

The background of the slide is a light gray gradient, decorated with numerous realistic water droplets of various sizes. Some droplets are large and prominent, while others are small and subtle, scattered across the top and bottom edges of the slide.

TELECOM CHURN – BUSINESS CASE STUDY

MEMBERS:

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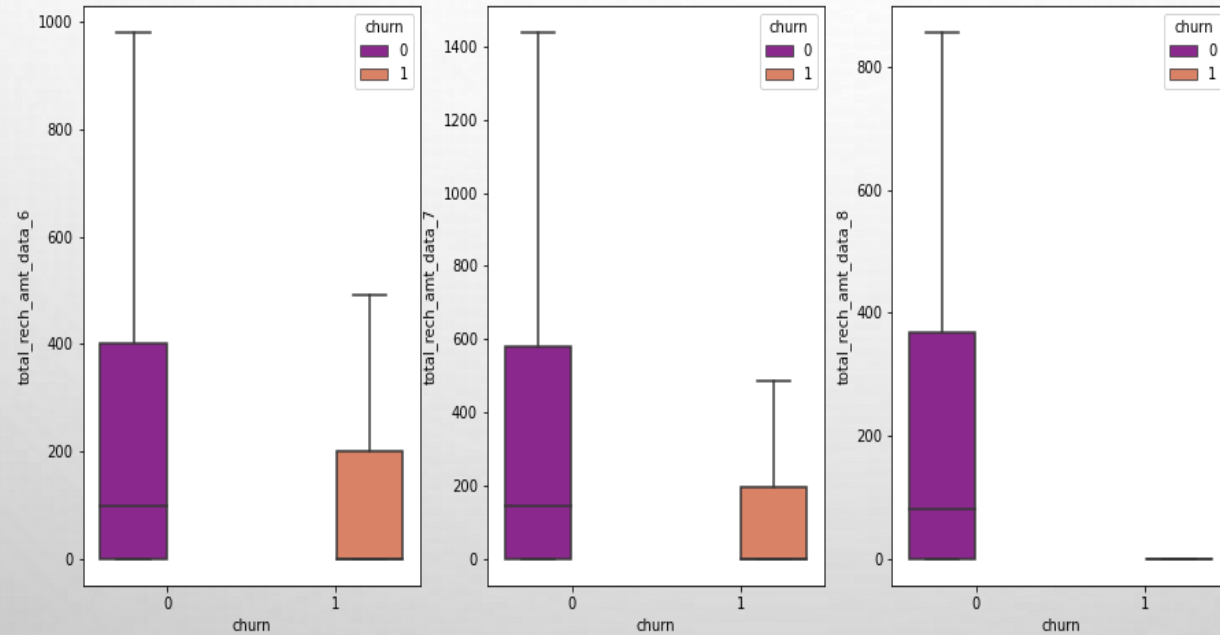
BUSINESS PROBLEM OVERVIEW

- IN THE TELECOM INDUSTRY, CUSTOMERS ARE ABLE TO CHOOSE FROM MULTIPLE SERVICE PROVIDERS AND ACTIVELY SWITCH FROM ONE OPERATOR TO ANOTHER. IN THIS HIGHLY COMPETITIVE MARKET, THE TELECOMMUNICATIONS INDUSTRY EXPERIENCES AN AVERAGE OF 15-25% ANNUAL CHURN RATE. GIVEN THE FACT THAT IT COSTS 5-10 TIMES MORE TO ACQUIRE A NEW CUSTOMER THAN TO RETAIN AN EXISTING ONE, CUSTOMER RETENTION HAS NOW BECOME EVEN MORE IMPORTANT THAN CUSTOMER ACQUISITION.
- FOR MANY INCUMBENT OPERATORS, RETAINING HIGH PROFITABLE CUSTOMERS IS THE NUMBER ONE BUSINESS GOAL.
- TO REDUCE CUSTOMER CHURN, TELECOM COMPANIES NEED TO PREDICT WHICH CUSTOMERS ARE AT HIGH RISK OF CHURN.
- IN THIS PROJECT, WE ANALYSE CUSTOMER-LEVEL DATA OF A LEADING TELECOM FIRM, BUILD PREDICTIVE MODELS TO IDENTIFY CUSTOMERS AT HIGH RISK OF CHURN AND IDENTIFY THE MAIN INDICATORS OF CHURN.

