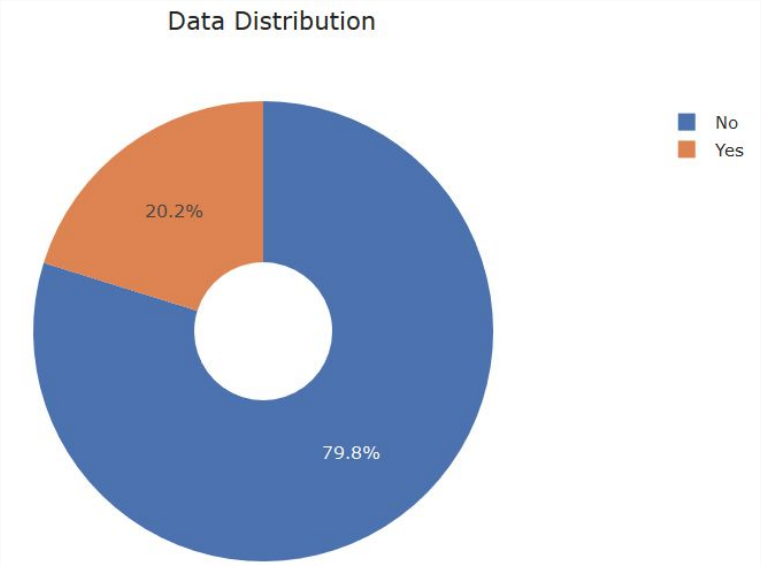
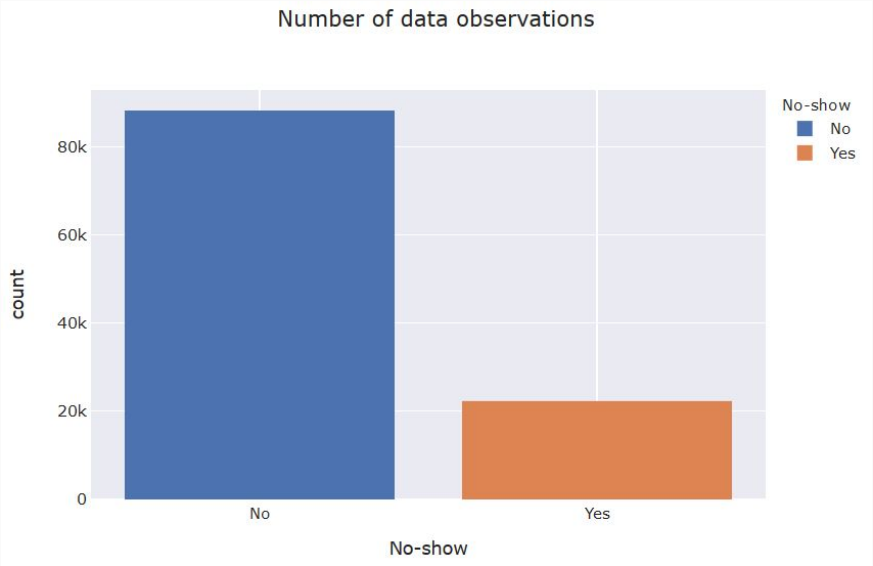
Hospitalization Cancellation

Gaurav Kumar

Hospitalization Cancellation

Data Distribution



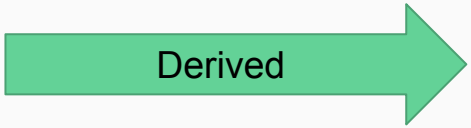


No: Appointment Not Cancelled
Yes: Appointment Cancelled

Hospitalization Cancellation

Influencing Factors considered

- Gender
- Scheduled Day
- Appointment Day
- Age
- Neighbourhood
- Scholarship
- Hipertension
- Diabetes
- Alcoholism
- Handicap
- SMS_received



- Gap b/w Scheduled day and Appointment Day
- Number of times Patient has registered in the hospital in past
- Patient historical Cancellation information / proportion
- Day of Month
- Day of Week

