Beyond the Buzz:
Call Transcript Analysis

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Content

- Data Exploration
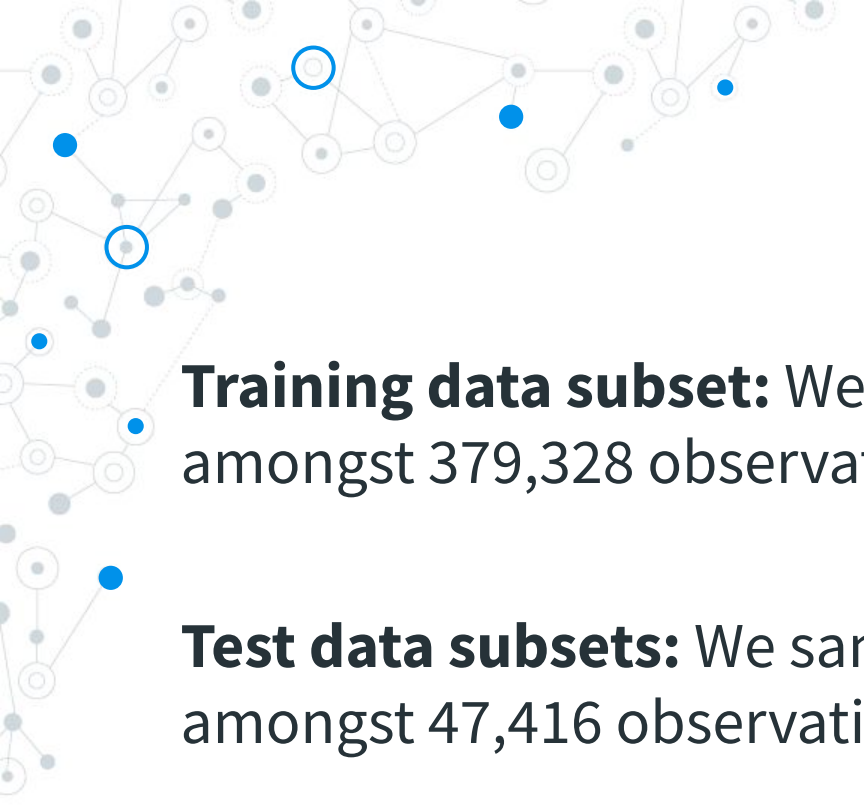- Attempted Models
- Data
- Our Approach
- Results
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Data
Exploration

57 Unique Labels:

['unauthorized charge or payment', 'billing or charge disputes',
 'cancel order', 'product details inquiry',
 'product availability and stock', 'schedule installation',
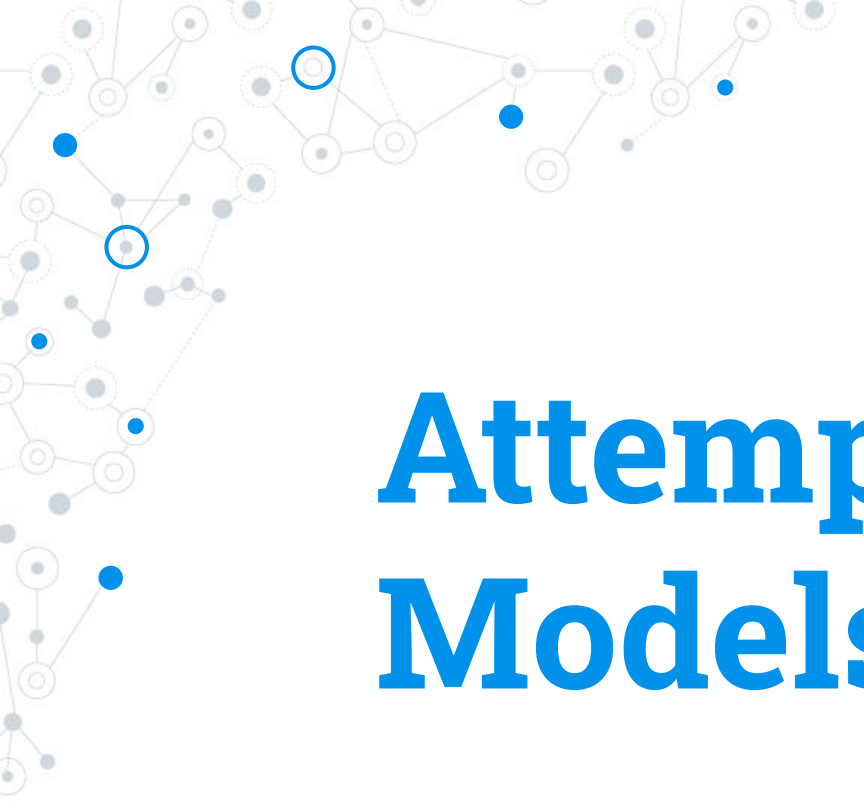 'schedule repair', 'change or update order',
 'miscellaneous inquiries', 'customer feedback',
 'transfer call to the right department or store',
 'delivery delays', 'change shipping address', 'defective product',
 'device damaged', 'bad customer service', 'troubleshooting',
 'reschedule delivery', 'forgot my password',
 'lost or forgot items', 'schedule delivery', 'return request',
 'renewal of a plan subscription or membership',
 'network or connectivity issues', 'refund status',
 'refund request', 'software error', 'delivery tracking',
 'reschedule repair', 'trade in inquiry', 'schedule order pickup',
 'damaged product', 'software installation',
 'website or app complaints', 'reschedule installation',
 'cancellation of a plan subscription or membership',
 'employment or career inquiries', 'rewards or discounts',
 'software update', 'check warranty coverage',
 'product compatibility', 'login issues', 'fraud concerns',
 'change payment method', 'price match', 'payment method',
 'reschedule order pickup', 'change shipping time',
 'warranty claim', 'best buy credit card', 'account security',
 'screen issues', 'delivery or parts of delivery items missing',
 'incomplete installation', 'payment failed', 'performance issues',
 'account cancellation'], dtype=object)

