Chapter – 5
Conclusion & Future Scope

5.1 Conclusion:

To provide the effective Customer Relationship Management System model, researcher first investigated and analyzed the various techniques of computational Data Exploration & Data Mining. Also during literature survey researcher studied many research papers and technical articles to explore the features and problems with current tools, techniques and methodologies. During the study of various tools and techniques researcher found following generic problems

➢ Existing data mining techniques requires high prerequisite knowledge to effectively operate them.
➢ Existing data exploration tools only presents the data in graphical format, but not allowed to fetch or process such graphically presented data.
➢ Existing clustering tools creates the cluster automatically whenever the data set is provided to them, but there is no way where user can create a cluster of customized shape to cater the need of individual application.

After finding above define problems researcher decided to design and develop a model that can resolve the problems of current tools and techniques. Thus researcher proposed 9 different models of clustering like techniques.

The design of the first model is discussed in 3.1 of chapter 3 and development, implementation and results are discussed in 4.1 of chapter 4. It allows user to create the cluster with the flexibility of selecting desired records within the bound of cluster. Here user can create and draw a cluster of rectangle shape that can cover or bound 100% desired records with the clustering. Here Rectangle shape of the cluster can be increased to cover more area or to include more records and can be decreased as per the end-user conveniences. Usage of this model requires comparatively less prerequisite knowledge for clustering as almost all the activities of clustering are performed graphically like selection of records, defining shape of cluster and population of selected records in the data grid. Thus clustering model becomes more interactive and easy to understand, ultimately results in increasing decision makers efficiency. Also End-user can apply various kinds of other statistical functions on the selected records.
However this model only allows to form the cluster in the rectangle shape only that may reduces the flexibility and accuracy of the end user in terms of selection of records. Also when user has decided the area to be clustered and when he/she clicks on the plotting area, that point becomes fixed starting point of the rectangle shape cluster. Of course user can increase/ decrease the size of cluster but cannot move cluster on other position. This model may not be useful if requirement of creating cluster in circular shape or fractal shape. For example if data to be cluster is with some central point and within specific radius or fractal shape of cluster is to be formed. Thus after analyzing the features and limitation of model 3.1, researcher decided to design & develop model 3.2 that can provide better way of selection of records and cluster to be created should be sizable as well as movable. Thus researcher design & develop a new Clustering Model to extract plotted data in the form of table by taking a Circle as graphical selector which is described as model 3.2.

The design of 2nd model is discussed in 3.2 of chapter 3 and development, implementation and results are discussed in 4.2 of chapter 4. The model 3.2 unlike model 3.1 gives the flexibility of moving the circular cluster shape across the plotting area as well as the Circle shape of the cluster can be increased to select desired records as per the end-user conveniences. Thus this model removes the limitation of previous model of moving cluster according to the requirement without fixing starting point of the cluster. This model requires comparatively less prerequisite knowledge for clustering as almost all the activities of clustering are performed graphically like selection of records, defining shape of cluster and population of selected records in the data grid. Thus clustering model becomes more interactive and easy to understand, ultimately results in increasing decision makers efficiency. End-user can apply various kinds of other statistical functions on the selected records very easily.

However this model only allow to form the cluster in Circular shape only that reduces the flexibility and accuracy of the end user in terms of selection of records. If user wants to create cluster in rectangle or fractal shape then this model may not be useful as it provides the flexibility of creating cluster only in circular shape. Thus after analyzing the features and limitations of this model 3.2 researcher decided to design & develop another model 3.3 that can provide maximum flexibility in terms of shape of the cluster. Thus researcher design & develop a new Clustering Model 3.3 to extract plotted data in the form of table by taking a closed fractal shape as graphical selector.
The design of the 3rd model is discussed in 3.3 of chapter 3 and development, implementation and results are discussed in 4.3 of chapter 4. The model 3.3 allows user to create the cluster unlike most of the data mining software that automatically creates the cluster when database is provided and thus model gives the flexibility to the end user to select desired records within the bound of cluster. Unlike previous models it is not compulsory to have rectangle shape or circular shape for clustering. With utmost flexibility user can draw a cluster that covers or bound 100% desired records with the fractal shape. Thus end user is getting the flexibility of drawing any shape of cluster as model allows to form the cluster as user moves mouse pointer on the plotting area. Thus not restricted with circular, rectangle or any other shape and thus removes the limitation of previous models. User can define a cluster in a way so that 100% of desired records can be bounded or can be selected to be clustered. Also this model requires comparatively less prerequisite knowledge as almost all the activities of clustering are performed graphically like selection of records, defining shape of cluster and population of selected records in the data grid. Thus clustering model becomes more interactive and easy to understand, ultimately results in increasing decision makers efficiency. Here End-user can apply various kinds of other statistical functions on the selected records very easily.

