Different Direction Flow Analysation Algorithm (DDFAA) Of Moving Object Using Spatial Temporal Database Concept

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***Abstract*— A main aim of this research to focus the moving object in the spatial temporal concept, the method for acquire and in place of the movements in which the positions of moving objects are sampled at selected points in time. The algorithmic discussion and equation describe object movement focusing accurately. The trajectory based queries are classified in 'topological' queries, which involve the whole information of the movement of an object and 'navigational' queries which involve derived information. The main challenge is to deal with a large number of possible topological relationships between static regions as well as to deal with a large number of object such regions. A relationship predicate indicates in of term disjoint, meet, inside, meet, disjoint that is composed of a temporal sequence of the basic spatial temporal predicates. Here the moving object is taken as lines, circles and squares, the database is used to cover the continuous updating of the object location, cover all the direction of the flow in the mentioned objects. The static region does not change their location for the entire process. The moving region comparison is considering in the volcanoes details from 2001 to 2010. Basis on data it calculate distance of the elevation continue and the direction of the elevation likewise.**

Keywords- Object movement-Static Region-Direction Flow-Algorithms-Query Analysation

I. INTRODUCTION

The term spatial data in a broad sense, it's covering multidimensional points, lines, rectangles, polygons, cubes and other geometric objects. A spatial data object occupies a certain region of space, called its spatial extent, which is characterized by its location and boundary. Each pixel stores a measured value for a corresponding location in space. Another example of such measured point data is medical imagery such as three-dimensional magnetic resonance imaging (MRI) brain scans. A line is the basic abstraction for moving through space, or connections in space. Examples of line objects are river, highways or telephone cables. A region has a spatial extend with a location and a boundary. The location can be thought of as the position of a fixed 'anchor point' for the region, such as its centroid. Databases that store information about states of the real world across time are called temporal databases. Based on the issue of time in database systems, distinguish time as measured by the system and time as observed in the real world. With many applications requiring support for temporal databases, extensive research has focused on temporal queries and reasoning. Moving objects are the object of which spatial data is changed in sequence over time. It can be largely divided into moving point and moving region. Moving regions are positions as well as shapes of objects changing over time. These include administrative area, progress of forests, influence of storms, or racial movement.

II. LITERAL REVIEW

Spatiotemporal outlier analysis has been an essential them in data mining [1].This is to disclose some strange moving objects or those changing rather differently in space, direction, speed, and time different objects have trajectories of different lengths and may above different time-scales, making a vector description inappropriate. Object trajectories are inherently smooth as a function of time, information which is lost Vectrozation [2]. Moving objects database technology for ad-hoc querying and satellite data retrieval for dynamic atmospheric events [3] in this paper based on the moving object database technology for ad-hoc querying and retrieval of atmospheric events and their associated satellite measurement.

Moving object in database and GIS State of the art and open problem [4] this paper is to give an overview of the current state-of-the art of moving object databases and in particular to identify open research problems and indicate possible solutions. The paper deals with moving objects in unconstrained environments; these are spatial objects that can freely change their location, shape and extent. These are spatial objects whose temporal evolution is bounded due to spatial limitation like networks.

Moving objects are unconstrained environments, separation into historical moving objects and predictive moving objects. The historical moving objects in database introduces the fundamental concept of spatiotemporal data types [Erwin et al.1999]

These data types enable the user to describe the continuous, dynamic and time-dependent behaviour and location change of spatial objects overtime and to perform spatiotemporal analysis. Spatiotemporal predicates (Gutting and Schneider 2005) describe changing topological relationships of moving objects overtime. Predictive moving objects describe the predicted temporal evolution of spatial objects at the present time and in the near future.

Querying moving objects with uncertainty in spatio-temporal databases [5] in this paper propose a model called pendent model, which captures the uncertainty of moving objects and represents it in a databases context. Topological relationship between moving objects with uncertainty and show query examples. In [Erwig 2002] authors have defined topological relationship between moving objects overtime as binary predicates, called spatio-temporal predicates(STP), the result of which are either true or false.

