A snapshot of churn rate at Telecom and factors impacting it.

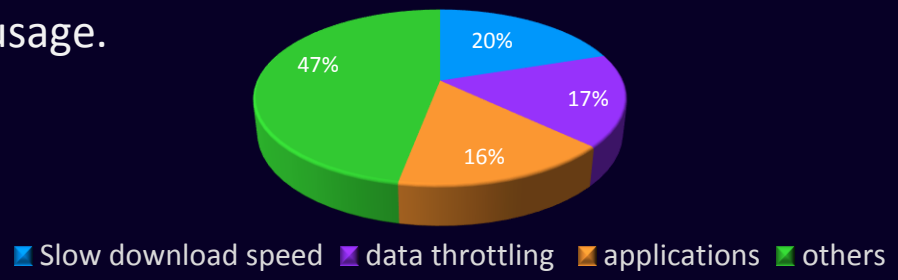
Agenda:

- Introduction
- Procedures & Methods
- Findings and Analysis
  - Top five factors driving likelihood of Churn
  - Cost & Billing and Network & Service Quality issues.
  - Rate plan migration
  - Usage of churn model
  - Proactive retention campaigns

Introduction

According to 2014 Acquisition and Retention Study Report

- Mobile operators who lead in loyalty outperform their competition in **network and service quality**, as well as in **customer care**
- Delivering **excellent quality** keeps customers happy and loyal
- Globally, 40% of customers are planning to switch provider in the next 12 months.
- **Cost and billing** plays a key role. Specifically for emerging markets
- **Network and service quality** is the next important factor.
- Problems experienced with data usage.



- **Internet & Recommendations from family and friends** are main sources for decision making.
- Telecom plans
  - usage based promotions to increase minutes of usage (MOU) for both voice and data.
  - Rate Plan Migration is a strategy
  - Offer bundling and churn is found to be negatively correlated.

Procedures & Methods

- Preparation of Data Quality Report: to understand data and the identify the %age of missing values in each variable.
- Elimination of greater than 40% missing values: Imputing this data will be biased and will have an impact on the model.
- Variable Profiling:
  - Decile binning to find out event rate.
  - data preparations and creating categorical variables.
  - Clubbing categorical variables with similar churn rate
  - Imputing NA's with matching churn rate category.
- Derived Variables: two derived variables are
  - compcalls_Mean= comp_vce_Mean+comp_dat_Mean
  - plcdcalls_Mean=plcd_vce_Mean+plcd_vce_Mean
- Outlier & NA treatment: Boxplot was base for all outlier treatments.
  - #For many continuous variables an outlier was imputed with 97^{th},98^{th} or 99^{th} percentile. However, for few outliers 1^{st} / 3^{rd} quartile,+/- of IRQ*1.5 was used. For example variable change_mou. This variable had outliers on both sides of boxplot. & hence this method was used to impute outliers.
  - #NA's were imputed with respective variable medians.
- Split the data into test and training sets: 70% train & 30% test
- Model Building: A Logistic Regression model is built to predict churn rate from the available variables. Excluded variables which has more then 5 Variance Inflation Factor(vif from "car" library) and variables which are insignificant.
- Model Testing: to test the model used Kappa2 from "irr" library and to check the accuracy used Confusion Matrix from "caret" library. To measure the performance "ROCR" package was used $. It tells how much model is capable of distinguishing between classes. There after, Area under curve(AUC) was obtained to make sure we have maximum possible area covered.

