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Using Quality Database Convert the Quantity data into Quality data and Automate the Control Points using SURF Algorithm in Spatio-Temporal data

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Abstract— GIS data can be divided into two formats, raster and vector. Raster format can represent the values which give quantitative information such as temperature, vegetation intensity, land use/cover etc. Vector format can represent the value which give qualitative data which consists of point, lines and polygons and these representing the location, distance or area of landscape features in graphical forms. For extracting the data we can register the image for the initial processing. For register the image we can select the control points. This control point selection can convert the quantity data into quality data. This process of transforming information (quantity) into knowledge (quality) is called appropriation. To overcome the limitations of relational databases and provide a greater knowledge in terms of knowledge we use the spatio-temporal database**.**

Keywords— Database , Quality database, Rotation,Scaling, SURF-Algorithm , Spatio-temporal model , Translation.

I. INTRODUCTION

The most important and basic information in the real world is related with space and time. Now a day's many application demand for spatial and the temporal support. The unit space is related with spatial and the unit time is related with temporal. So Spatio-temporal database management system can become an enabling technology for important applications such as GIS, information system, multimedia and the hardware such as position aware devices. Spatio-temporal database helps in information fusion and change detection in distinct pix. We extend the existing data models to include space and time in order to better describe our dynamic real world .

In spatio-temporal database we simply create the data and that data can be determined by the three parameters which includes number of periods, time intervals, number of objects at each period by determing these three parameters we can start the simulation on randomly selected data[11] and we stop the simulation until all the objects will be arrived at their destination fig.1.

Our model deals with dynamic entities evolving in time known as time slice [10]. Each of them may be described along 4 additives which might be identity, spatial, temporal, spatio-temporal as depicted in fig.2. Spatio-temporal version deal with dynamic entities not the static entities and those are referred to as time slice.

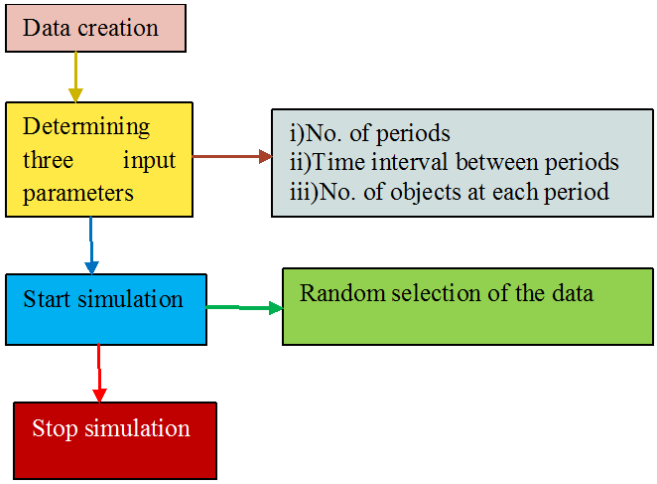

Fig.1:-Flow chart of the data in spatio-temporal database

Time slice may be described at the side of four components The considerable affect [1] of spatio-temporal database on the landmark of database network, due to its powerful functionality to map, express and purpose about our real international spatially. The modeling, analysis and visualization of dynamic geospatial phenomena has been diagnosed as a key improvement challenge for subsequent generation GIS.

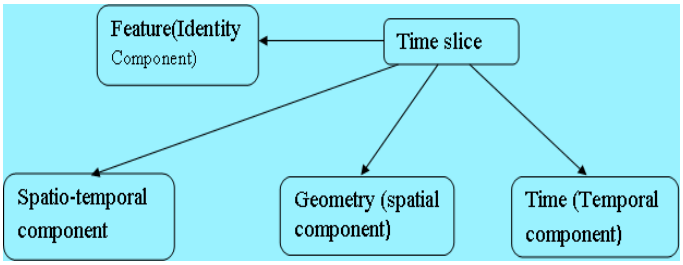

Fig.:-2 Component diagram

Event occur and the state both are related to each other in which we can define the spatial and the temporal state as depicted in fig. 3.Temporal state is that during which the event can occur at one of a kind time with distinctive state. Spatial state is that during which the exchange can occur and describe the very last kingdom that this is the change we've got seen in the environment. Temporal defines the attributes and spatial we've the geometry and the topology. If both spatial and the temporal can be part of then we are able to have the nation and this state is called the spatio-temporal state. To explain that nation we are able to take the example of green land covered or uncovered [2] in the course of one of a kind periods.