However if plotting area is clumsy with the records then it becomes very difficult to select desire records and distinguish the records to be clustered and records not to be clustered. The accuracy in terms of selection of desired records degraded as it becomes very difficult for the end user to draw a fractal shape cluster to select records. Even if with this model 3.3 if facility of enlarging plotting area is provided then also it creates another problem where most of the enlarged plotting area may not be visible and there is no facility to move the plotting area is provided and thus may not be possible to select desired records. Thus after analyzing the features and limitation of model 3.3 researcher decided to design & develop another model that can provide maximum flexibility in terms of shape of the cluster as well as the facility to navigate the plotting area within the navigation area. Thus researcher design and develop a model 3.4 to extract plotted data in the form of table by taking a closed fractal shape as graphical selector and with zoom-in zoom-out facility to perfectly select records in case of clumsy data as well as with navigation of plotting area.

The design of the 4th model is discussed in 3.4 of chapter 3 and development, implementation and results are discussed in 4.4 of chapter 4. The model 3.4 allows
user to create the cluster unlike most of the data mining software that automatically creates the cluster when database is provided and also eliminates the limitation of previous model 3.3 in case of clumsy data on plotting area by providing the facility of zoom-in and zoom-out of the plotting area and navigation of plotting area. End user can get the enlarged view of plotting area as per the requirement by clicking zoom-in component. Also to make visible all the records when plotting area is enlarged, navigation facility is provided. Thus user can enlarge the plotting area as to make the plotting area best visible and then navigate plotting area as per the requirement to perfectly select the desired records. Thus model eliminates the limitation of previous model 3.3 in case of requirement of selection of large area within the bound of cluster. For this plotting area is required to be shrink. This facility is provided with the zoom-out control with which user can decrease the size of plotting area as per the requirement and then allow to navigate plotting area to perfectly select the records to create fractal cluster. Here End user is getting the flexibility of drawing any shape of cluster as model allows to form the cluster as user moves mouse pointer on the plotting area. Thus not restricted with circular, rectangle or any other shape and thus removes the limitation of previous models 3.1 and 3.2. User can define a cluster in a way so that 100% of desired records can be bounded or can be selected to be clustered. Also comparatively less prerequisite knowledge is required for clustering almost all the activities of clustering are performed graphically like selection of records, defining shape of cluster and population of selected records in the data grid. Thus clustering model becomes more interactive and easy to understand, ultimately results in increasing decision makers efficiency. Here End-user can apply various kinds of other statistical functions on the selected records very easily.

However this model 3.4 is difficult to map with real life application’s requirement as researcher has assumed some x and y coordinate values for the customer location on the plotting area. All the models 4.1, 4.2, 4.3, 4.4 instead of representing customer location with some longitude and latitude, they are represented with some assumed x and y coordinate values on plotting area. Thus to get the actual x and y coordinates value that represent longitude and latitude value of customer location, every time it is required to convert longitude and latitude value into the appropriate x and y coordinates value. Also in this model 3.4 as facility of enlarging and shrinking plotting area are provided, it becomes more difficult to convert longitude and latitude value into the respective x and y coordinates values whenever
plotting area is enlarged or shrink. Thus after analyzing the features and limitations of the model 3.4 researcher decided to design & develop model with real map representing customer’s location on plotting area with some longitude and latitude values. Thus researcher decided to again design and develop all the previously defined models 3.1,3.2,3.3 and 3.4 with actual map represented as plotting area and customer location to be presented with latitude and longitude. For this researcher has selected the map of Gujarat state as if model map and to be plotted on plotting area and some location of Gujarat state with their longitude and latitude values are selected and plotted on the map.