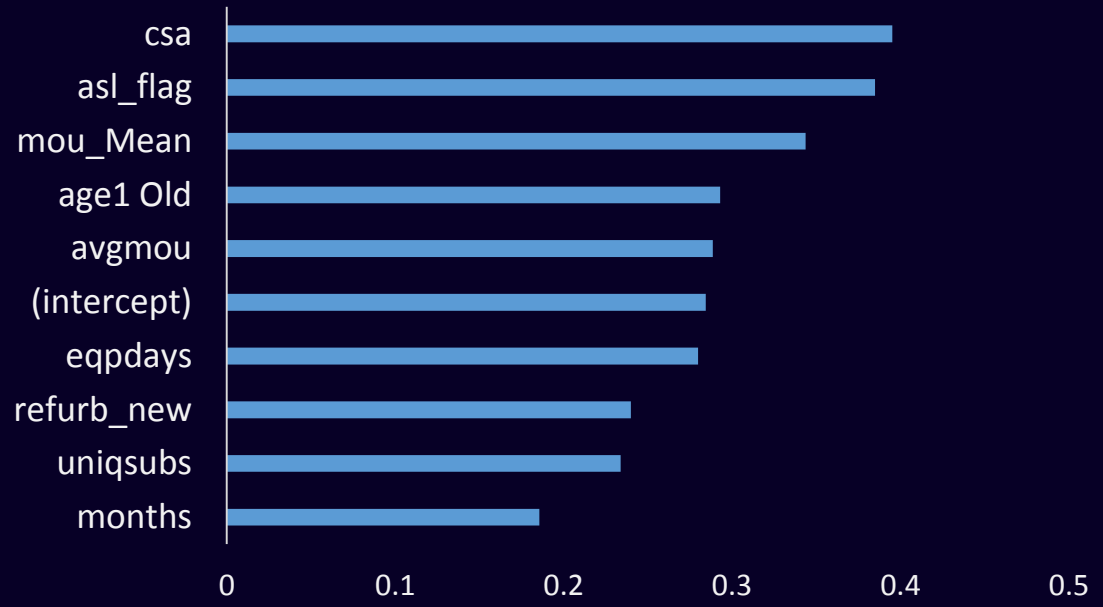
 # see appendix for before & after treatment boxplots.

$ see appendix for Training & Testing ROC Curves


FINDINGS & ANALYSIS

Top five factors driving likelihood of churn at Telecom

csa	Communications local service area
asl_flag	Account spending limit
mou_Mean	Mean number of monthly minutes of use
age1 Old	Age of first household member(age greater than 55yrs)
avgmou	Average monthly minutes of use over the life of the customer
eqpdays	Number of days (age) of current equipment
refurb_new	Handset: refurbished or new
uniqsubs	Number of unique subscribers in the household
months	Total number of months in service



Top five factors that are driving likelihood of churn at Telecom are

1. Communications local service area
2. Account spending limit
3. Mean number of monthly minutes of use
4. Age of first household member(age greater than 55yrs)
5. Average monthly minutes of use over the life of the customer

As these factors have higher impact on attrition of customer, Telecom should focus on these variables to bring changes the way Telecom is operating currently. Couple of suggestions could be: There should be more interaction by the CSA with customers to understand customer pulse.

Account spending limit has a greater impact. Higher the limit, lesser the churn.

Telecom can introduce various plans for customer to increase their minutes of use so the stick on to the network.

Cost & Billing and Network & Service Quality issues

totmrc_Mean	Mean total monthly recurring charge
rev_Mean	Mean monthly revenue (charge amount)
drop_blk_Mean	Mean number of dropped or blocked calls
comp_vce_Mean	Mean number of completed voice calls
comp_dat_Mean	Mean number of completed data calls

- Mean total monthly recurring charge and Mean monthly revenue (charge amount) both defines the cost to customer and are forming important factors to churn.
- Mean number of completed voice & data calls and Mean number of dropped or blocked calls are factors determining network issues and are constituting important factors for churn.

Rate plan migration

- There is a mixture of users who are exceeding their minutes of use and those who are paying extra for overage . These customers can be offered an optimal rate plan.

Usage of churn model

- We can use Gains chart, the best tool to prioritize customers for a proactive retention campaigns.
- Below is the Gains(lift) chart that is produced from the model.
- Here we can see about 30% of the customers fall under top 30%

Depth of File	N	Cume N	Mean Resp	Cume Mean Resp	Cume Pct of Total Resp	Lift Index	Cume Lift	Mean Model Score
10	1989	1989	1.39	1.39	11.3%	113	113	0.40
20	1989	3978	1.34	1.37	22.0%	108	110	0.33
30	1989	5967	1.32	1.35	32.7%	107	109	0.29
40	1989	7956	1.25	1.33	42.8%	101	107	0.26
50	1989	9945	1.24	1.31	52.9%	100	106	0.24
60	1989	11934	1.22	1.29	62.7%	98	104	0.22
70	1989	13923	1.18	1.28	72.2%	95	103	0.20
80	1989	15912	1.18	1.27	81.7%	95	102	0.18
90	1989	17901	1.14	1.25	90.9%	92	101	0.15
100	1989	19890	1.13	1.24	100.0%	91	100	0.11