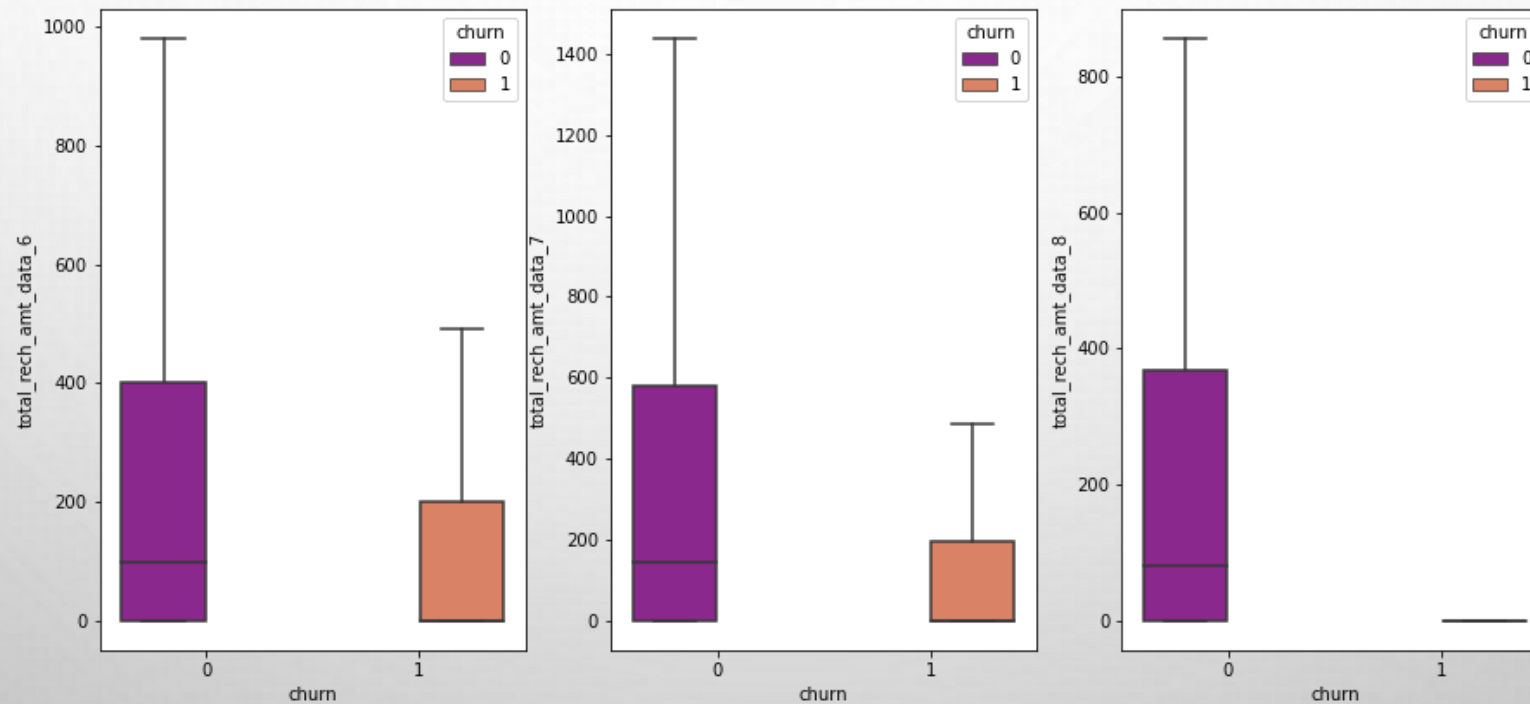
UNDERSTANDING CUSTOMER BEHAVIOR DURING CHURN

- THE 'GOOD' PHASE: IN THIS PHASE, THE CUSTOMER IS HAPPY WITH THE SERVICE AND BEHAVES AS USUAL.
- THE 'ACTION' PHASE: THE CUSTOMER EXPERIENCE STARTS TO SORE IN THIS PHASE.
- THE 'CHURN' PHASE: IN THIS PHASE, THE CUSTOMER IS SAID TO HAVE CHURNED.
- YOU DEFINE CHURN BASED ON THIS PHASE. ALSO, IT IS IMPORTANT TO NOTE THAT AT THE TIME OF PREDICTION (I.E. THE ACTION MONTHS), THIS DATA IS