Thus researcher decided to design & develop model where the design of the model is discussed in 3.5 of chapter 3 and development, implementation and results are discussed in 4.5 of chapter 4. This model unlike the previously defined model 3.1, makes the use of actual map of Gujarat state as model map instead of plotting area and clustering is performed on the base of longitude and latitude values instead of imaginary x and y coordinates of customer location. Thus model application can be mapped very easily with the real life application. This model allows user to create the cluster unlike most of the data mining software that automatically creates the cluster when database is provided and thus model gives the flexibility to the end user where a user can draw a cluster that covers or bound 100% desired records with the rectangle shape cluster. This rectangle shape of the cluster can be increased to cover more area or to include more records and can be decreased as per the end-user conveniences. Comparatively less prerequisite knowledge required for clustering as almost all the activities of clustering are performed graphically like selection of records, defining shape of cluster and population of selected records in the data grid. Thus clustering model becomes more interactive and easy to understand, ultimately results in increasing decision makers efficiency. Also end-user can apply various kinds of other statistical functions on the selected records very easily.

However Model only allows to form the cluster in the rectangle shape only that reduces the flexibility and accuracy of the end user in terms of selection of records. Also once user has decided the area to be clustered and when he/she clicks on the plotting area, that point becomes fixed starting point of the rectangle shape cluster. Of course user can increase/ decrease the size of cluster but cannot move cluster on other position. Thus if requirement of creating cluster is in circular shape or fractal shape is there then this model may not be useful. For example if data to be cluster is
with some central point and within specific radius or fractal shape of cluster is to be formed. Thus after analyzing the feature and limitation of the model 3.5 researcher decided to design & develop another model that can provide better way of selection of records and cluster to be created should be sizable as well as movable. Thus researcher design & develop a new Clustering Model 3.6 to extract plotted data in the form of table by taking a Circle as graphical selector and the actual map of Gujarat state instead of plotting area.

The design of the model is discussed in 3.6 of chapter 3 and development, implementation and results are discussed in 4.6 of chapter 4. This model unlike the previously defined model 3.2, makes the use of actual map of Gujarat state as model map instead of plotting area and clustering is performed on the base of longitude and latitude values instead of imaginary x and y coordinates of customer location. Thus model application can be mapped very easily with the real life application. This model allows user to create the cluster unlike most of the data mining software that automatically creates the cluster when database is provided and thus model gives the flexibility to the end user as end user gets the flexibility of moving the circular cluster shape across the map area as well as the Circle shape of the cluster can be increased and decreased to select desired records as per the end-user conveniences. Thus this model removes the limitation of previous model 3.5 of moving cluster according to the requirement without fixing starting point of the cluster. This model also require less comparative prerequisite knowledge for clustering as almost all the activities of clustering are performed graphically like selection of records, defining shape of cluster and population of selected records in the data grid. Thus clustering model becomes more interactive and easy to understand, ultimately results in increasing decision makers efficiency. Also end-user can apply various kinds of other statistical functions on the selected records very easily.

However model only allow to form the cluster in Circular shape only that reduces the flexibility and accuracy of the end user in terms of selection of records. Thus if requirement of creating cluster is in fractal shape then this model may not be useful as it provides the flexibility of creating cluster only in circular shape. Also If data is very much clumsy on the map or if dataset is highly dispersed on the map then selection of desired records becomes very difficult and thus resulting in decreased efficiency and less conveniences of the end-user. Thus after analyzing the features and limitations of this model 3.6 researcher decided to design & develop another
model that can provide maximum flexibility in terms of shape of the cluster. Thus researcher design & develop a new Clustering Model 3.7 to extract plotted data in the form of table by taking a closed fractal shape as graphical selector.

The design of model is defined in 3.7 of chapter 3 and development of model is defined in 4.7 of chapter 4. The model 3.7 unlike the previously defined model 3.3, makes the use of actual map of Gujarat state as model map instead of plotting area and clustering is performed on the base of longitude and latitude values instead of imaginary x and y coordinates of customer location. Thus model application can be mapped very easily with the real life application. Also this model allows user to create the cluster unlike most of the data mining software that automatically creates the cluster when database is provided and thus model gives the flexibility to the end user to select desired records within the bound of cluster. It is not compulsory to have rectangle shape or circular shape for clustering in this model 3.7 unlike the previously define models 3.5 and 3.6. Here with utmost flexibility user can draw a cluster that covers or bound 100% desired records with the fractal shape that as model allows to form the cluster as user moves mouse pointer on the model map of Gujarat state. Thus not restricted with circular, rectangle or any other shape and thus removes the limitations of previously define models 3.5 and 3.6. This model require comparatively less prerequisite knowledge for clustering as almost all the activities of clustering are performed graphically like selection of records, defining shape of cluster and population of selected records in the data grid. Thus clustering model becomes more interactive and easy to understand, ultimately results in increasing decision makers efficiency. Also end-user can apply various kinds of other statistical functions on the selected records like very easily as selected records are easily accessible from the data grid.

