Agent Performance

Why we need to do it

According to the previous analysis, we know that the efficiency and performance of the same agent dealing with different issues are different, and the different agents dealing with the same issue's performance are different. Therefore, our target is to arrange appropriate agent to handle appropriate issue to improve the customer experience when customers ask for help.

Goal

- Build scorecard system for agents' performance
- Improve customer experience
- Create an API to transfer data

---> **Scorebased systems for agents to determine best matchmaking**

Whatwe are trying to get

- Which attributes could measure agent's performance
- what attributes we need to use during data modeling
- how to get customer's feedback on this scorecard system

---> **Feature Determination**
---> **Feature Importance**
---> **Feedback Capture**

Agent's performance Measurement   --> **Conversation Health Score as new attribute to determine csat score when conversations doesn't have scat scorex.**

Here we cannot just use csatscore to measure agent's performance, because there are so many conversasions that do not have the csatscore; here, we created a new attributes - CHS (conversasion health score), this is created by using NLP methods in the conversasion flow.
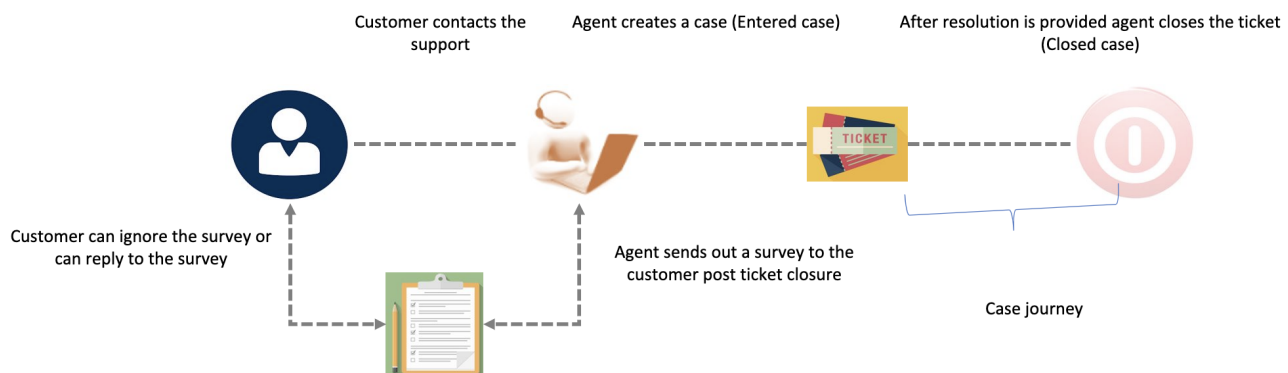
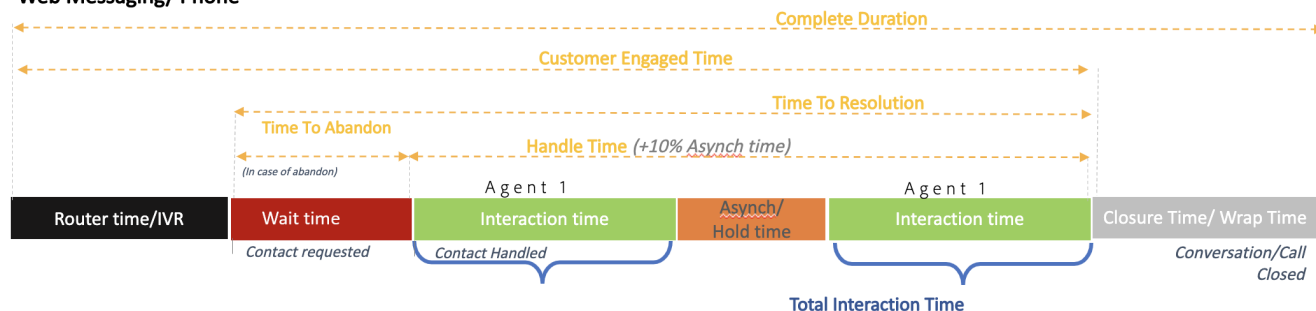| KPI	Description	Value
CHS	conversasion health score	-1: bad conversasion 1: comfortable conversasion probability score