- We can cross verify this using quantiles. Dividing the data into 10 equal parts forming 10% buckets.
- We can see nearly 30% of customers fall under top 30% of data. (70% to 100%)

10%	20%	30%	40%	50%
0.1383696	0.1678525	0.1894031	0.2098813	0.2297568
60%	70%	80%	90%	100%
0.2518830	0.2763574	0.3060494	0.3500032	0.7556875

Proactive retention campaigns

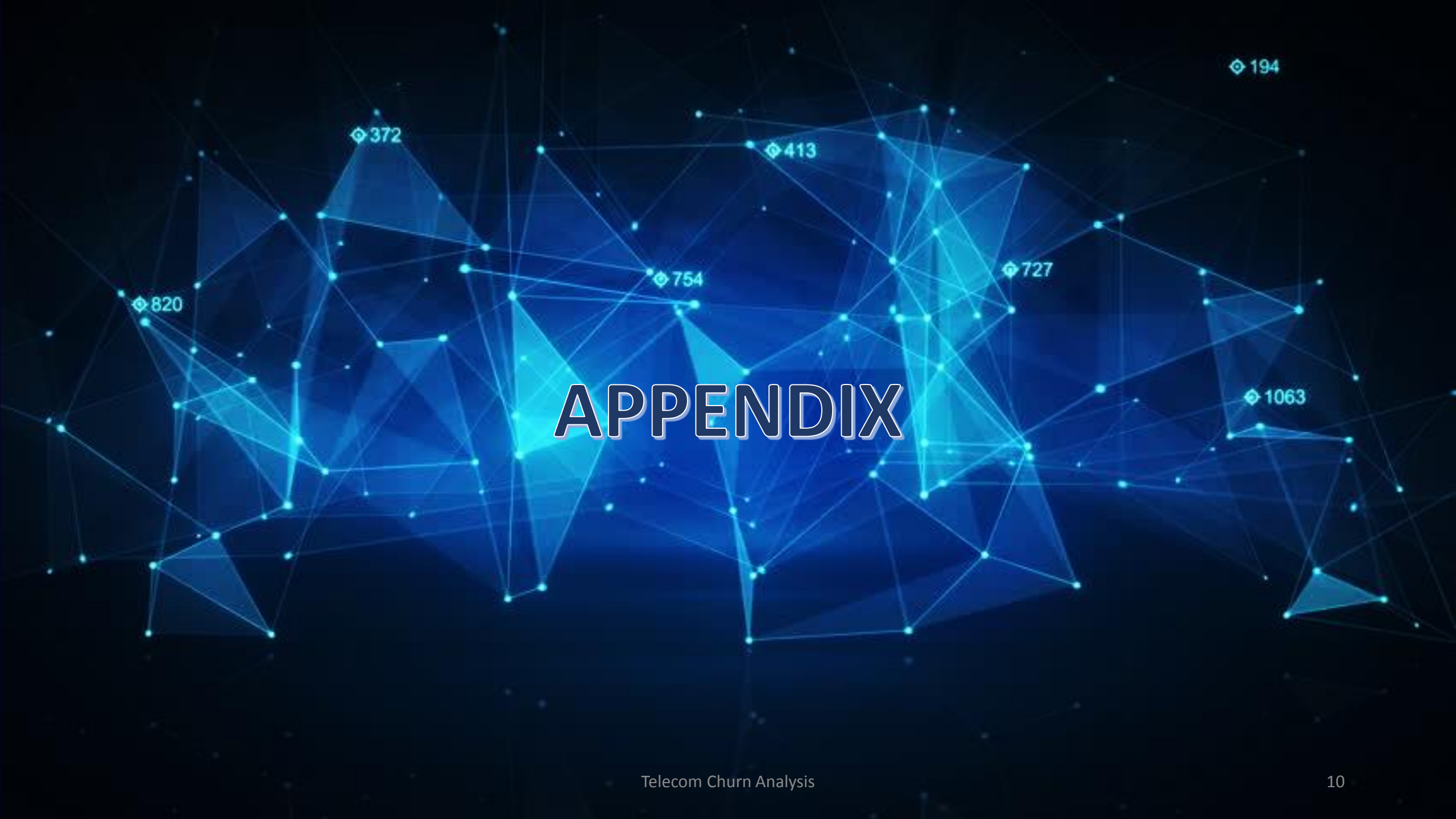
Below table shows the targeted customer sections that Telecom need to focus on retaining them from losing heavy revenues.