Topological reasoning between complex regions in database with frequent updates [6] the main goal of this paper is to develop a reasoning model for complex regions. The main challenge is to deal with a large number of possible topological relationships between two complex regions as well as to deal with a large number of such regions. Second goal is to derive a set of inference rules by which the inference of relationship is performed. Since the type for simple region is a subset of the type for complex regions.

III. RELATED WORK

The goal of the research on moving objects databases is to extend database technology, any kind of moving entity can be represented in a database, and powerful query languages are available to formulate any kind of questions about such movements. In this research to mainly focus the object in the continuous changes values and updates frequently in the x and y coordinates values. The movement of the object can be taken as the point object with straight line. The dataset is considered as the continuous changing attribute pattern. Experimental results describe all the value set and the algorithmic steps of the movement data.

Initial value of the object =(O_ID, X_0, Y_0, T_0) ;

Where O_ID –ObjectID, X_0, Y_0-Initial X,Y Values,T_0-Start Duration

The next continuous steps of moving object = (O_ID, x_i, y_i, t_i) $0<i<n$; Where i is continuous moving step(i.e.i=i+1;)

Algorithm-1

Step1: Set the object initial value and start the database to store values.

Step2: Calculate the continuous increment coordinate values of x and y,also update the database

if the object moving in the cross direction the value of the coordinate increment both x and y at the instant of t_{i+1}

Repeat: $x_{i=} x_i + d$ & $y_{i=} y_i + d$; Where d-Distance of moving object. $(0<i<n)$

Step3: Finish

The above algorithm how the object move from one location to another it may be move cross direction otherwise it may move straight words that situation calculate basis on the x or y only because any one of the coordinate is constant.

Table I: Data for Continuous Moving Object

Object_ID	X_Cor	Y_Cor	Speed
O101	1950	255	50
O101	2340	255	50
O101	2660	255	50
O101	3050	255	50
O101	3550	255	50
O101	4550	255	50
O101	5050	255	50

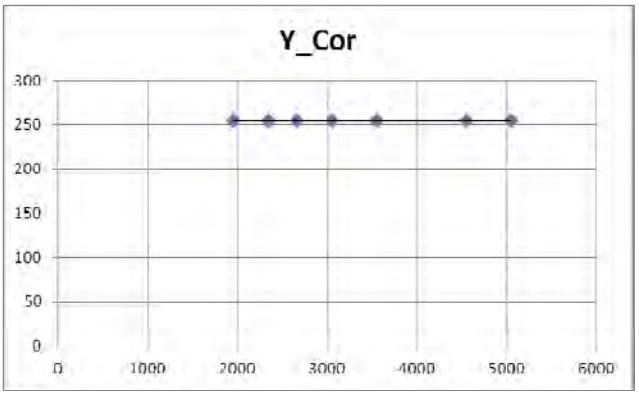

Figure1:Moving Object in the X-Direction

The figure1 shows the direction of moving object based on the tableI values, the database updates in continuous values untill the object reach in the destination,here to discuss only sample values.the speed mentioned constent for all the movements of the object and also coordinates value increment only in x-coordinate but y is constant

The location of movement in the object also with different direction, for example left to right, right to left, topleft to rightbottom, righttop to leftbottom likewise to cover all the directions. The moving objects to cross static region, the SQL query to retrieve all the records based on the predicate mentioned in the query generation. The predicates are setting based on the entry status of the object mentioned in the static region. Here to focus the moving object in the different directions with and the speed variance.