--->Good conversation vs Bad Conversation

CHS model: https://adobe.sharepoint.com/:p:/s/CEInsightsAnalytics2/Ee1_HGLFEoBJulMp7YjWT6cBy_hMRc5pVDSV_E9GGoa-Ew?email=yuxia%40adobe.com&e=bVsxUE

Issue Type	Description
L2 Issue type	the level 2 Issue types in our system

Customer Journey Scenario

Customer contacts the support

Agent creates a case (Entered case)

After resolution is provided agent closes the ticket (Closed case)

Customer can ignore the survey or can reply to the survey

Agent sends out a survey to the customer post ticket closure

Case journey

Web Messaging/ Phone

API Data Output   ---> **FastAPI for Model Consumption**

API URL	Method	Return
http://144.202.28.242:8000/search?=agent_id_type_issue	GET	Single Agent Performance Sore
http://144.202.28.242/api/resources/output	GET	Agent Performance table (json, csv etc.)
http://144.202.28.242:8000/upload_feedback	POST	Upload new data feedback to modeling

Note: in the future, we could have more key attributes in API for us to check agent performance: for example, different agent group's performance, different time period's performance comparison etc.

**Data Modeling**   ---> **Feature/Attributes used for Modeling**

before building model, here is the attribute we use

Attribute	Understanding
wait time	customers' waiting time
complete duration	complete duration time
avg_response_cust	average response time for customers
avg_response_agnt	average response time for agents
agent_handle_time	average handling time
no_of_turns_conversasion	the number of turns in the whole conversasion
no_of_agents	the number of agents handling the whole case
agent_tenure_days	agent tenure days
resolution_days	resolution days
customer_tenure_days	customer tenure
working hours	average workings hours for agents
billable hours	average billing hours for agents
CPH	contact per hour

for more attribute understanding please take a look at: ASD 2.0 slide

Result

- **Correlation between attributes and CHS**
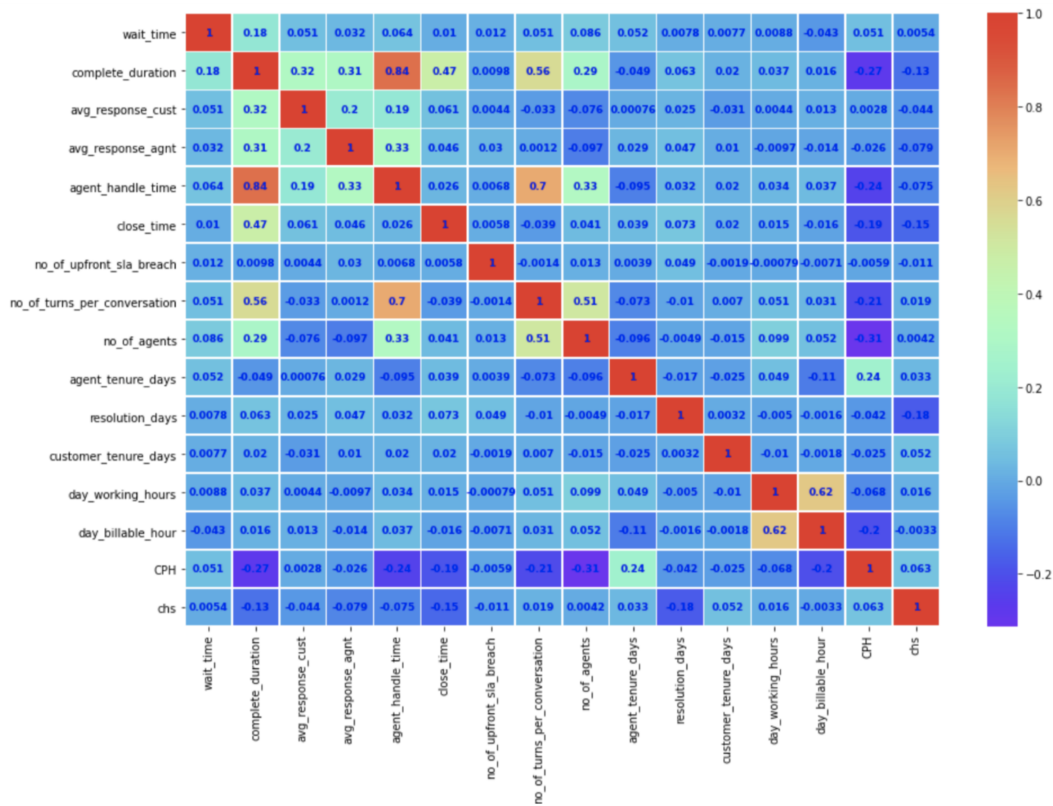
---> Exploratory Data Analysis (EDA)