However if model map area is clumsy with the records then it becomes very difficult to select desire records and distinguish the records to be clustered and records not to be clustered. If map area is heavily populated by the records and becomes clumsy then accuracy in terms of selection of desired records degraded as it becomes very difficult for the end user to draw a fractal shape cluster to select records. Also if facility of enlarging map area is provided then it creates another problem where most of the enlarged map area may not be visible and there is no facility to move the map area is provided and thus may not be possible to select desired records. Thus after analyzing features and limitations of this model 3.7, researcher decided to design &
develop another model that can provide maximum flexibility in terms of shape of the cluster. Thus researcher decided to design & develop a new Clustering Model that provides the facility of enlargement of model map area to select the records and the facility to navigate the model map area within the navigation area. Thus researcher design and develop a model 3.8 to extract plotted data in the form of table by taking a closed fractal shape as graphical selector and with zoom-in, zoom-out facility to perfectly select records in case of clumsy data as well as with navigation of model map area.

Unlike the previously defined model 3.4, this model makes the use of actual map of Gujarat state as model map instead of plotting area and clustering is performed on the base of longitude and latitude values instead of imaginary x and y coordinates of customer location. Thus model application can be mapped very easily with the real life application. This model allows user to create the cluster unlike most of the data mining software that automatically creates the cluster when database is provided and thus model gives the flexibility to the end user to select desired records within the bound of cluster. This model eliminates the limitation of previous model 3.7 in case of clumsy data on model map area by providing the facility of zoom-in and zoom-out of the plotting area and navigation of map area. End user can get the enlarged view of model map area as per the requirement by clicking zoom-in component. Also to make visible all the records when model map area is enlarged, navigation facility is provided. Thus user can enlarge the model map area as to make the model map area best visible and then navigate model map area as per the requirement to perfectly select the desired records. This model also eliminates the limitation of previous model 3.7 in case of requirement of selection of large area within the bound of cluster. For this model map area is required to be shrink. This facility is provided with the zoom-out control with which user can decrease the size of model map area as per the requirement and then allow to navigate model map area to perfectly select the records to create fractal cluster. Here end user is getting the flexibility of drawing any shape of cluster as model allows to form the cluster as user moves mouse pointer on the model map area. Thus not restricted with circular, rectangle or any other shape and thus removes the limitation of previous models 3.5 and 3.6. User can define a cluster in a way so that 100% of desired records can be bounded or can be selected to be clustered. Comparatively less prerequisite knowledge required for clustering as almost all the activities of clustering are performed graphically like selection of records,
defining shape of cluster and population of selected records in the data grid. Thus clustering model becomes more interactive and easy to understand, ultimately results in increasing decision makers efficiency. Here end-user can apply various kinds of other statistical functions on the selected records as selected records are easily accessible from the data grid.

However it is not necessary that user always want to perform clustering on the model map area of Gujarat state. On different access user may want to perform clustering on different area, different cities, different districts or even user may want to perform clustering on area which is not provided in the model map of Gujarat state, which may be the area of other state or districts, cities of other states. But with all the previously define models 4.5,4.6,4.7 and 4.8, only map of Gujarat state can be used, thus reduces the flexibility of the user to select desired area and to perform clustering on it. On different access if user select different area of map, then it is require that user has to acquire the image of the map of size 640 * 640 pixels and its corresponding top-left and bottom-right corner longitude and latitude and to change such longitude and latitude value in the model application. Thus map has to be placed very accurately on the plotting area of the application at every time when ever user wants to perform the clustering on different maps of different area and thus model becomes very difficult for End-user or decision maker to perform all the above tasks to use this model for analysis purpose. Thus after analyzing the features and limitations of the model 3.8 researcher decided to design & develop model where user can acquire the map of desired region or area and its corresponding longitude and latitude automatically from the online Google map application instead of acquiring the image of map and its corresponding longitude and latitude values manually. Thus model application 3.9 was designed & developed to provide the desired functionality and to eliminate above define limitation of the model application.