NOT AVAILABLE TO YOU FOR PREDICTION. THUS, AFTER TAGGING CHURN AS 1/0 BASED ON THIS PHASE, YOU DISCARD ALL DATA CORRESPONDING TO THIS PHASE.
- IN THIS CASE, SINCE YOU ARE WORKING OVER A FOUR-MONTH WINDOW, THE FIRST TWO MONTHS ARE THE 'GOOD' PHASE, THE THIRD MONTH IS THE 'ACTION' PHASE, WHILE THE FOURTH MONTH IS THE 'CHURN' PHASE.

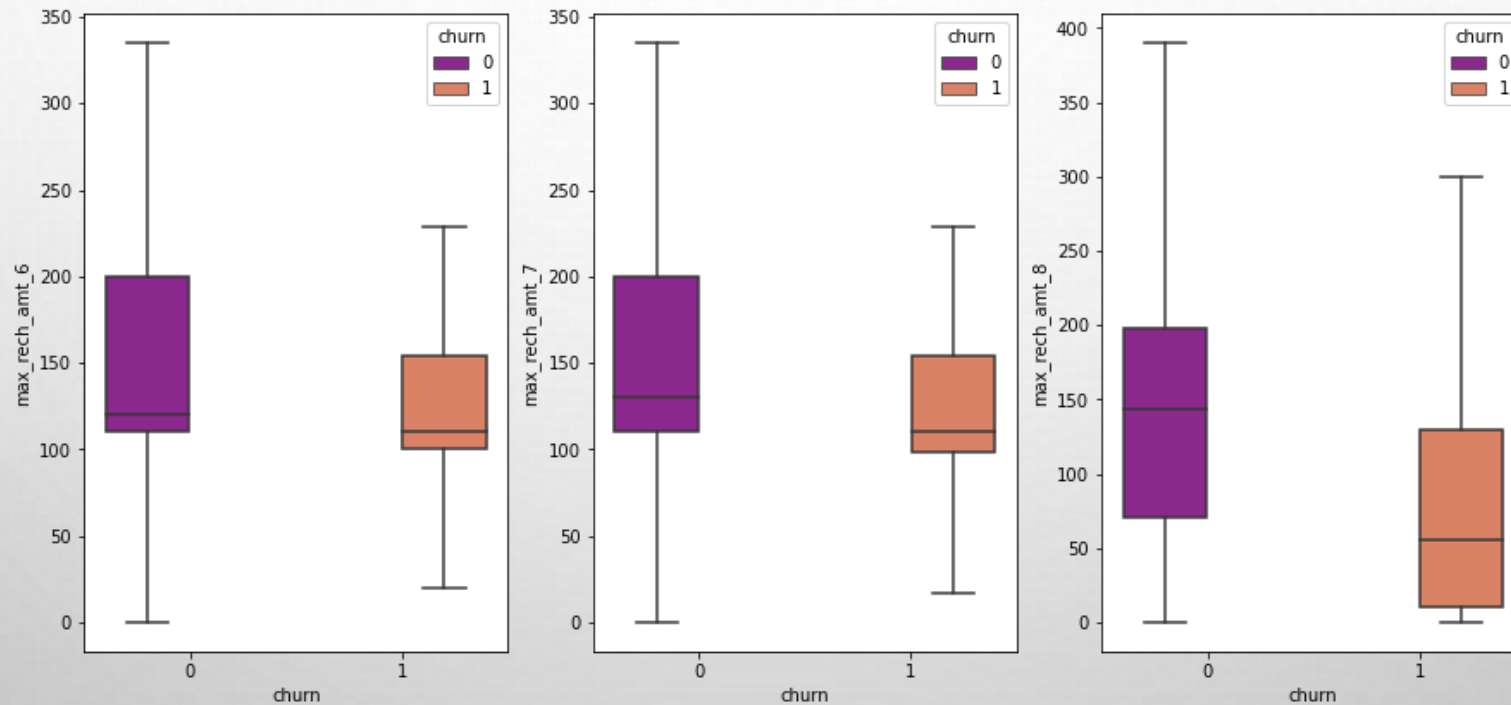
WE SEE THERE IS A DECREASE IN THE RECHARGE AMOUNT IN THE ACTION PHASE FOR THE CHURN CUSTOMERS



