Telecom Churn Analysis – A Case Study
Introduction

- Global Top Trends in technology and computing includes mobile technology

- Landscape of Telecom Industry has changed
  - Large Number of Private Service Providers have evolved
  - To Survive in current Scenario new innovative business models are a must

- Churn is huge factor in Telecom Industry

- Major initiators of churn include
  - Quality of service
  - Tariffs
  - Dissatisfaction in post sales service etc.

- Interesting facts surrounding churn
  - Annual churn rate is estimated to be 25-30% in Europe
  - Acquiring new customers is costlier than retaining them
Objective

Objective of the current study was to predict churn and identify the key drivers of churn in each business division using simulated customer data sets.
Telecom Data - Classification

Customer Data
- Profile Data
- Assurance Resolved
- Delivery Completed
- Billing

Services
- On Time
- Delayed
- Advanced

Billing Pattern
- Tier1
- Non Tier1

Data
- Voice
- Data
- Managed
Analysis Data

Records used in the study

<table>
<thead>
<tr>
<th>Table Name</th>
<th>Initial Records – Before Cleaning</th>
<th>Records – After Cleaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>Assurance Resolved</td>
<td>17,6743</td>
<td>17,6972</td>
</tr>
<tr>
<td>Delivery Completed</td>
<td>17,7795</td>
<td>13,8895</td>
</tr>
<tr>
<td>Billing</td>
<td>17,64,883</td>
<td>17,64,883</td>
</tr>
</tbody>
</table>

Sample Key Attributes of Assurance Resolved

<table>
<thead>
<tr>
<th>Attributes</th>
<th>Data Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>CaseID</td>
<td>Varchar</td>
</tr>
<tr>
<td>Customer Number</td>
<td>Varchar</td>
</tr>
<tr>
<td>Fault duration</td>
<td>Varchar</td>
</tr>
<tr>
<td>Resolution Country</td>
<td>Varchar</td>
</tr>
<tr>
<td>Complaint Type</td>
<td>Varchar</td>
</tr>
</tbody>
</table>

Sample Key Attributes of Delivery/Completed Table

<table>
<thead>
<tr>
<th>Attributes</th>
<th>Data Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>No of Orders</td>
<td>Int</td>
</tr>
<tr>
<td>Installation Charges</td>
<td>Varchar</td>
</tr>
<tr>
<td>Order type</td>
<td>Varchar</td>
</tr>
<tr>
<td>Contract Number</td>
<td>Varchar</td>
</tr>
</tbody>
</table>

Attributes used for Modeling Clues

<table>
<thead>
<tr>
<th>Customer Tier</th>
<th>Product Services</th>
<th>Delivery State</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tiel</td>
<td>Voice</td>
<td>Delay</td>
</tr>
<tr>
<td>Others</td>
<td>Data</td>
<td>On-Time</td>
</tr>
<tr>
<td>Managed Services</td>
<td>Advanced</td>
<td></td>
</tr>
<tr>
<td></td>
<td>and Others</td>
<td></td>
</tr>
</tbody>
</table>
Data Preprocessing

- Null Value elimination
  ✓ Is Empty() fn present in matlab was used to identify null values and row associated with it was removed

- Missing Value Elimination
  ✓ Is NaN() fn present in matlab was used to identify missing values and row associated with it was removed

- Negative Value Elimination
  ✓ Negative values cannot be part of the analysis being performed hence these values were identified and eliminated
Methodology

- Sanitized data stored in MYSQL database
- Matlab R2012b was used for the analysis
- Query Builder of Matlab package was used to query data
  ✓ Specific join queries on delivery completed and billing table based on customer number and timestamp were used
- Neural networks, Naïve Bayesian, Decision Trees have been reported to be used for analyzing telecom churn
- Current study used Stats tool box - Multivariate logistic Regression on the data
- The probabilities of churn and key drivers of churn for the two different customer namely tier 1 and non tier1 were found
Sample Screen Shots -1
Sample Screen Shots - 2
Results

Churn = 1.054 + 2.1404 * Customer Tier - 3.8226 * Delivery Status + 2.1404 * Product Services
Conclusion

- Delayed response whether in tier 1 or non tier 1 is the chief initiator of churn

- Quality of service could also a play major role even if the response/delivery state is on time

- Extraction of data using queries were time consuming

- Need to parallelize in order to make prediction faster

- Use of matlab production server is being explored
Thank you