Hospitalization Cancellation

Data

Data for Analytics

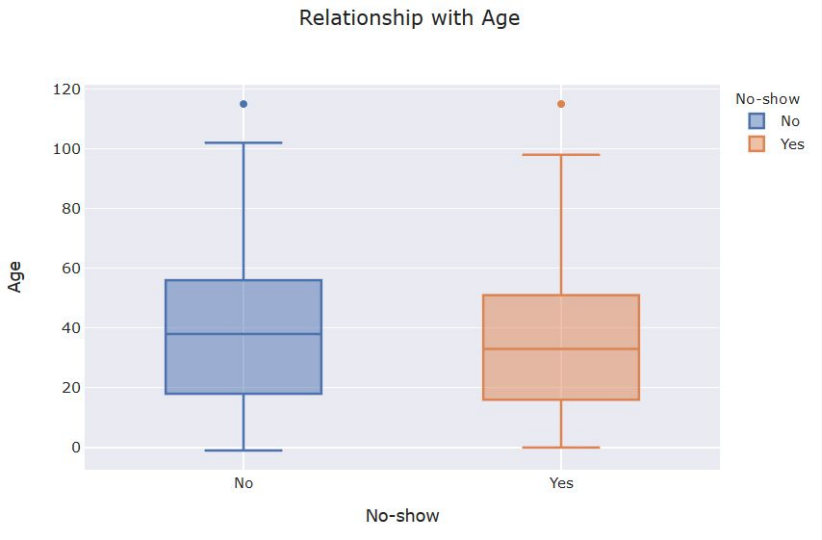
	Gender	Age	Scholarship	Hipertension	Diabetes	Alcoholism	Handcap	SMS_received	date_delta	day	month	occurance	cumsum	date
26960	F	36	0	0	0	0	0	0	0	Monday	May	2	1.0	9
65052	F	24	0	0	0	0	0	0	13	Friday	May	0	NaN	20
62482	F	53	0	0	0	0	0	0	0	Thursday	May	0	NaN	19
98978	F	7	0	0	0	0	0	1	3	Monday	June	2	0.5	6
70881	F	1	0	0	0	0	0	0	0	Tuesday	May	0	NaN	24

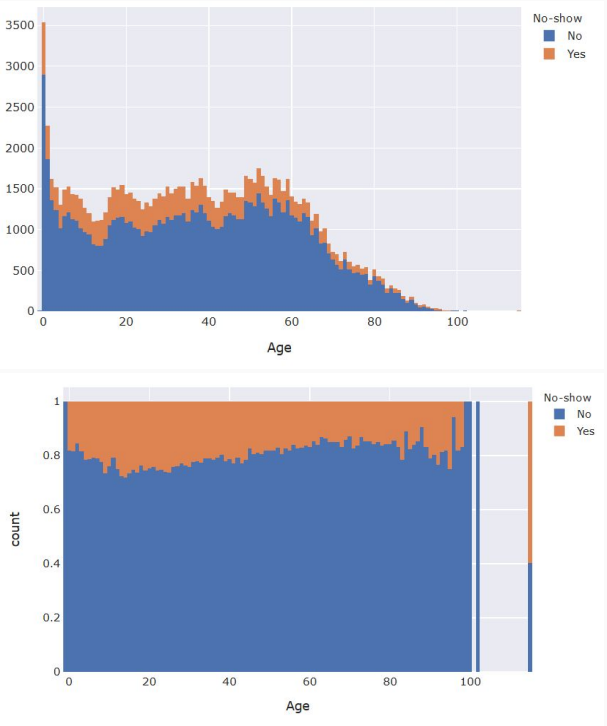
Data for ML Model [Converted]