Unlike the previously defined model 3.8 this model allows researcher to select and capture the desired geographical area from the online map without any boundary or limitation to select geographical area. Also the clustering is performed on the base of longitude and latitude values instead of imaginary x and y coordinates of customer location. Thus model application can be mapped very easily with the real life application. This model also allows researcher to enlarge or shrink geographical area on the map, that allows to perform clustering operation on very small geographical area as well as very huge geographical area. Here user need not have to worry about
how to capture the map of specific geographical area as Model application provides the facility of selection of desired map area from the online map system. Even the navigation, enlargement and shrinking of the geographical area is also possible as user clicks on Lock Map the desired geographical area is automatically settled on the application for the further process of clustering. Finest feature of this model is that here user need not have to worry about how to fetch the values of longitude and latitude of the top-left and bottom-right corner of the captured /selected geographical of the map as Model application provides the facility of automatic display and updation whenever user navigates, enlarges or shrink the geographical area of the map. Also once user clicks on Lock Map the longitude and latitude values of top-left and bottom-right corners of the captured geographical area are automatically forwarded to the model application for the further process of clustering. Also like previously define models 4.5,4.6,4.7 and 4.8 it carries all the major features like model allows user to create the cluster unlike most of the data mining software that automatically creates the cluster when database is provided and thus model gives the flexibility to the end user to select desired records within the bound of cluster. Also end user is getting the flexibility of drawing any shape of cluster as model allows to form the cluster as user moves mouse pointer on the model map area. Thus not restricted with circular, rectangle or any other shape and thus removes the limitation of previous models 3.5 & 3.6. Comparatively less prerequisite knowledge required for clustering as almost all the activities of clustering are performed graphically like selection of records, defining shape of cluster and population of selected records in the data grid. Thus clustering model becomes more interactive and easy to understand, ultimately results in increasing decision makers efficiency. Here end-user can apply various kinds of other statistical functions on the selected records easily as selected records are easily accessible from the data grid.

However there are some lacunas exist in this model like, It is not necessary that user always want to perform clustering operation, User may want to implement some other data mining techniques like classification, association rule, decision tree etc. But this model only gives the facility of performing clustering operations. Also clustering operations may not be always required and suitable for user. Thus model application is only useful if clustering is effectively required and implemented. In this model geographical locations in terms of longitude and latitude are accurately required to be obtained to perform the clustering tasks efficiently and accurately and
to be stored in the database before applying any clustering operations. Thus required to procure the device and services which gives accurate longitude and latitude values of customer location. Another major factor of concerned is model makes the use of Google Map V2 API for which in near future Google may stop the support. Thus at that time user has to make the changes in the application to feet with the new version of Google Map API. Also model may not work accurately if very large geographical area is selected or captured for example any continental or else if very narrow /small area is selected or captured for example any small street then application may not work perfectly. Again if customer’s location are very clumsy in narrow geographical area or very dispersed in huge geographical area then clustering task may not be performed accurately and effectively. Also in terms of tools and technologies Visual Basic 6.0, Ms Access, Activex Controls are used to develop the model application and these tools may be obsolete in near future, thus researcher has to migrate the model on some other tools.

However Model 4.9 satisfies almost all the requirement define in the study and as model application fails in some extreme cases only otherwise it performs its task according to the requirement defined in the beginning phase. Also graphical selection and fractal shape of cluster provides utmost flexibility and accuracy to perform data mining tasks with this model Thus researcher decided to end-up the research work after designing and developing model 4.9.

