatically identified using a fuzzy classifier based on a set of predefined membership function for roadsurface and the corresponding normalized digital numbers in each multi spectral band. A number of shape descriptorsfrom the refined angular texture signature are defined and used to reduce the misclassification between roads and otherspectrally similar objects such as parking lots, building or crop field [7].Jalal (2006) has proposed a method comprise of two stages: feature extraction and fuzzy modelling for roadidentification. In the first stage mean, standard deviation, skewness and kutosis. In the fuzzy modelling stage, the roadsare identified based on converted features to the specific fuzzy sets in the linguistic variables. In existing method of roadextraction various semi automatic and automatic methods have been developed [8].Hui Kong, J.-Y.Audibert, J. Ponce (2010) have developed the method based upon the vanishing point associated withmain

part of road, followed by the segmentation of the corresponding road area based upon the detected vanishing point[9].

PROPOSED WORK

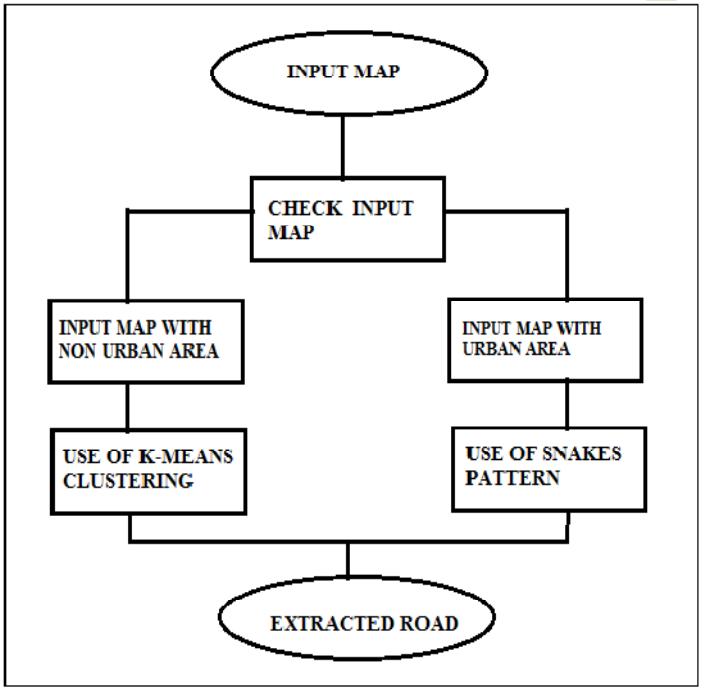

Fig 2: PROPOSED SYSTEM ARCHITECTURE

We were done a lots of work on road extraction using automatic and semi automatic methods of road extraction. These methods extracts road from urban area as well as non urban area. Also there are some approaches developed to extract road from urban as well as non urban area that uses some different method.
So now in this paper, we propose a method that extracts road from non urban area by using k-means clustering and a method that extracts road from urban area by using snakes pattern. Above fig2 is proposed system architecture of a road extraction system. The components of the road extraction system are as below.

INPUT MAP

Input map contains a satellite image which contains road part as well as non road objects such as building parts, crop area, parking slots, etc.

CHECK INPUT MAP:

Basically,this part check the input image that is high resolution satellite image by using corresponding methods.

Input With Non Urban Area:

Here input is checked that is input is of non urban type and by using k-means clustering we do necessary operations

Input With Urban Area:

Here input is checked that is input is of urban type and by using snakes pattern and we do necessary operations

EXTRACTED ROAD:

This is the last part of proposed system architecture that produces extracted road as a output image which is the main goal of our proposed system.

WORKING

Basically,our proposed system architecture contains three main components such as input map,check input map and extracted road. The input map component accept satellite image as input image that includes road area and non road area that is building parts,crop area , parking slots,etc. The second component is check input map where the input road map is checked. If the road map is of the non urban type then by using k-means clustering and we perform some operations and extract a road. If the road map is of the urban type then by using snakes pattern and performing some operation ,we extract a road.

CONCLUSION

The main aim of our proposed system is to extract a road from different satellite images that contains road area as well as non road objects by using k-means clustering and snakes pattern depending on the type of area. Proposed model of road extraction extracts roads from non urban area using K-means clustering and extracts roads from urban area using the snake's pattern very efficiently.

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