	0	1	2	3	4	5	6	7	8	9	...	12	13	14	15	16	17	18	19	20	21
0	3.535308e+00	1.0	0.0	0.0	1.0	0.0	0.0	0.0	0.0	0.0	...	-0.047371	0.186558	-0.383464	-0.634429	0.0	0.0	0.0	0.0	0.0	0.0
1	-1.224407e-16	1.0	0.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	...	-0.567324	-0.324170	0.829710	0.229666	0.0	0.0	0.0	0.0	0.0	0.0
2	-1.224407e-16	1.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0	...	0.689230	-0.324170	0.719422	-0.634429	0.0	0.0	0.0	0.0	0.0	0.0
3	1.329613e+00	1.0	0.0	0.0	1.0	0.0	0.0	0.0	0.0	0.0	...	-1.303925	0.186558	-0.714330	-0.435022	0.0	0.0	0.0	0.0	0.0	1.0
4	-1.224407e-16	1.0	0.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0	...	-1.563902	-0.324170	1.270865	-0.634429	0.0	0.0	0.0	0.0	0.0	0.0

Hospitalization Cancellation

Correlation b/w [Age and Cancellation status]

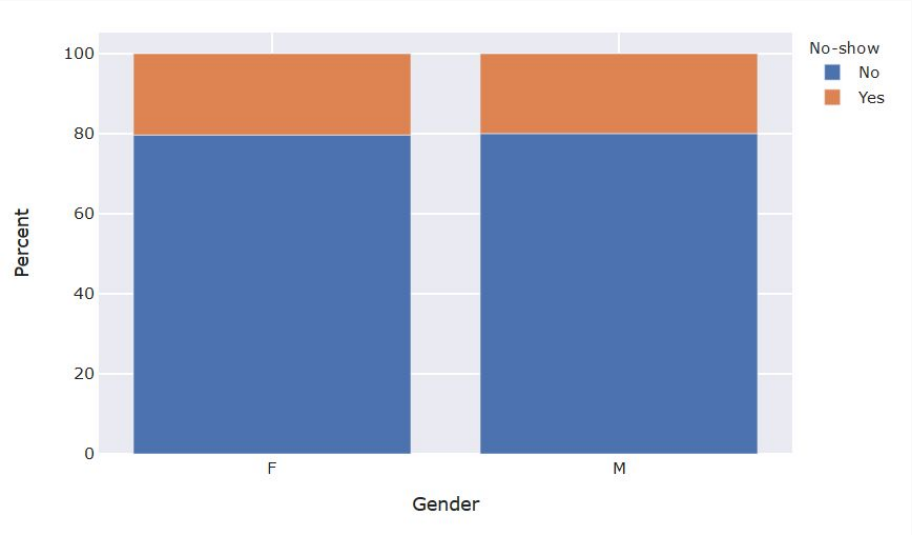


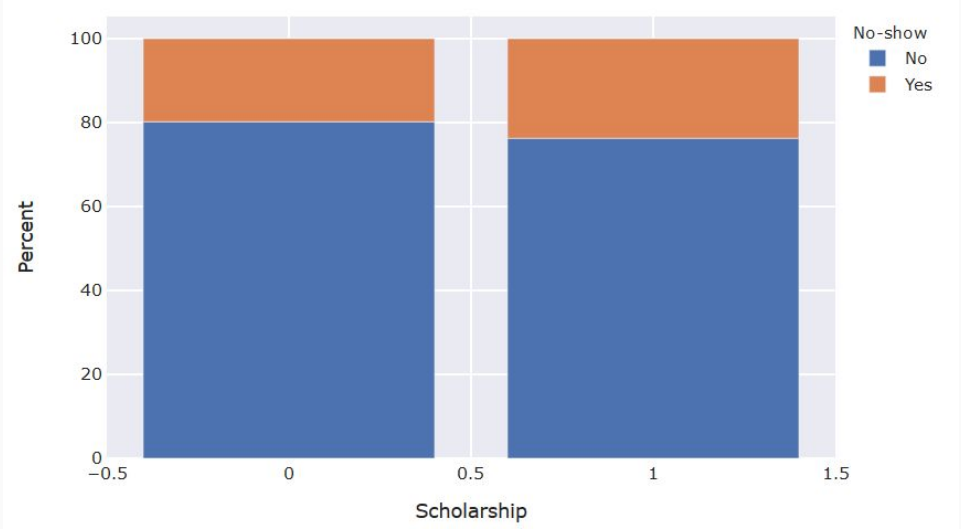


High Age infers Less fraction of people cancelling the appointment, except for infants