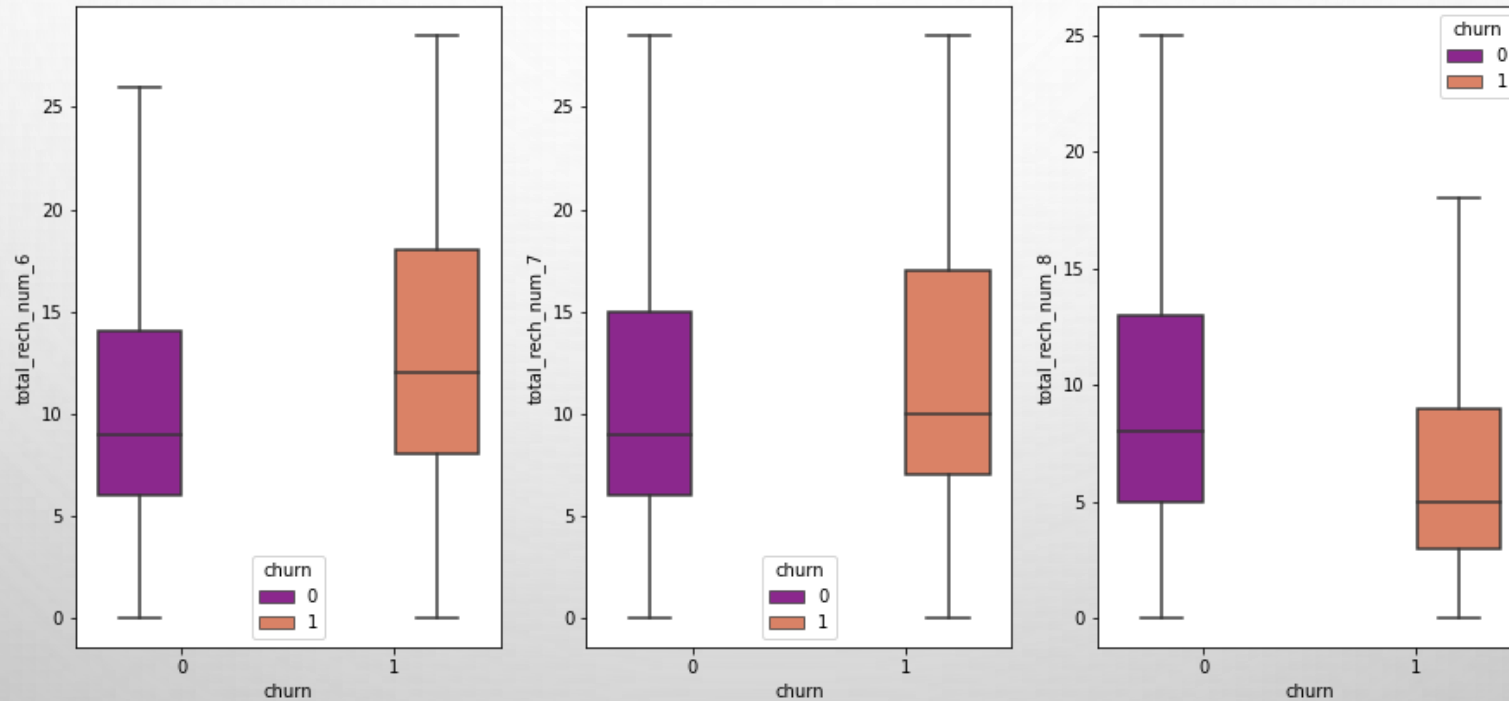
WE SEE THERE IS A DECREASE IN THE DATA RECHARGE IN THE ACTION PHASE FOR THE CHURN CUSTOMERS