Training data subset: We sampled 149,972 observations amongst 379,328 observations.

Test data subsets: We sampled 47,416 observations amongst 47,416 observations.

Attempted Models

BERT

◎ Contextual representation
◎ Issues with computational power

DistillBERT

◎ Faster and lighter version of BERT
◎ Issues with computational power

XLNet

◎ Large input sequence length

TF-IDF
Approach

TF (Term Frequency)
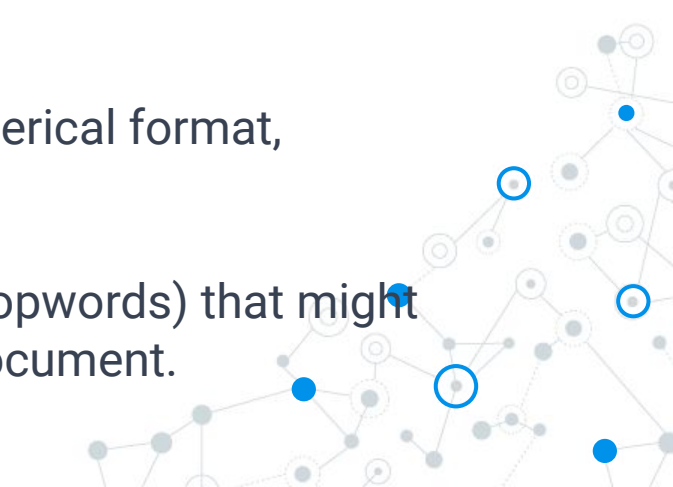
◎ Considers how often a term appears in a document,

◎ Indicates the importance of a term within a specific document.

IDF (Inverse Document Frequency)

◎ Penalizes terms common across multiple documents.

◎ Helps to identify terms unique to a particular document
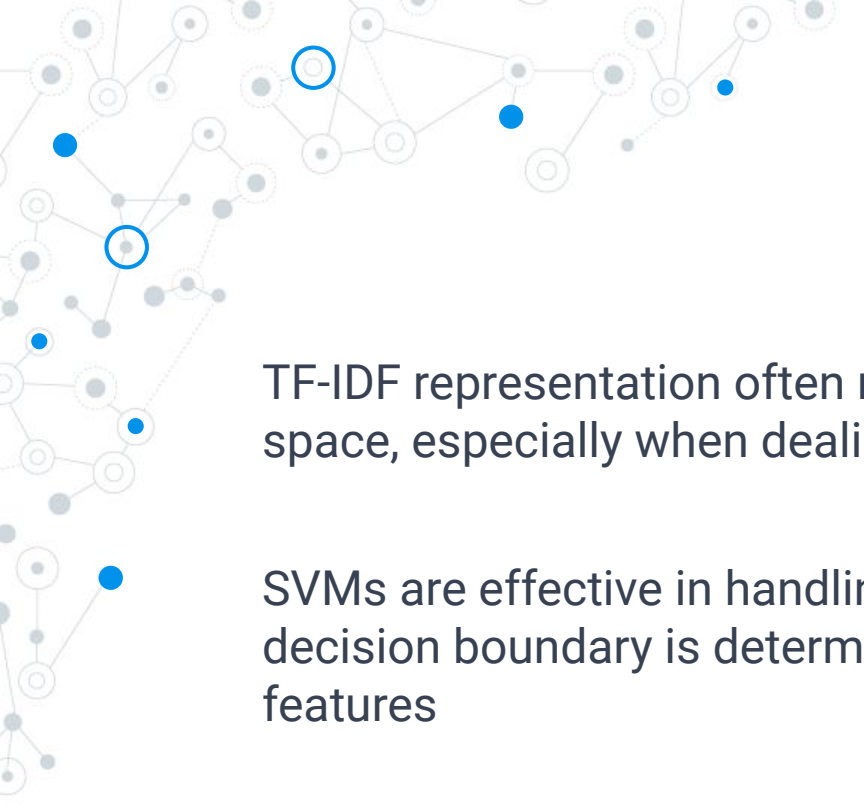
Using TF-IDF, we transform the raw text into a numerical format, reducing the dimensionality of the feature space.