It describes the probability of churn:

- Medium Churn score & High Revenues has 1913 customers predicted
- High Churn score & Medium Revenues has 2521 customers predicted
- High Churn score & Medium Revenues has 1957 customers predicted

Having retention campaigns targeted at these customers will help Mibicom maintain their customer base.

Score/Revenue	Low Revenue	Medium Revenue	High Revenue
Low Score			
Medium Score			1913
High Score		2521	1957



APPENDIX

Before Outlier & NA treatment

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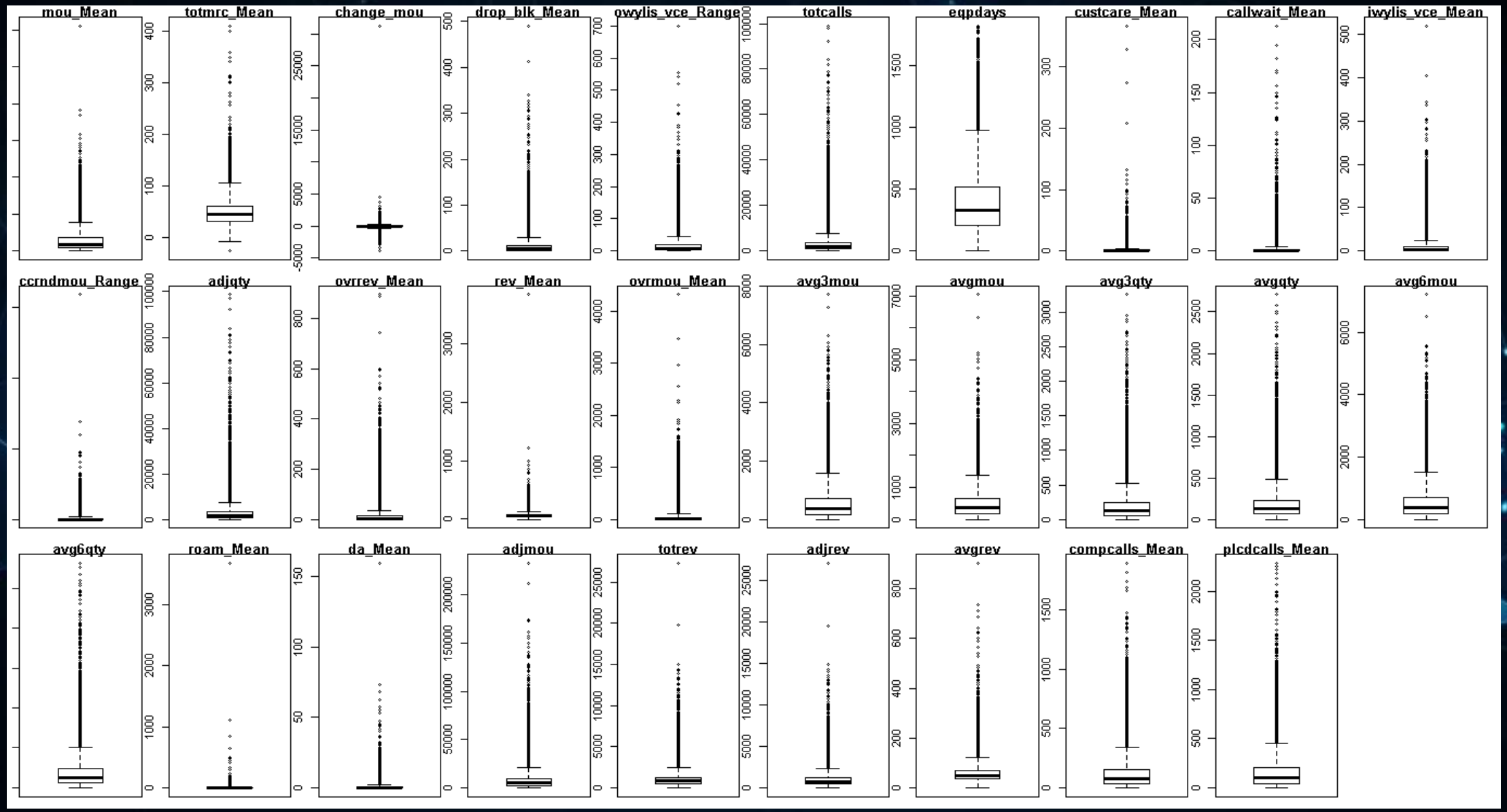