- **Ab test for different attributes**   ---> EDA extended

======avg_response_agntmean and ab test==========

chs

-1 58.623965

1 48.920876

Name:avg_response_agnt,dtype: float64

Ttest_indResult(statistic=25.094906800317492,**pvalue=1.5368768028395452e-138**)

======agent_handle_timemean and ab test==========

chs

-1 1804.467839

1 1557.205855

Name: agent_handle_time, dtype: float64

Ttest_indResult(statistic=23.63472804090295,**pvalue=3.725307086051561e-123**)

======no_of_agentscrosstab and ab test==========

no_of_agents 1 2 3 4 56 7 8

chs

-1 4982 8927 3168 565 73 10 0 0

1 16707 50789 12394 1278 106 20 3 1

(1070.7641807257914, **pvalue= 6.146455481321728e-227**)

======resolution_daysmean and ab test==========

chs

-1 4.446657

1 0.775259

Name:resolution_days,dtype: float64

Ttest_indResult(statistic=56.10796344733855,**pvalue=0.0**)

======CPH mean and ab test==========

chs

-1 2.274786

1 2.426172

Name: CPH,dtype: float64

Ttest_indResult(statistic=-19.75285477452278,**pvalue=1.1144464680367495e-86**)

======day_working_hoursmean and ab test==========

chs

-1 8.713672

1 8.745168

Name:day_working_hours,dtype: float64

Ttest_indResult(statistic=-4.920325542935314,pvalue=8.653872114158934e-07)

======day_billable_hourmean and ab test==========

chs

-1 7.831340

1 7.823395

Name:day_billable_hour,dtype: float64

Ttest_indResult(statistic=1.0510987969977839,pvalue=0.29321578164032736)

======no_of_turns_per_conversationmean and ab test==========

chs

-1 23.470748

1 24.106731

Name:no_of_turns_per_conversation,dtype: float64

Ttest_indResult(statistic=-5.932832483174628,pvalue=**2.987376694136076e-09**)