TF-IDF naturally down-weights common words (stopwords) that might not contribute much to the overall meaning of a document.
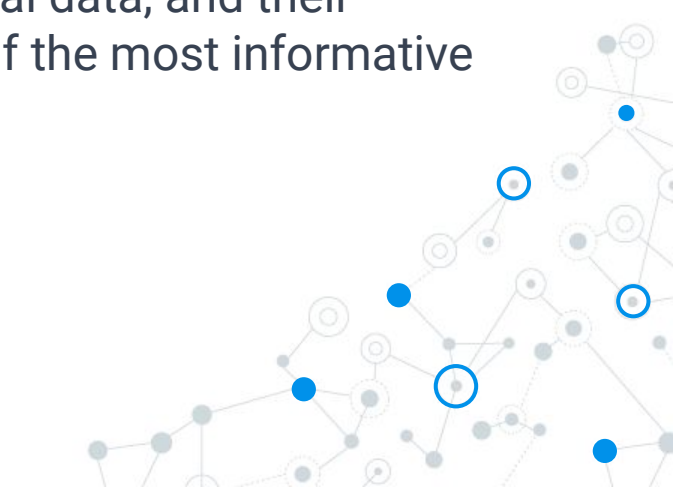
SVM Approach

TF-IDF representation often results in a high-dimensional feature space, especially when dealing with a large vocabulary.

SVMs are effective in handling high-dimensional data, and their decision boundary is determined by a subset of the most informative features

Results

Test Scores

F1: 56.8%; Accuracy: 58.0%

Classification Report Heatmap

|	precision	recall	f1-score
account cancellation	0.76	0.20	0.32
account security	0.39	0.27	0.32
bad customer service	0.45	0.38	0.41
best buy credit card	0.33	0.30	0.31
billing or charge disputes	0.49	0.29	0.36
cancel order	0.66	0.61	0.63
cancellation of a plan subscription or membership	0.62	0.75	0.68
change or update order	0.43	0.59	0.49
change payment method	0.49	0.41	0.45
change shipping address	0.70	0.31	0.43
change shipping time	0.00	0.00	0.00
check warranty coverage	0.46	0.27	0.34
customer feedback	1.00	0.05	0.09
damaged product	0.60	0.41	0.49
defective product	0.55	0.53	0.54
delivery delays	0.50	0.21	0.29
delivery or parts of delivery items missing	0.45	0.09	0.16
delivery tracking	0.48	0.44	0.46
device damaged	0.45	0.03	0.06
employment or career inquiries	0.83	0.94	0.88
forgot my password	0.48	0.60	0.53
fraud concerns	0.51	0.56	0.53
incomplete installation	0.50	0.01	0.02
login issues	0.56	0.47	0.51
lost or forgot items	0.61	0.41	0.49
miscellaneous inquiries	0.57	0.59	0.58
network or connectivity issues	0.00	0.00	0.00
payment failed	0.67	0.05	0.10
payment method	0.50	0.30	0.38
performance issues	0.38	0.08	0.14
price match	0.89	0.85	0.87
product availability and stock	0.80	0.77	0.78
product compatibility	0.61	0.32	0.42
product details inquiry	0.47	0.57	0.52
refund request	0.45	0.46	0.46
refund status	0.66	0.37	0.47
renewal of a plan subscription or membership	0.63	0.74	0.68
reschedule delivery	0.58	0.61	0.59
reschedule installation	0.57	0.11	0.18
reschedule order pickup	0.00	0.00	0.00
reschedule repair	0.66	0.44	0.53
return request	0.69	0.70	0.70
rewards or discounts	0.75	0.85	0.80
schedule delivery	0.46	0.28	0.34
schedule installation	0.64	0.68	0.66
schedule order pickup	0.69	0.70	0.70
schedule repair	0.54	0.75	0.62
screen issues	0.40	0.32	0.36
software error	0.60	0.56	0.58
software installation	0.54	0.35	0.43
software update	0.50	0.23	0.32
trade in inquiry	0.81	0.79	0.80
transfer call to the right department or store	0.56	0.71	0.62
troubleshooting	0.54	0.49	0.52
unauthorized charge or payment	0.57	0.50	0.53
warranty claim	0.35	0.15	0.21
website or app complaints	1.00	0.01	0.02
accuracy	0.58	0.58	0.58
macro avg	0.55	0.41	0.43
weighted avg	0.58	0.58	0.57