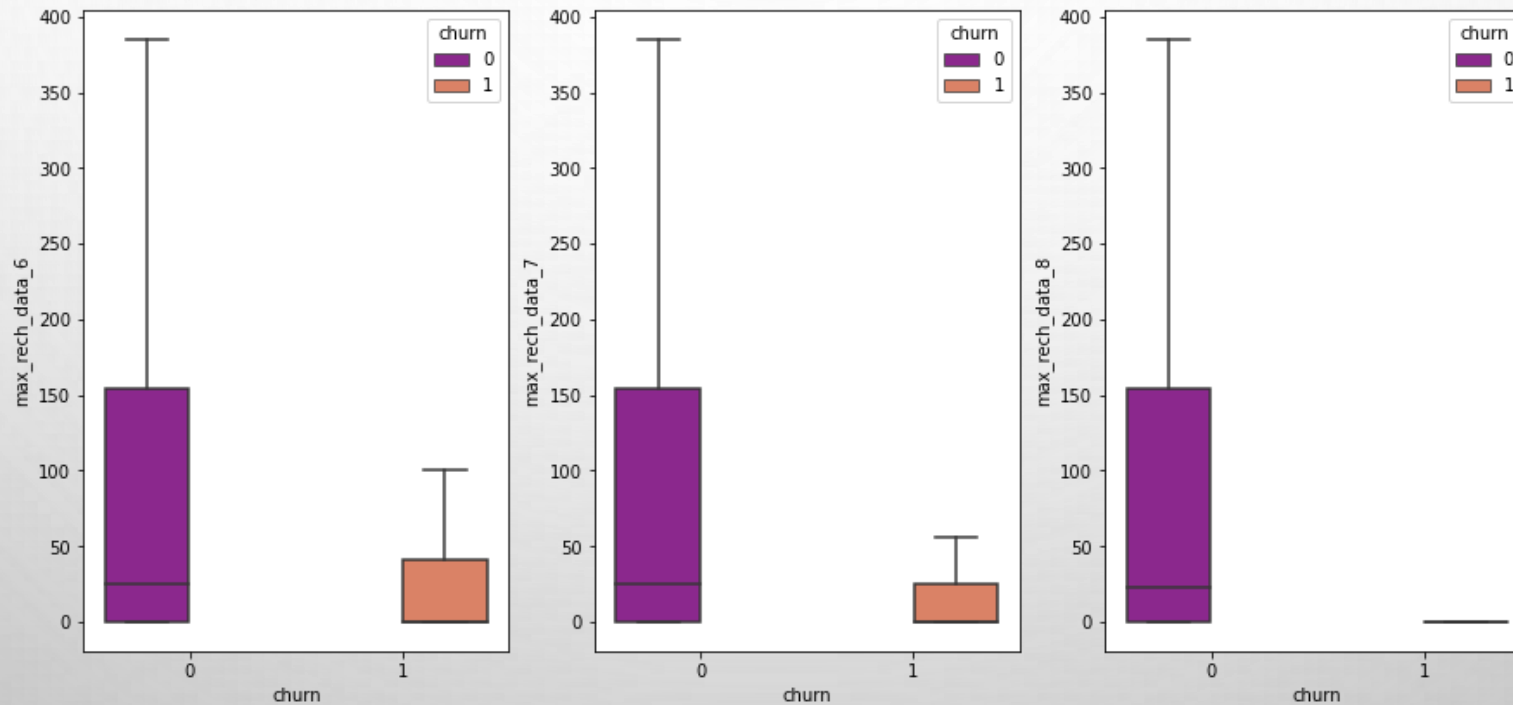
WE SEE THERE IS A DECREASE IN THE
MAX_RECH_AMT IN THE ACTION PHASE FOR
THE CHURN CUSTOMERS