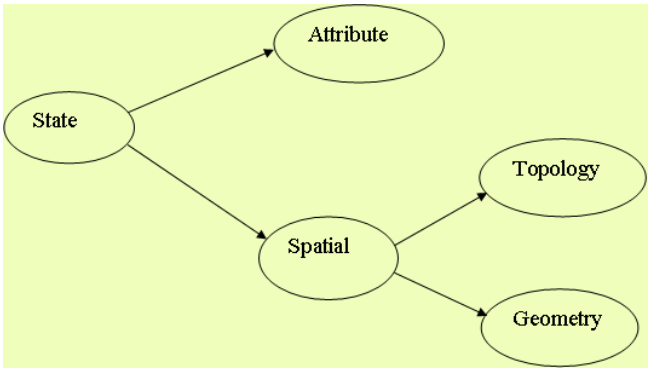

Fig.3:- Spatio-temporal Object-State

II. SPATIO-TEMPORAL DATA ORGANISATION

Using statistics enterprise we can lessen the facts redundancy and store space for facts storage. Spatio-temporal data can be stored in one-of-a-kind databases. So we will arrange the statistics in exceptional records bases as we will explain in fig.4:-

Modern-day Database:- that is the bottom database wherein the contemporary region of the information can be shown .

System Database:- transition can take place and the information may be proven at different processing nation manner the faux state is there in which the system database can rollback that data and might constitute the appropriate information .

Distinction Database or ancient Database:- The present day kingdom of an item may be up to date and the vintage kingdom of the object might be moved to the database .

Version Database:- In version database we have statistics like image . We can browse the statistics at any time instance and make a model into the model database. On this database we are able to browse the records fast [3] and manage it additionally.

Satisfactory Database:-The statistics are saved in database but a few data is redundant in above database however in satisfactory database we will get rid of the redundant information and might preserve the database at pleasant basis.

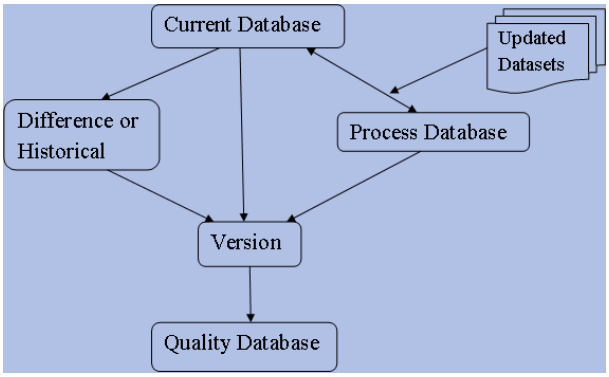

Fig.4:- Data Organization

III. CHANGE IMAGE DATA

The statistics can be prepared in database but the image shape of the land exchange cant't be stored so we will take the bottom image and the transformed photograph and then we preprocess the statistics of that photo by choosing the important thing points as a function descriptor or function mapping .The transformation can take location by means of alignment of the picture after which register that photograph. The general procedure can be achieved with the aid of the use of the SURF set of rules[4]

The overall set of rules is divided into numerous modules to enhance the performance of picture registration technique. Surf module extracts the dimensions invariant key factors and form context provide rotation provide rotation and transformation invariance to the detected key points. The detection of these key factors can differentiate the statistics from quantitative to qualitative. There are photographs that are referenced image and converted photograph and those pictures can be preprocessed to get the result in the qualitative shape. By means of taking the picture as referred image we will map the capabilities and the transformation

can take region wherein the alignment of the photograph is there after which the image may be registered.