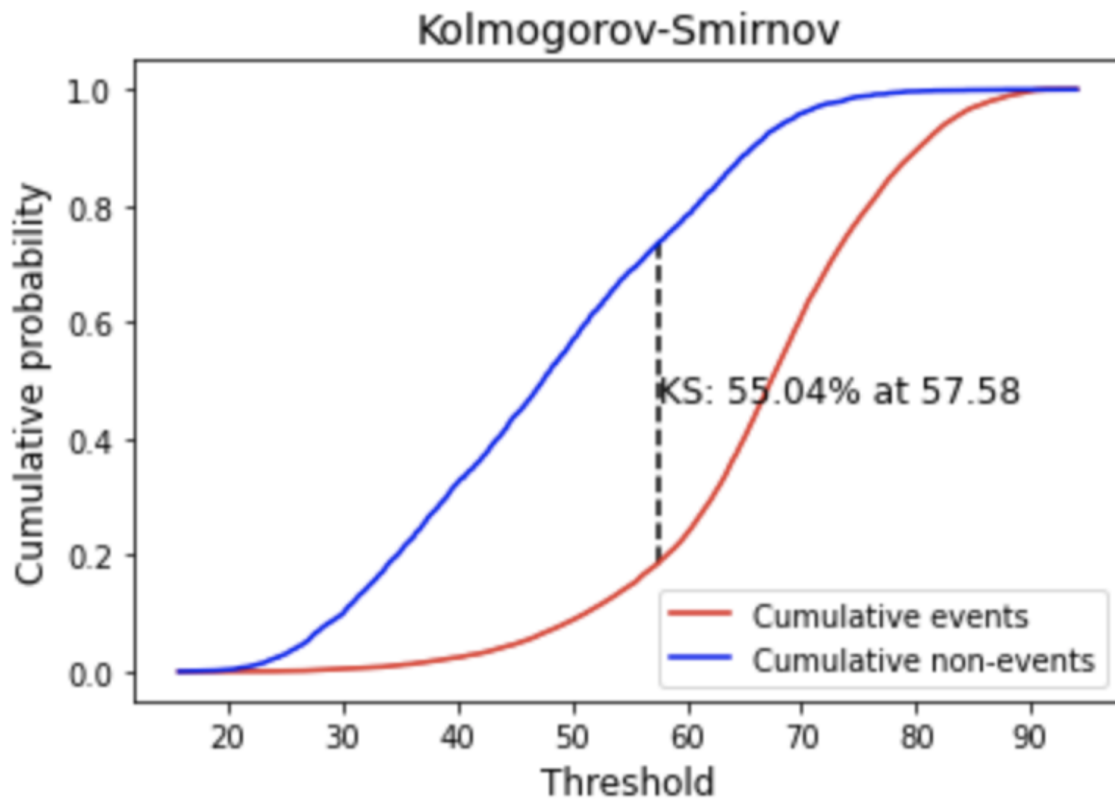======agent_tenure_daysmean and ab test==========
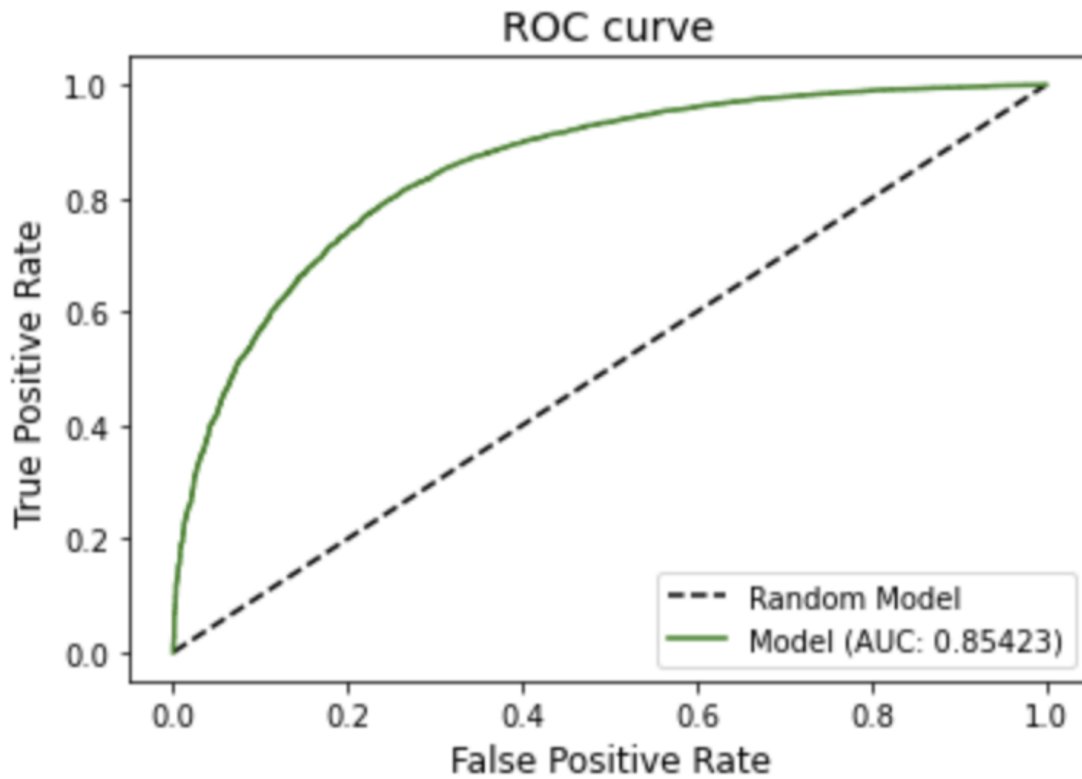
chs