Hospitalization Cancellation

Correlation b/w [Gender/scholarship and Cancellation status]

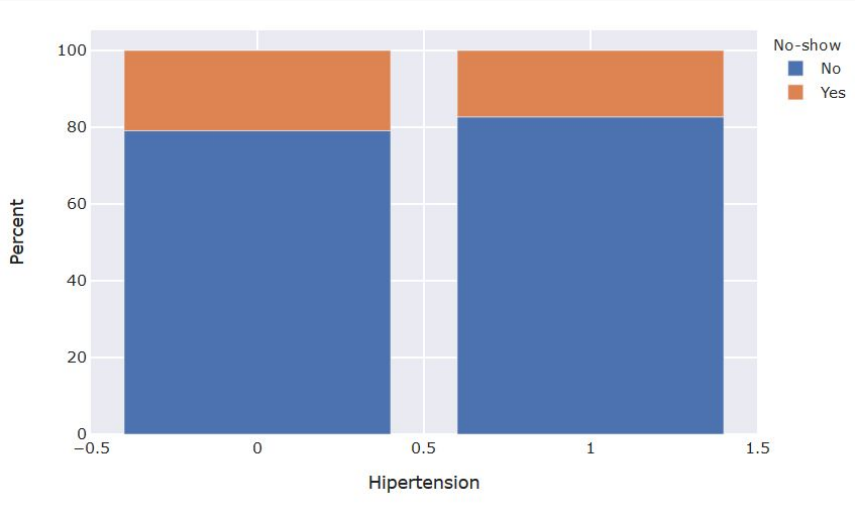


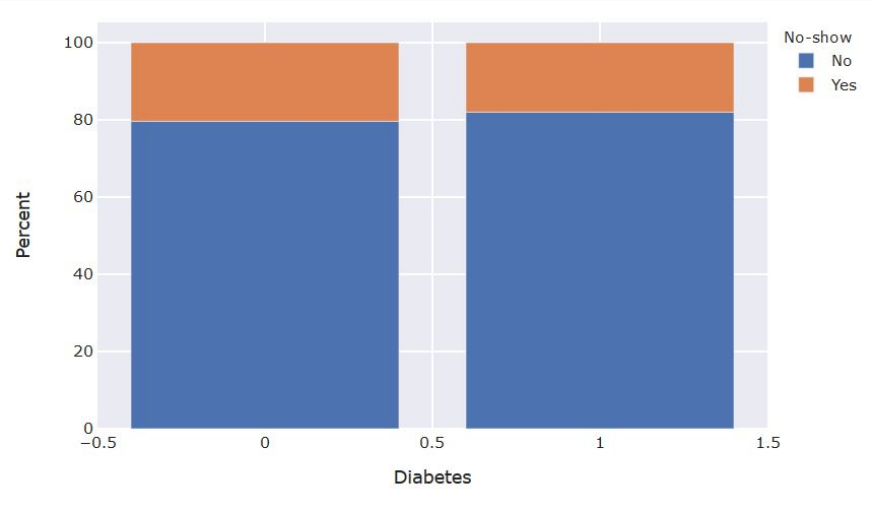


No Apparent Correlation between Gender and cancellation status
Slightly Higher Cancellation with higher scholarship

Hospitalization Cancellation

Correlation b/w [Hipertension/Diabetes and Cancellation status]

