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ANALYTICS ON SUGARCRM USING MICROSOFT AZURE

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***Abstract*—Enterprises use the CRM(Customer relationship management) to manage the data about their customers and analyse it throughout the customer life cycle so as to improve business relationship with the customers. The usefulness of this data is limited. When you add analytics on top of CRM, it provides better understanding and insight about the behaviour of the customer and maximize the profit. Our application focuses on SugarCRM database which is an open source software. It connects the SugarCRM users with the services of Microsoft Azure Machine Learning and provide output in terms of graphs, predictions and suggestions.**

Keywords:CRM,machine learning,predictive analysis,customer behaviour,SSO(Single Sign-On).

1. Introduction

One of the basic needs of any enterprise is to understand their customers and clients, know their behaviour, their habits so as to change or implement a strategy to increase their sales, revenue offer new products and so on. In an age when companies are trying to understand their customers better and provide unique customer experiences, analytical tool like this with a tightly integrated database and machine learning could give businesses the ability to deliver a more customized, friendly experience.We intend to implement a connector for extracting data from a Customer-Relationship Management System(CRM) for an efficient prediction and better customer management. The predictive analysis will be implemented using Microsoft AzureML platform.

What is Predictive Analysis?

Predictive analysis uses statistics, machine learning, data mining and modeling for analyzing current data and to make predictions about the future. It uses the patterns found in historical and transactional data to identify risks and opportunities for the future. The models created helps the organizations to capture relations among many factors to access risk with a particular set of conditions. On successfully applying predictive analysis, the organizations can effectively interpret big data for their benefit.

2. Technologies Used

- **Azure Cloud:**
  Cloud computing is known as 'on-demand computing', it is an Internet-based computing where data, shared resources and information are provided to computers and other devices. It is becoming popular because of its Universal access, flexibility, Reduction of costs , Up to date software and Potential to be greener and more economical. Azure is the cloud computing service provided by Microsoft for deploying,building and managing applications and services. It provides PaaS and Iaas. Azure provides Web Apps to create webipages and UI, diferent types of servers like Windows 2012, Apache Tomcat, SQL server in various versions. Azure Active Directory is used for SSO. Using Azure's PaaS and IaaS, we intend to create a SaaS application for SugarCRM users.

- **Sugar CRM:**
  CRM has all aspects of company-customer interaction in terms of sales or services. Apart from business-customer relationship, crm is used to manage business to business relationships. CRM systems includes contracts, contacts, clients, sales etc. When a new interaction starts with the customer, the company looks at this as an opportunity, with the help of our product, we intend to help the company understand which opportunities will turn into a sale. This software will also help to retain customers by predicting different solutions to what they may like. There are multiple CRM systems available in the market like Salesforce, Dynamics, SugarCRM etc. we intend to target SugarCRM as it the most widely used CRM, because it is

open-source, it can operate on cross platform and supports databases like MySQL, Oracle, Microsoft SQL Server and IBM DB2.

- **Microsoft AzureML:**
Predictive analysis is a part of advanced business intelligence paradigm. But predictive analysis can be carried out more efficiently if size of the data is large enough. To manage the enormous amount of data, usage of cloud is the easiest solution. Thus, the Azure Machine learning(Azure ML) is an integration of cloud and predictive analytics put forth by Microsoft. Azure ML is a service that provides developers a platform to carry out machine learning, train data sets, build predictive analysis models, and so on. It also provides a seamless use of multiple functionalities, supports numerous algorithms useful for prediction and along with that the developer does not need to have a thorough knowledge of data science. In our project we intend to perform a predictive analysis on the customer's data present in a CRM.

3. Literature Survey

1) **CRM analytic framework:**
In this paper they have provided a framework for connecting data warehouse to analytic engine which helps in developing the application by reducing the time required. It transfers the data automatically to the next step.

2) **The feasibility of using MS Azure:**
In this paper they have given a brief description of azure infrastructure used for monitoring and evaluation, azure services, SLA, virtual network design and using Azure as IaaS.

3) **Application of Predictive Analysis in CRM:**
Mapping of different types of the CRM elements on various algorithm and finding out the one which suits the most.

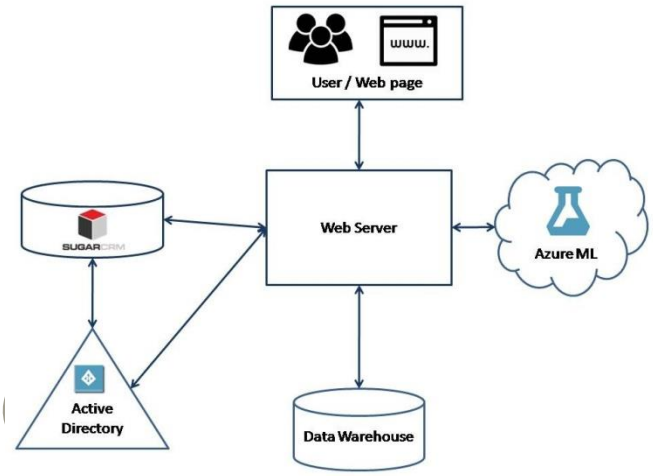
4) **Hybrid product recommender:** The recommender firstly analyses the customer information, historical buying records and employs collaborative and content-based filtering algorithm for the target customer.