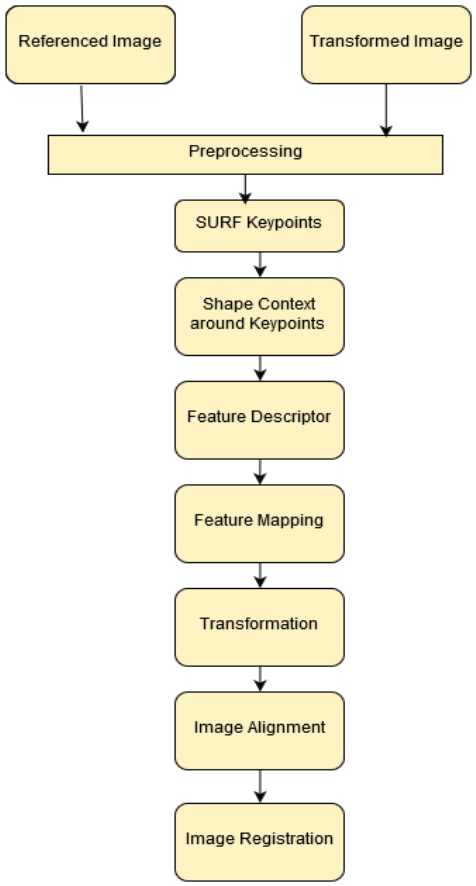

Fig.-5:- Transformation process

This procedure can be defined in fig.5. Key factor extraction is the most critical step in picture registration. Accuracy of transformation matrix depends upon the accuracy of detected key points. Key factors act [5] because the function descriptor; consequently it needs to be rotation, translation and scale invariant. We used surf algorithm to provide scale invariant and form context to provide rotation and transformation invariant.

SURF Descriptor sped up sturdy feature is improvised model of SIFT descriptor, which makes use of critical picture with Haar wavelets filter to lower computation time and growth the robustness. Surf set of rules as much as scale invariance is utilized [6] in our proposed set of rules.

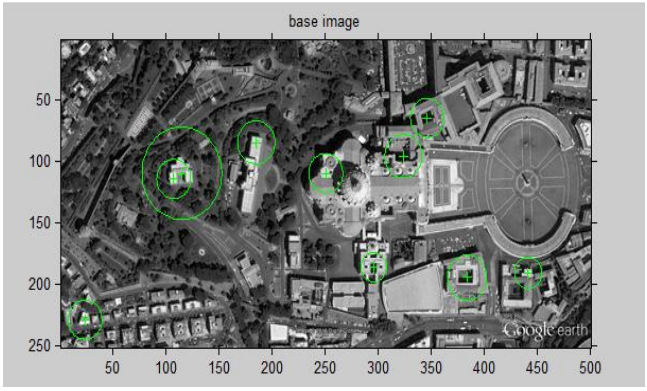

Figure 6: Base Image

Figure 6 is the satellite view of Vatican City taken from Google Earth application, which had served as our base image during the implementation of this algorithm. In this image, the circles are depicting the control points found with respect to a similar but translated image of same location on the basis of its feature point selection.

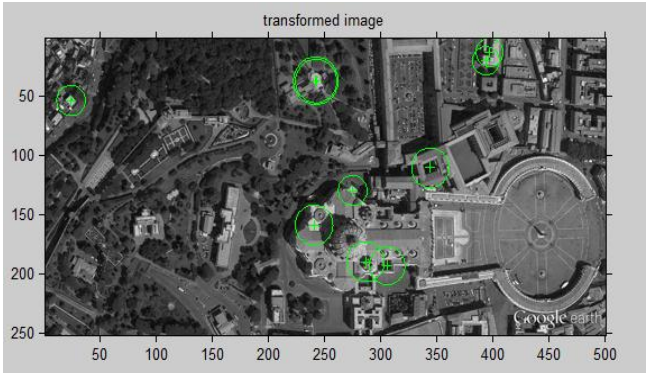

Figure 7: Transformed Image

Figure 7 is the transformed form of the previous figure.

In this image, control points are analysed on the basis of its similarity with figure 5 and unnecessary control points are removed so that proper connection can be established between the images.

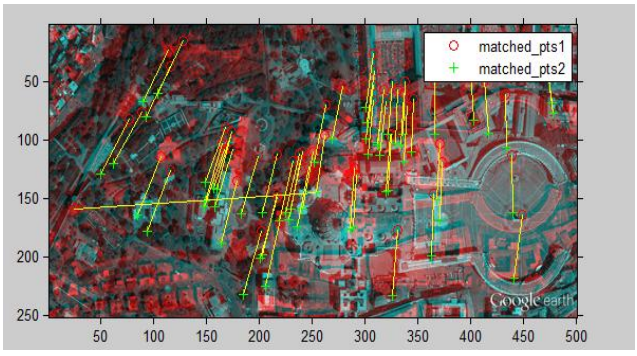

Figure 8: Control Point Selection

Figure 8 is depicting the mapping of these control points on overlapping the previous images. Each control point is connected with its counterpart so that proper relation can be specified in these images.