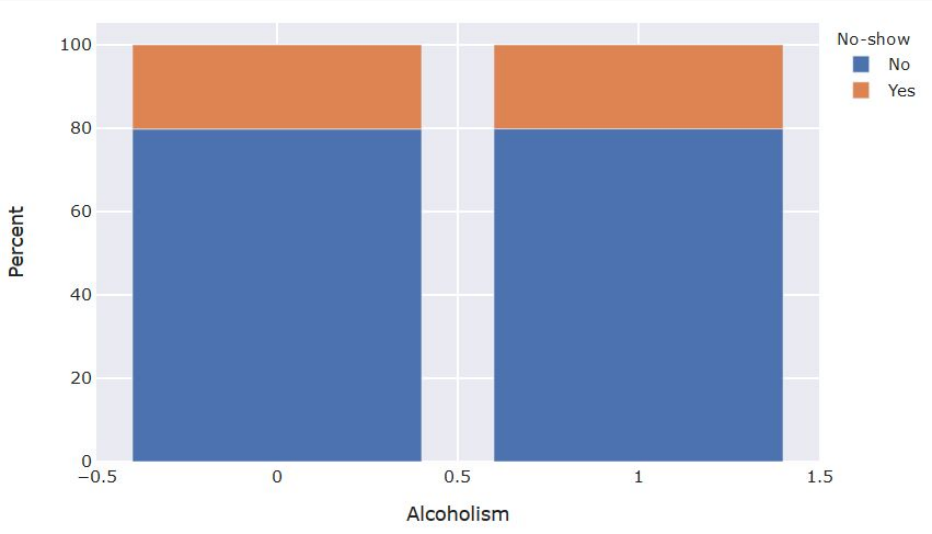


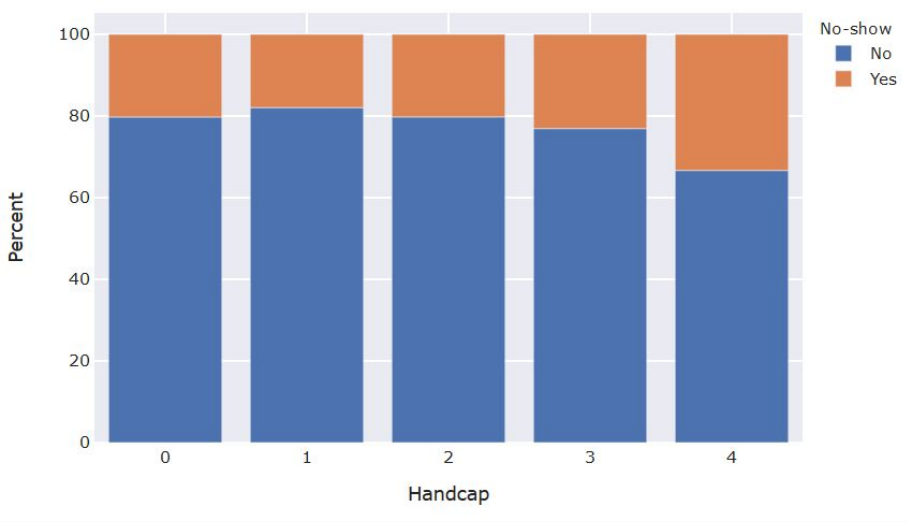


Slightly Higher Cancellation with higher Hipertension and higher Diabetes

Hospitalization Cancellation

Correlation b/w [Alcoholism/Handicap and Cancellation status]