After Outlier & NA treatment

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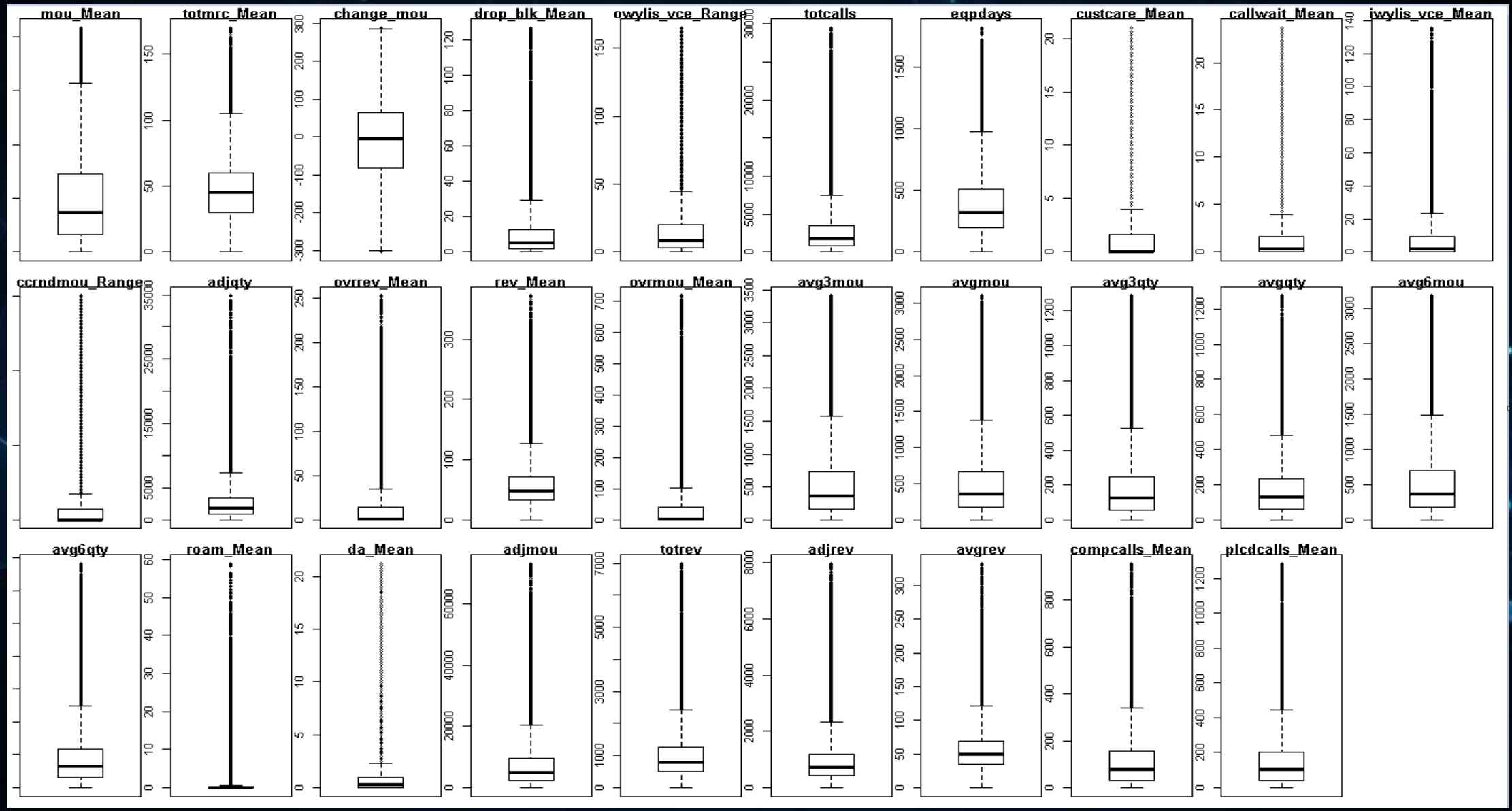

Training & Test ROC Curves