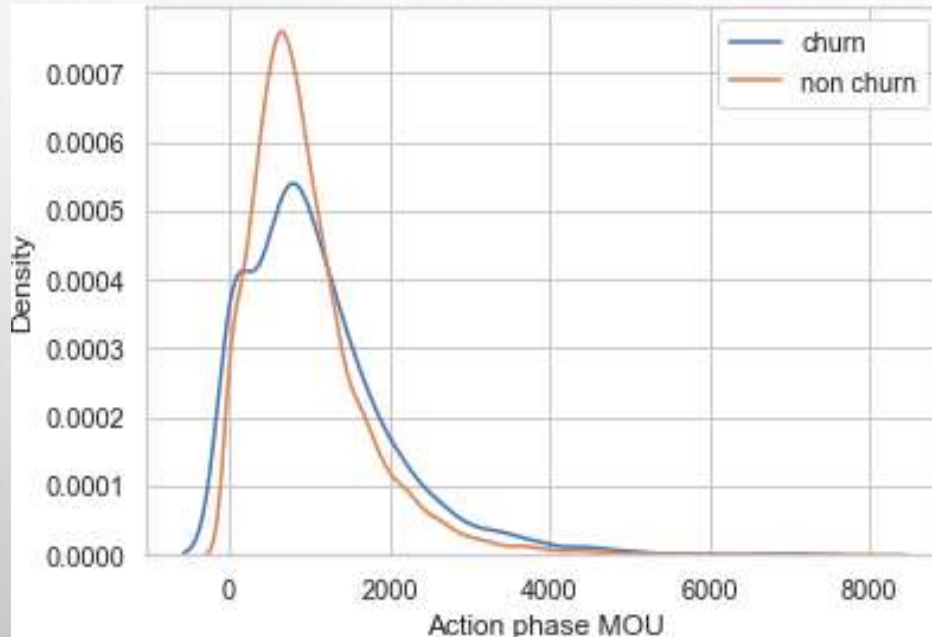
WE SEE THERE IS A DECREASE IN THE NUM
OF RECHARGES IN THE ACTION PHASE FOR
THE CHURN CUSTOMERS



WE SEE THERE IS A DECREASE IN THE DATA RECHARGE IN THE ACTION PHASE FOR THE CHURN CUSTOMERS



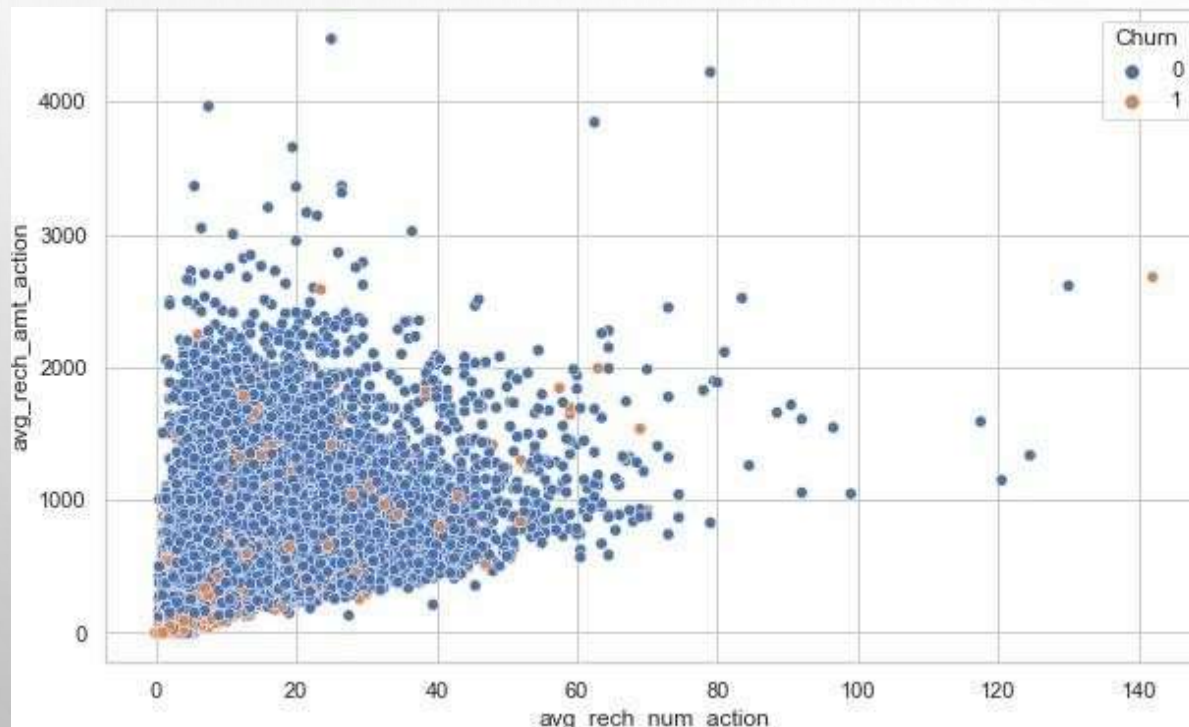
ANALYSIS OF THE MINUTES OF USAGE MOU (CHURN AND NOT CHURN) IN THE ACTION PHASE



Customers that churn tend to have minutes of usage (MOU) that range from 0 to 2500. Higher the MOU, the lesser the churn probability