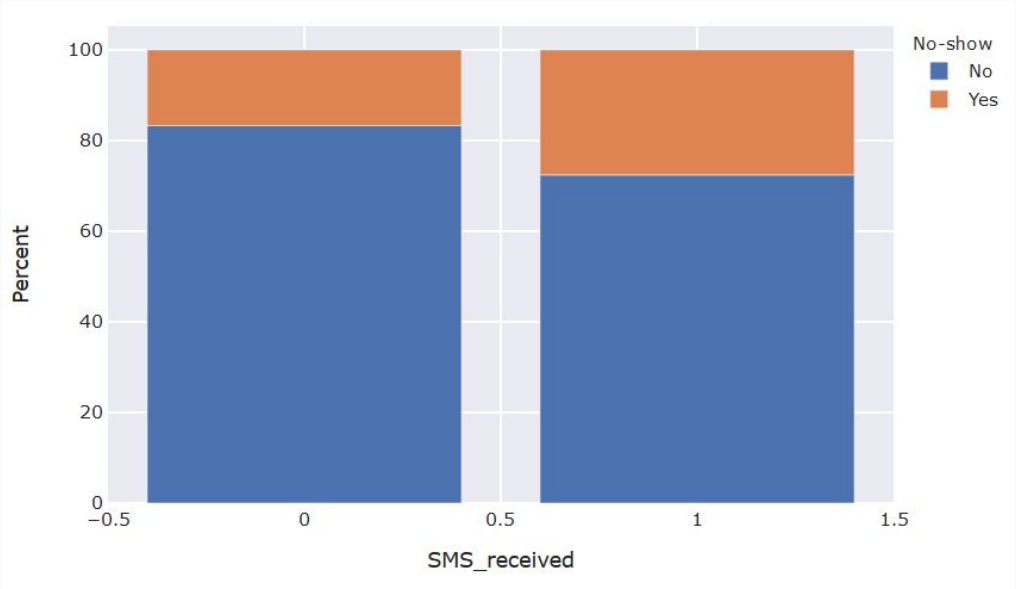




No Apparent influence of Alcoholism
Higher Cancellation chances with High level of handicap

Hospitalization Cancellation

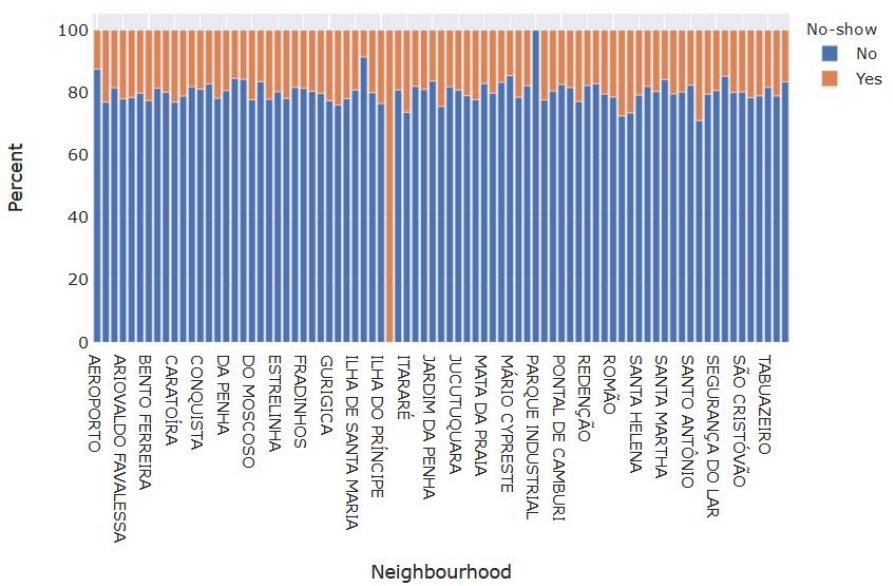
Correlation b/w [SMS and Cancellation status]