The direction is Forward: the movement of the line x and y coordinates as in the time interval of t_i and t_n as

t_i duration the value of $x_i=x_i+\Delta x$ ($\Delta x= x_i-x_{i-1}$) & y_i=Constant $(0<i<n)$

The direction is Reverse: the movement of the line x and y coordinates as in the time interval of t_i and t_n as

t_i duration the value of $x_{i-1}=x_i-\Delta x$ ($\Delta x= x_i+x_{i-1}$) & y_i=Constant $(0<i<n)$

The direction is Crosswise:

t_i duration the value of $x_i=x_{i-1}+\Delta x$ ($\Delta x= x_i-x_{i-1}$) & $y_i=y_{i-1}+\Delta y$ ($\Delta y=y_i-y_{i-1}$)

Where Δx and Δy is the difference between x and y coordinate comparing with previous values.

Algorithm-2: Line (int x1, int y1,int x2,int y2)

Variables: x1,y1,x2,y2 are the coordinate value of the line,Draw the line and static region, set the timer interval, line move the direction TopLeft to RightBottom, set the destination(d) value of the line.

1) The line value compare with the destination (denote as d) value.

a) If line.x1< d.left then

For i = line.x1 to d.left

$x_i=x_{i-1}+\Delta x$ ($\Delta x= x_i-x_{i-1}$)

$y_i=y_{i-1}+\Delta y$ ($\Delta y=y_i-y_{i-1}$)

move to step2 and step3

elseif line.x1>d.left then
return “stop the movement of the line”
endif

2) The line enter the static region (denote as s)

2.1) if line.x1=s.top then
Msgbox “the line enter the region”
Elseif line.x1>s.top and line.x1<s.end and line.x2>s.top and line.x2<s.end then
Msgbox “the line3 completely inside”
Elseif line.x1>s.end then
Msgbox “line outside the region”
Endif

3) Save all the values and remarks in the database until the value reaches the destination.

4) Exit

In algorithm-2 to focus the line value, the parameters of the line2 as x1, y1, x2, y2. The line value move from lefttop to rightbottom, in the step1 the value of line compare the destination value, increment the x and y coordinates until the loop completed. The line increment duration it compare the static region top and bottom value, the line y and x coordinate equal to the static region top and left value “the line enter the region”, the line coordinate entirely inside the static region “the line completely inside the region”. The line x and y coordinate compare the bottom value of the static region “line outside the region”. The step3 save all the values line movement in the database until the line reaches the destination. The step4 exit the algorithm

Here the object movement to update both x,y-coordinates values,speed and remarks using this remarks to analyse different types of queries to retrieve the object position. For example

SQL>Select *from objectmove where and x_coor>2000 and x_coor<4000 and y_coor>1000 and y_coor<3000;