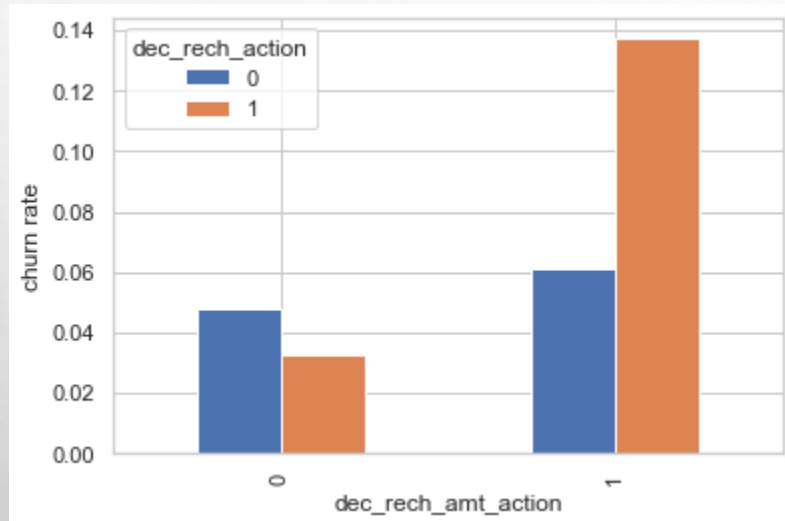
churn probability

ANALYZING RECHARGE AMOUNT AND NUMBER OF RECHARGE IN ACTION MONTH



We can see from the pattern that the recharge number and the recharge amount are almost proportional. The higher the number of recharges, the higher the amount of the recharge.

ANALYZING CHURN RATE WRT THE DECREASING RECHARGE AMOUNT AND NUMBER OF RECHARGE DURING THE ACTION PHASE



We can see from the above plot, that the churn rate is higher for the customers, whose recharge amount as well as the number of recharges have decreased in the action phase when compared to the good phase.

FINAL CONCLUSION WITH PCA

- AFTER TRYING SEVERAL MODELS WE CAN SEE THAT FOR ACHIEVING THE BEST SENSITIVITY, WHICH WAS OUR ULTIMATE GOAL, THE CLASSIC LOGISTIC REGRESSION OR THE SVM MODELS PERFORMS WELL. FOR BOTH THE MODELS THE SENSITIVITY WAS APPROX 81%. ALSO WE HAVE GOOD ACCURACY OF APPROX 85%.

MODEL ANALYSIS

- WE CAN SEE THAT THERE ARE FEW FEATURES HAVE POSITIVE COEFFICIENTS AND FEW HAVE NEGATIVE. MANY FEATURES HAVE HIGHER P-VALUES AND HENCE BECAME INSIGNIFICANT IN THE MODEL. *COARSE TUNING (AUTO+MANUAL)*
- WE'LL FIRST ELIMINATE A FEW FEATURES USING RECURSIVE FEATURE ELIMINATION (RFE), AND ONCE WE HAVE REACHED A SMALL SET OF VARIABLES TO WORK WITH, WE CAN THEN USE MANUAL FEATURE ELIMINATION (I.E. MANUALLY ELIMINATING FEATURES BASED ON OBSERVING THE P-VALUES AND VIFS).