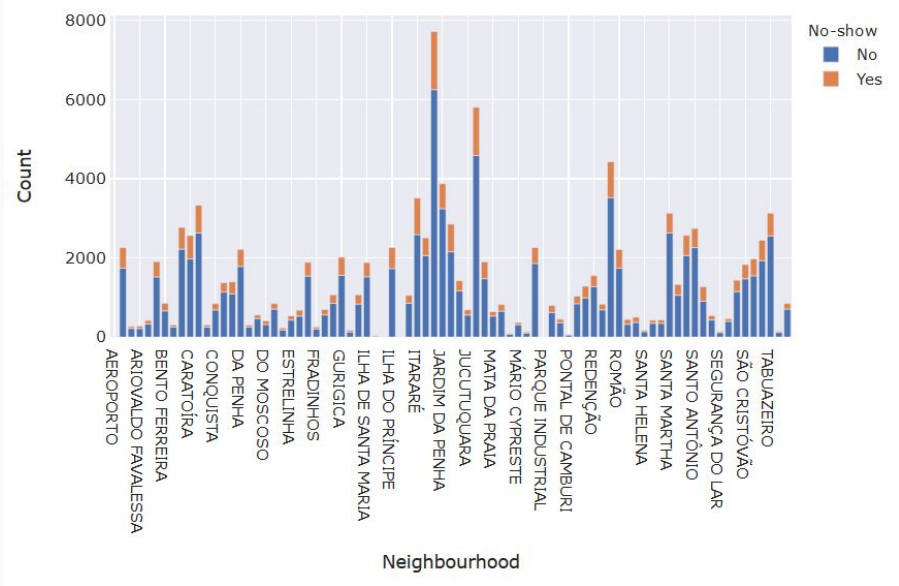


People who received SMS are more likely to cancel the appointment

Hospitalization Cancellation

Correlation b/w [Locality and Cancellation status]

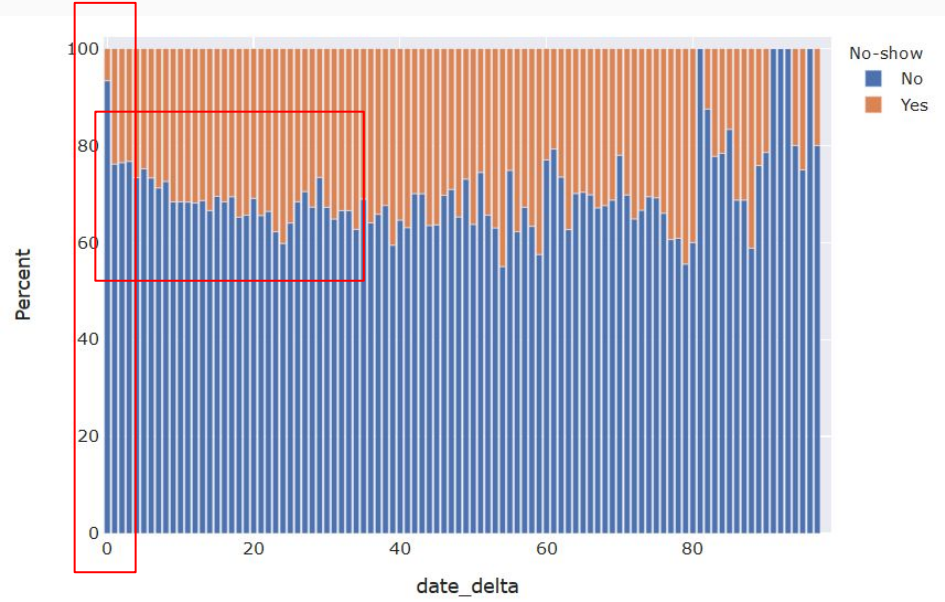


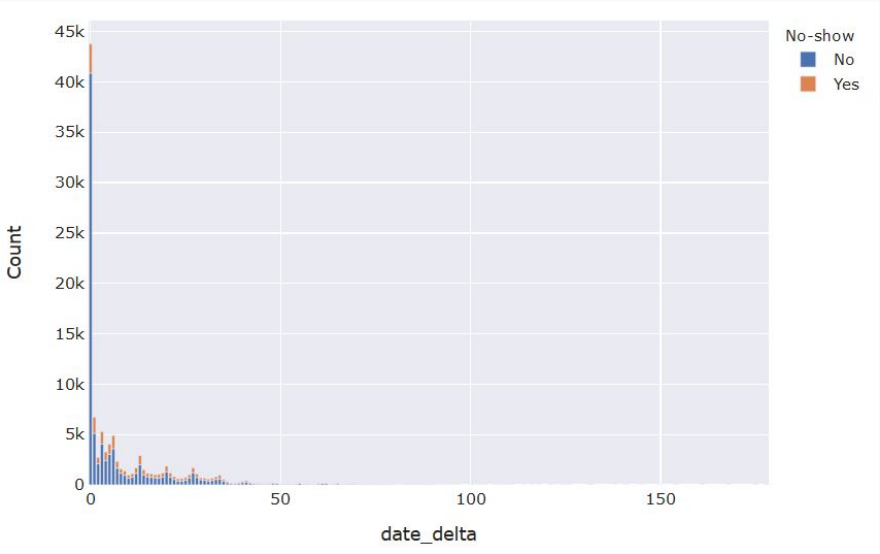


No Significant differences across different regions

Hospitalization Cancellation

Correlation b/w [Delay - gap b/w schedule and appointment date]