The output of the line is inside the region otherwise the line is outside

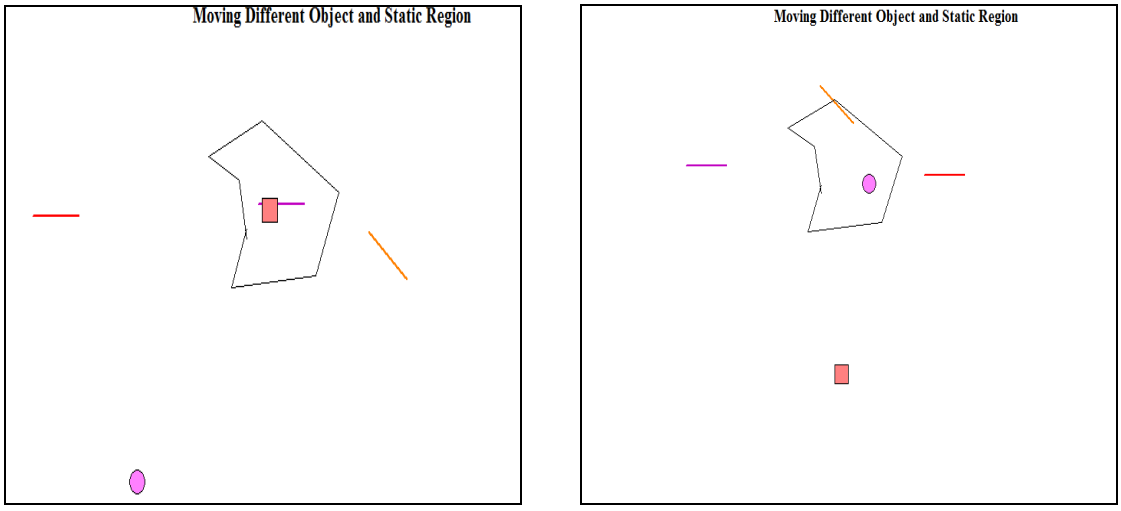

Figure2: Moving different object in different direction with static region (Two object crossing the region same time and another object partially entering the region)

Table II : The Object Entering Region Details of the Group by Report

OName	Xmin	Ymin	Xmax	Ymax	NOP	STime	ETime
Circle	5640	1790	5650	1800	10	3120	3140
Square	4680	2940	4680	2940	10	9475	9475
Line1	3770	2160	4500	2160	10	7560	9020
Line2	5090	2280	5810	2280	10	4520	5240
Line3	3975	850	4500	1200	10	1850	2725

Figure2 and tableII shows the movement of the object, all the object moves from source to destination with different speed and different direction from source to destination, all the movement store in the database. The line1 and line2 its crossing the region at the same time in the opposite direction i.e.,known as topological relation.

$C_o = x_{ce} - x_{cs}$; where C_O – Object movement in completely inside the region,

Ex: x_{cs}= 4680; y_{cs} = 2160 , x_{ce} = 4740; y_{ce} =2160;where y_{cs} and y_{ce} here is the constant value because the line move in the straight line, x_{cs} and x_{ce} starting and ending value of the x-coordinate value.

= 4740 – 4680 = 60 pixels

Sample Query:

Sql> select *from staticregion where objname=?;

Sql>select objname,min(x1),max(x1),min(y1),max(y1),max(distance),

max(tinterval),max(ctime) from staticregion group by objname;

sql>select objname,min(x1),min(y1),max(x1),max(y1),max(nop),min(ctime),

max(ctime) from staticregion where remarks=? group by objname;

The moving object is not only to consider the point, line and the moving region it's also describe the size and the shape of the object. the moving region continuously increases its size with different coordinates depends upon the attributes value, here to discuss about the moving region comparison in the volcanoes details. There are number of ways to analyze the data in the research, first to start the discussion how many volcanoes occur in the duration of 2001 to 2010 in the past ten years collection of volcanoes details.