4. Requirements

- **Developer Requirements:**
  1) Azure storage(SQL server 2012)
  2) Web server[Apache Tomcat 8]
  3) Azure Active Directory
  4) Azure VHD
  5) Machine Learning Studio

- **User Requirements:**
  1) Web Browser which supports Azure such as:
     a) Edge (latest)
     b) Internet Explorer (11 and up)
     c) Safari (7 and up)
     d) Chrome (latest)
     e) Firefox (latest)
  2) SugarCRM credentials
  3) Good internet connectivity

5. System Architecture



6. Algorithmic Steps

Our predictive software contains a repertoire of machine learning algorithms which are required according to the problem type and variables to be predicted. More than two algorithms may apply to a specific problem. In such a scenario, an algorithm is selected based on user preference or multiple applicable algorithms can be executed simultaneously whose results will be used for comparison. Overview of the steps performed are taking user input such as variables to be predicted and evaluation criteria which will begin the process, selecting the relevent algorithm(s), exeuting the selected algorithms.

1) **Initial phase(calling the predictive engine):**
This is the first step where user gives inputs on what data is to be predicted that is the predictive variables, type of the problem. The user may specify whether he wants all the relevent/applicable to be run or any specific algorithm.

2) **Identifying the algorithms:**
An appropriate algorithms is selected by the software based on user inputs provided in initial phase. If the user desires to implement all the

applicable algorithms , then all these algorithms will be selected based on evaluation criteria provided in earlier stage. The output of this phase will be an algorithm or a set of algorithms.

3) **Execution:**
All the machine learning algorithms selected earlier are executed. Results are compared in case of multiple algorithms. The predicted variables are copied back to our database with an addition of a column.

4) **Displaying results:**
The result can be a single value or a complete column of values.They can be displayed to user in table format or graphically. This will help the business user to analyse the customer data and make an informed decision.

7. Expected Results

Our main aim is to provide a seamless technique for visualization of customer data. The prediction is based on two main things.First,the data known at the time of prediction and the output.Therefore, after acquiring the required data, the final stage of the predictive analysis is displaying the results in graphical form according to the respective user. The user would like to have the analysis of the results of the prediction in different ways. It may include comparisons, reports on the data, decisions, etc. The sample visualization of the result is as follows:

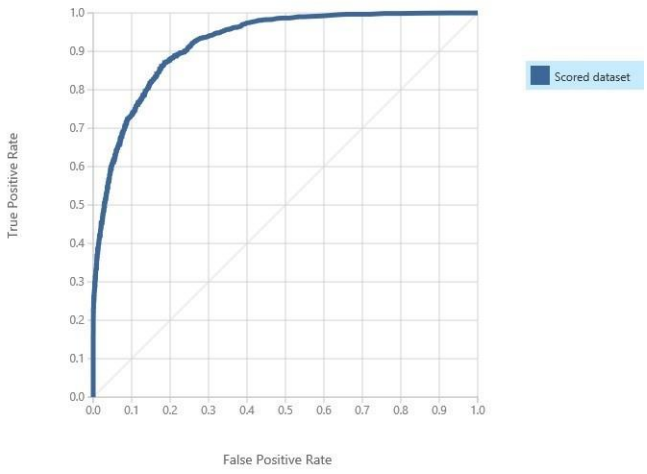


Figure 1. Visualizing the accuracy of the predictive model

As shown in the above figure, we had applied a predictive analysis on a dummy data set to check the accuracy of our predictive model.This would act as our intermediate result.We observed that the plotted line is much farther than the line which divides the graph into two halves(The center diagonal indicates 50 percent accuracy).This indicates that we have a reasonably accurate prediction model.

8. Conclusion

The proposed system will be available for all SugarCRM customers. We will use the data obtained from the CRM system(Sugar CRM) to train the model and then test the model to provide user with predictive analysis on his data set and also give suggestions for his further approach in business.Therefore, this would lead to more customer satisfaction which would benefit both the customer as well as the enterprise.

Acknowledgments

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References

[1] Azure ML modules:
https://msdn.microsoft.com/library/azure/dn906033.aspx

[2] SugarCRM:
https://skyvia.com/connectors/sugarcrm

[3] SugarCRM guide:
http://support.sugarcrm.com/Documentation/Sugar_Developer/Sugar _Developer_Guide_6.5/

[4] SugarCRM analytics:
https://blog.sugarcrm.com/2014/10/25/the-value-of-analytics-integrated-with-crm/

[5] Joseph P Bigus,Upendra Chitnis, Prasad M Deshpande, Ramakrishnan Kannan, Mukesh K Mohania, Sumit Negi," CRM analytics framework ", COMAD ,2009

[6] Tala Mirzeei, Lakshmi Iyer," Application of Predictive Analytics in CRM; A literature review and classification ", SAIS-USA conference, 2014

[7] Yu Liangxing, Dong Aihua,Hybrid Product Recommender System for Apparel Retailing Customers,IEEE,2010

[8] Mustansar Ali Ghazanfar and Adam Prugel-Bennett,A Scalable, Accurate Hybrid Recommender System ,IEEE,2010