Top Ten Label Proportions
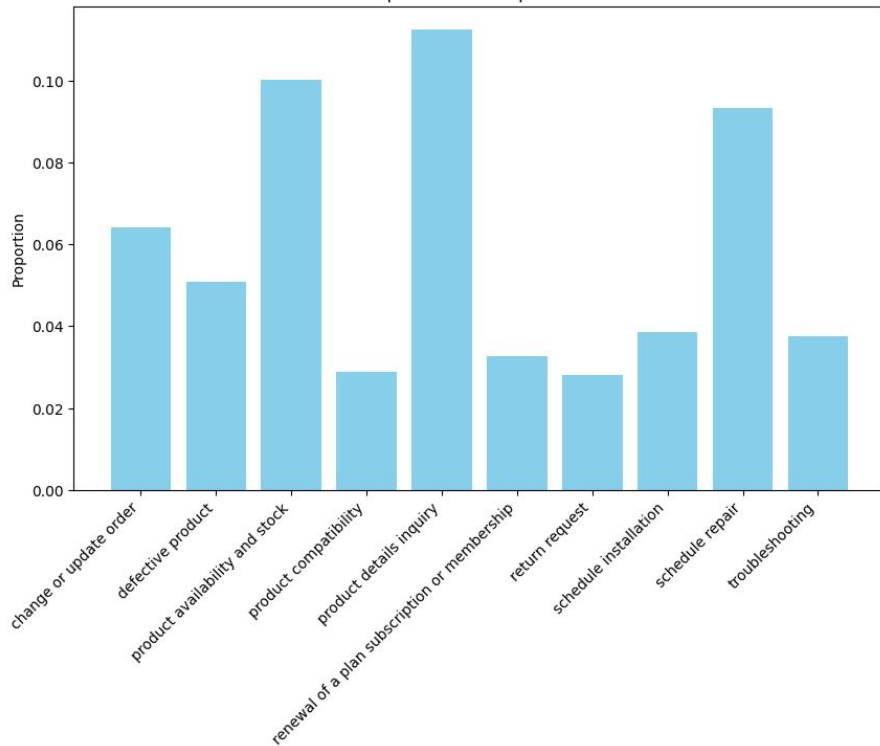
Top Ten Predicted Label Proportions
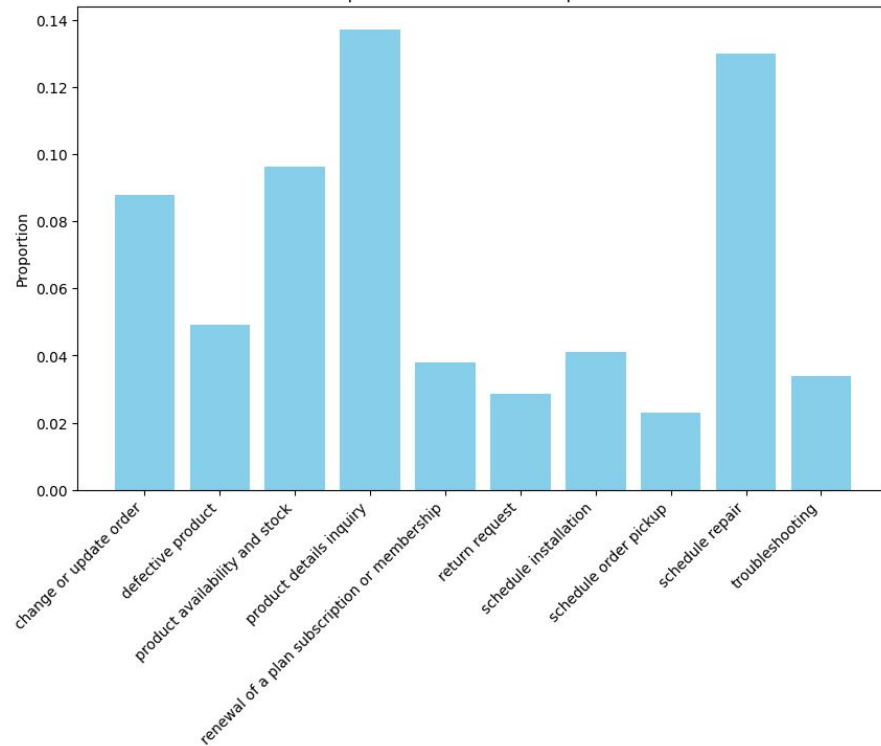
Future Scope

- Acquire more powerful computational resources in order to use the entire training set

- Sentiment analysis using BERT and TensorFlow

Thank You