ANALYSIS OF THE ABOVE CURVE

- ACCURACY - BECOMES STABLE AROUND 0.6
- SENSITIVITY - DECREASES WITH THE INCREASED PROBABILITY.
- SPECIFICITY - INCREASES WITH THE INCREASING PROBABILITY.
- AT POINT 0.6 WHERE THE THREE PARAMETERS CUT EACH OTHER, WE CAN SEE THAT THERE IS A BALANCE BETWEEN SENSITIVITY AND SPECIFICITY WITH A GOOD ACCURACY.
- HERE WE ARE INTENDED TO ACHIEVE BETTER SENSITIVITY THAN ACCURACY AND SPECIFICITY. THOUGH AS PER THE ABOVE CURVE, WE SHOULD TAKE 0.6 AS THE OPTIMUM PROBABILITY CUTOFF, WE ARE TAKING 0.5 FOR ACHIEVING HIGHER SENSITIVITY, WHICH IS OUR MAIN GOAL.

FINAL CONCLUSION WITH NO PCA

- WE CAN SEE THAT THE LOGISTIC MODEL WITH NO PCA HAS GOOD SENSITIVITY AND ACCURACY, WHICH ARE COMPARABLE TO THE MODELS WITH PCA. SO, WE CAN GO FOR THE MORE SIMPLISTIC MODEL SUCH AS LOGISTIC REGRESSION WITH PCA AS IT EXPLAINS THE IMPORTANT PREDICTOR VARIABLES AS WELL AS THE SIGNIFICANCE OF EACH VARIABLE. THE MODEL ALSO HELPS US TO IDENTIFY THE VARIABLES WHICH SHOULD BE ACT UPON FOR MAKING THE DECISION OF THE TO BE CHURNED CUSTOMERS. HENCE, THE MODEL IS MORE RELEVANT IN TERMS OF EXPLAINING TO THE BUSINESS.

MODEL SUMMARY

- TRAIN SET
- **ACCURACY = 0.83**
- **SENSITIVITY = 0.88**
- **SPECIFICITY = 0.78**
- TEST SET
- **ACCURACY = 0.82**
- **SENSITIVITY = 0.87**
- **SPECIFICITY = 0.77**
- OVERALL, THE MODEL IS PERFORMING WELL IN THE TEST SET, WHAT IT HAD LEARNT FROM THE TRAIN SET.

BUSINESS RECOMENDATION TOP PREDICTORS

- BELOW ARE FEW TOP VARIABLES SELECTED IN THE LOGISTIC REGRESSION MODEL.
- WE CAN SEE MOST OF THE TOP VARIABLES HAVE NEGATIVE COEFFICIENTS. THAT MEANS, THE VARIABLES ARE INVERSELY CORRELATED WITH THE CHURN PROBABILITY.
- E.G.:-
- IF THE LOCAL INCOMING MINUTES OF USAGE (LOC_IC_T2M_MOU_8) IS LESSER IN THE MONTH OF AUGUST THAN ANY OTHER MONTH, THEN THERE IS A HIGHER CHANCE THAT THE CUSTOMER IS LIKELY TO CHURN.

RECOMMENDATIONS

- TARGET THE CUSTOMERS, WHOSE MINUTES OF USAGE OF THE INCOMING LOCAL CALLS AND OUTGOING ISD CALLS ARE LESS IN THE ACTION PHASE (IN THE MONTH OF AUGUST).
- ALSO, THE CUSTOMERS HAVING VALUE BASED COST IN THE ACTION PHASE INCREASED ARE MORE LIKELY TO CHURN THAN THE OTHER CUSTOMERS. HENCE, THESE CUSTOMERS MAY BE A GOOD TARGET TO PROVIDE OFFER.
- CUSTOMERS, WHOSE MONTHLY 3G RECHARGE IN AUGUST IS MORE, ARE LIKELY TO BE CHURNED.
- CUSTOMERS HAVING DECREASING LOC INCOMING MINUTES OF USAGE FOR OPERATORS T2M FOR THE MONTH OF AUGUST ARE MORE LIKELY TO CHURN.
- CUSTOMERS DECREASING MONTHLY 2G USAGE FOR AUGUST ARE MOST PROBABLE TO CHURN.
- CUSTOMERS HAVING DECREASING TOTAL OUTGOING MINUTES OF USAGE FOR AUGUST ARE MORE LIKELY TO CHURN.
- ARPU_8 AND VBC_3G_8 VARIABLES HAVE POSITIVE COEFFICIENTS. THAT MEANS FOR THE CUSTOMERS, WHOSE AVERAGE REVENUE PER USER IS DECREASING ARE MORE LIKELY TO CHURN.