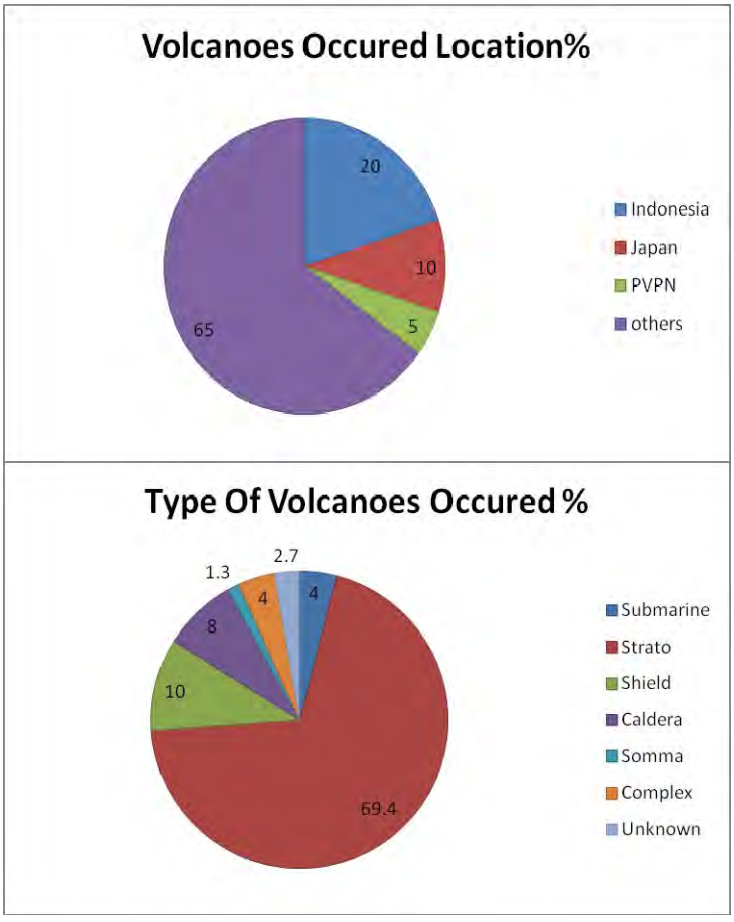

Figure 3: Volcanos Affected Places in the Year &Type of Volcanoes Occurred [2001 to 2010]

The figure3 shows the details of the volcanoes affected areas and types in the year 2001 to 2010, the others 65% indicates all the location in the affected area of volcanoes except the indication of 20%,10%,5% locations. The 5% of PVPN (philippines,vanuatu, papua new guinea, new zealand) indicates the four location details. the type of the volcanoes affected in the percentagewise.The 70% volcanoes belong to the strato type of volcanoes, 10 to 8 percentage of type are affected in the shield and caldera type volanoes, the remaining are below this level in percentage.

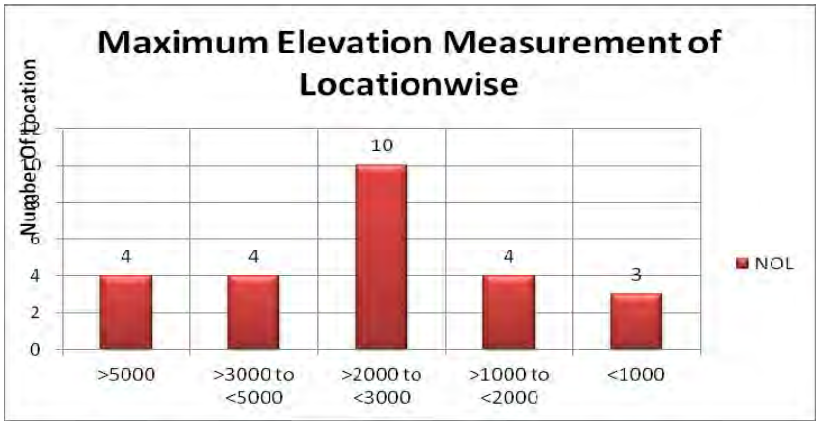

Figure4: Maximum Elevation Measurement Locationwise [2001 to 2010]

Figure4 shows the details of maximum elevation occurred in each place from the ten years data collection report. The elevation is measured in meters. The maximum elevation above 5000 meter distance covered in the four location, the elevation between above 3000 to below 5000 meter distance is covered in four places, the distance of above 2000 to below 3000 is covered in ten places, the distance of above 1000 to below 2000 is covered in four places and the remaining three location is covered the below 1000 meter. The details of elevation is finding basis of the group by output of the location, and the output of the aggregate value of the elevation eg.max(elevation) from the group by report.

IV. CONCLUSION

This paper is to covered the direction flow of object movement and relation of object movement in the region while crossing with object, entering the object with the region, inside the region and outside the region of the object movement with the static region, at the same it is not only to cover the object relation and movement algorithms. The comparison movement of volcanoes considered to moving region. The comparison report of each one is to give some link between one another, in the location wise comparison to give the output in Indonesia is the highest volcano occur compare then the other locations. In the type wise comparison the maximum volcanoes occur in the type of strato type, the year wise comparison report output to perform the maximum and minimum elevation details and the coordinate wise report to give the details of each coordinate report and which type of volcanoes occur in the coordinate like that. In future research to describe more elaborately discuss with real time samples.

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