-1 585.965078

1 632.275837

Name:agent_tenure_days,dtype: float64

Ttest_indResult(statistic=-10.388282368877283,**pvalue=2.888724015734704e-25**)

- **Machine leanring model**
    - **Using woe and IV to split the attributes and build logistic regression model**

Kolmogorov-Smirnov

ROC curve

---> Confusion Matrix(Precision, Recall, True/False Positve, True/False Negative) ROC Curve/AUC->Area Under Curve

Insights

- For issue types:

- Our agents are good at handling:

> ['Payment Delay/Update for Purchase Order' 'Free credit days Request'
> 'Images Licensed Accidentally' 'Unable to Change Plan Online'
> 'Promo Plan/Pricing' 'Change/Switch Subscription' 'Change Billing Date'
> 'CCP package creation' 'Adobe Update Server SetupTool(AUSST)'
> 'User Account Corruption' 'User Management API' 'Add a Contact'
> 'Activation Issues' 'Permission Issues while Importing'
> 'Trial/Buy Now Error' 'ReferToThird Party'
> 'Referred to Admin for Assignment' 'Metadata Import Issue'
> 'Retrieve Serial Number'
> 'License not available suggested to add new license' 'SSO Login Errors'
> 'License UpgradeEntitlement(LUE) Upgrade' 'K12 Sign-in issue'
> 'Hardware Issue (Crash)' 'Expired Card on File' 'Error/Exit Code'
> 'System Pricing Error' 'End of Subscription term'
> 'Device License Packaging' 'Third Party Device and Obsolete Drivers'
> 'Change Of Reseller' 'Lost/Stolen Card']

- Our agents arenotgood at handling:

['No Watermark after Exporting' 'First Time Setup' 'Transfer of License'
'Adding/Removing Seat(s)' 'Remote Update Manager'
'Redemption Code Not MarkedAsSold' 'License Expired Contact Reseller'
'Case Closed by Customer' 'Market Segment Change (Indirect/Direct)'
'View Purchase History/Manage Account' 'Entitlement Issues'
'Plan not used/activated' 'Not sure' 'Data Loss' 'Server Issue'
'Crash During Import' 'Team Credit Pack Issues' 'Package Installation'
'File/Project Corruption' 'Third Party Purchase Inquiry'
'Corrupt Preferences' 'Unable to locate charge' 'Recover Deleted Files'
'Backend Request from Adobe Team' 'Permissions Issue (Crash)'
'Account Manager Inquiry' 'Lightroom Sync Issue' 'AFC' 'DM'
'Purchased incorrect product (accidental)'
'Images Not Credited to Account' 'Unable to Rename Files and Add Preset'
'Graphic Card Compatibility' 'Patent/Copyright Issues' 'SaaS Services'
'Unauthorized/fraudulent/minor purchase' 'Technical Issues'
'Output Quality Issue' 'Saas Subscription/Perpetual'
'Payment Failure: Refer to Bank' 'Migrate Data' 'Add-on Issues'
'Goodwill Gesture' 'Legacy/FreeProducts(OutOfScope)'
'Expired/Invalid Redemption Code' 'End DateIssue(Direct/Indirect Order)'
'Directory Creation' 'One Console Provisioning Issue'
'Activate License not shown in Admin Console' 'Language Swap'
'Content Quality/Corrupt Images' 'SDL Download' 'Server Outage'
'Too complicated to learn' 'Correct Profile Issues'
'License History/Usage Issues' 'Offline Activation'
'Fraudulent/Unauthorized Charge'
'Crash while Exporting/Printing/Publishing/Scanning'
'Workflow Related Crash' 'Adobe Sign Provisioning Issue'
'CC/DC File Sync\xa0Issue' 'On-demand or Standalone Refund'
'Perpetual License Inquiry']

Verify this:

In good at issue types: 97.5% conversationschs= 1;meancsatscoreis;4.83

In bad at issue types:62.1% conversationschs= 1; meancsatscoreis;3.55