5.2 Comparative study of all the models
After designing & development of all the models, researcher performed the comparative study of all the models to analyze the pros and cons. This analysis clearly shows that model 3.9 is quite capable and applicable model that can be embed with almost all kind of generalized business application. To analyze this researcher designed following table which shows the list of all the models and their futures and capabilities.
<table>
<thead>
<tr>
<th>Name of the Model</th>
<th>Features</th>
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</thead>
<tbody>
<tr>
<td>Clustering of Data Presented on Graph with Rectangle Shape</td>
<td>√</td>
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<tr>
<td>Clustering of Data Presented on Graph with Circle Shape</td>
<td>√</td>
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<tr>
<td>Clustering of Data Presented on Graph with Fractal Shape</td>
<td>√</td>
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<tr>
<td>Clustering of Data Presented on Graph with Fractal Shape with Zoom-In, Zoom-Out</td>
<td>√</td>
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<tr>
<td>Navigation Facility</td>
<td>√</td>
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<tr>
<td>Clustering of Data Presented on Model Map of Gujarat State with Rectangle Shape</td>
<td>√</td>
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<td>Clustering of Data Presented on Model Map of Gujarat State</td>
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<td>Clustering of Data Presented on Model Map of Gujarat State with Fractal Shape</td>
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<td>Clustering of Data Presented on Model Map of Gujarat State with Fractal Shape</td>
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<tr>
<td>Clustering of Data Presented on Online Map with Fractal Shape with Zoom-In,</td>
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<tr>
<td>Zoom-Out and Navigation Facility</td>
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</table>
5.3 Rational of the study

- Model application not only provides the facility of visualization of data but also provides the way to select the data from the graph.
- Model application not only provides the facility of visualization of data but also provides the way to select the data from the model map of Gujarat state.
- Model application not only provides the facility of visualization of data but also provides the way to select the data from the online map.
- Model application provides the facility of selection of data through various closed and customized shapes like square, circle and fractal shape.
- Model application interface provides Visual mining facility where one can view the data with the graphical representation as well as mine the data with the graphical selection.
- Model application provides the way to perform the graphical summarization of the data selected with the help of customized and closed fractal shape.
- Model application provides the facility of data selection from specific part of the graphical presentation. Thus user is allowed to focus on specific data set and can get the better understanding of the data rather than focusing entire large data set.
- Model application provides the way of efficient processing where facility is provided to select the data from the specific part of the graph or map, thus reducing the number of records to be processed and time taken to process the records.
- It is the human mentality where one can understand the information or data presented in graphical format very fast and easily in comparison of tabular and narrative statement format which results in faster decision making.
- As most of the Decision makers / managers belongs to non IT background, it becomes difficult for them to deal with the computer application, but as model application interface provides graphical way to access the data and information, it becomes very easy for such non IT background people to use the application for decision making. Also desired information can be retrieved by performing some basic mouse operation and no need for decision makers to know the syntaxes of Query language or SQL.
In model application information can be easily fetch by performing basic mouse operation. Thus does not required the knowledge of SQL and no complicated training is required to operate the applications. Applicable to many domains where information is required to fetch from some graphically represented data.

5.4 Limitations of the study

- Aspect ratio of graph size and the area covered within the graph in terms of area in kilometers and graph length in terms of centimeters has to be defined by the user of the applications.
- User has to procure the device to obtain the longitude and latitude value of the customer location for the visual mining of the map.
- Longitude and Latitude value has to be perfectly recorded otherwise may give erroneous results while selecting records from map.
- Clustering technique has been used with the model application development, thus model application is only suitable to be used for the applications where clustering techniques are suitable.
- At a time only one cluster can be created. Thus model is having limitation when there is a requirement of comparing 2 or more then 2 clusters with any model.
- Model application utilizes specific color to create cluster, to represent data points and the customer number on the graph or map. Thus in case of map is having same color then model may not work perfectly.

5.5 Future Scope

To provide the effective customer relationship management system model researcher studied various model developed in the past and idea came into the mind of researcher about “Why not to provide the CRM model which require comparatively very less prerequisite knowledge so that decision maker can easily use this model and can take effective decision”. As most of the decision makers belongs to the None-IT background and thus faces several problem in effective utilization of computerized system for decision making and analysis purpose. Thus to enabled such decision makers to take effectively use CRM, researcher decided to provide a kind of models which provides maximum graphical operations and requires less prerequisite
knowledge. Thus researcher developed 9 different but similar concepts those are having potential usage in the CRM to increase its effectiveness.

However these models are designed & developed keeping in mind only the clustering techniques. There are other enabled data mining techniques available that if implemented with the maximum graphical operations then can be very useful to the decision makers.

Also at a time only one cluster can be created in all the models. Thus work can be extended for defining multiple clusters at a time for comparative analysis for all the models designed and developed.

The research work can be extended for migrating all the model applications on the tablet or any handy device. As most of operations / applications available on tablet are executed with graphical operations.