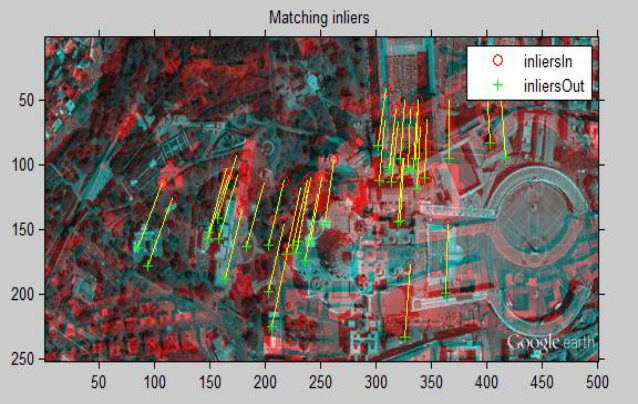

Figure 9: Matching Inliners

In figure 9, overlapped images of same location with some variations in them are shown. In this figure the process of matching inliners is clearly shown.

A Square window of 10x10 dimensions around each extracted surf key points is created and send to the shape context modules to create the final feature descriptor.

IV. SHAPE CONTEXT

The form context is a descriptor used to degree similarity and point correspondences between shapes. It describes a factor on the object contour with appreciate to each different factor inside the contour. Inside the form context computation; first off, the binary picture is padded from all the sides with a purpose to extract the hand photograph completely. By way of making use of the sobel part detection [7], edge of the picture is extracted as shown in fig. 9. Every aspect points are stored in a listing. The points are sampled by way of using EAS sampling technique.

Steps to compute shape context:-
Extract the edge points of the hand contour. For each factor, we can compute the Euclidean distance to all different final (n-1) points which include the point itself. This could end result into nxn distance matrix Md.

We can normalize the matrix[8] by means of imply distance

$$\text{ƛ: ƛ} = \sum \text{Mij} / \text{N}$$

where N is the total no. of element of distance matrix[9]. As proven in fig. 8 and fig. 9
For every pattern factor find the angle for rest of the (n-1) sampling points w.r.t. to centroid.

Normalize the gap matrix and angle matrix, a good way to make the shape context rotation and translation independent.

• Classify each point to the respective bin.

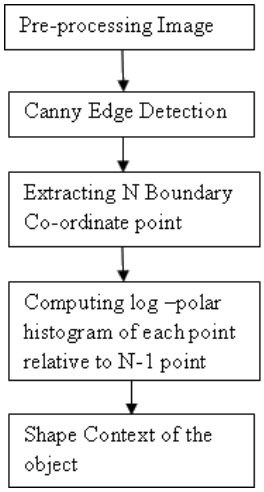

Fig.:- 10

V. RESULT

Our proposed algorithm has been tested for three cases. The translation can be done in which the image translate from the previous to the current state. The second factor is the rotation in which the image has been rotate at any angle. The scaling factor can give the way in which the data or the image can be scaled to give the exact data of that image fig.11.

- Translation
- Rotation
- Scaling

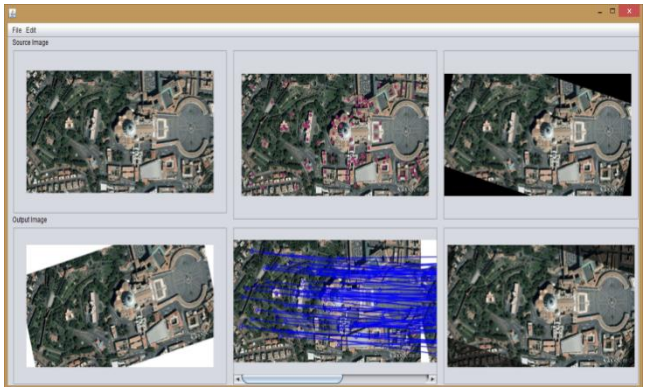

fig. :-11

This proposed algorithm can do the experiment and these three results. In all the above mentioned cases, image registration has been done accordingly as shown in the above fig.10.

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