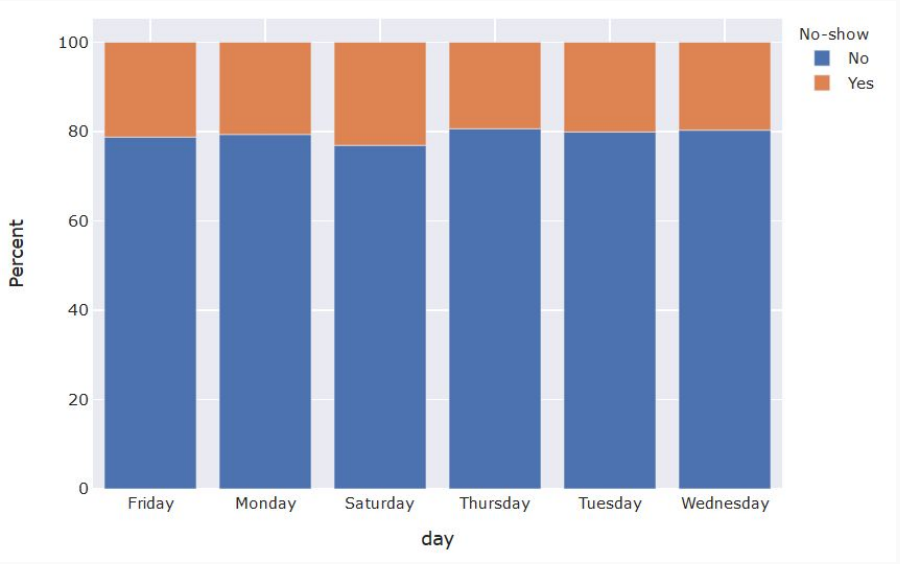


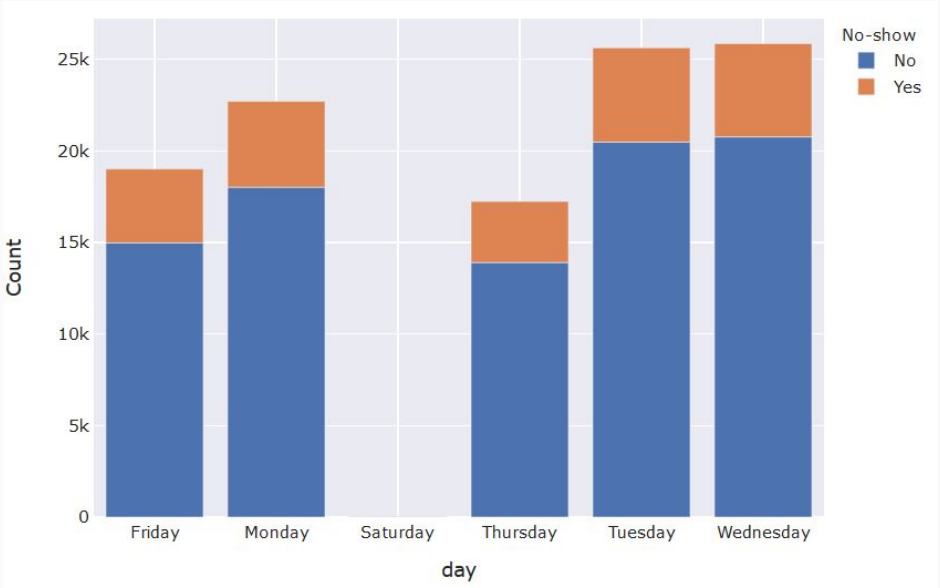


Those who register on the same day, don't cancel
With Higher date delays the chances of cancellation increases

Hospitalization Cancellation

Correlation b/w [Day and Cancellation status]

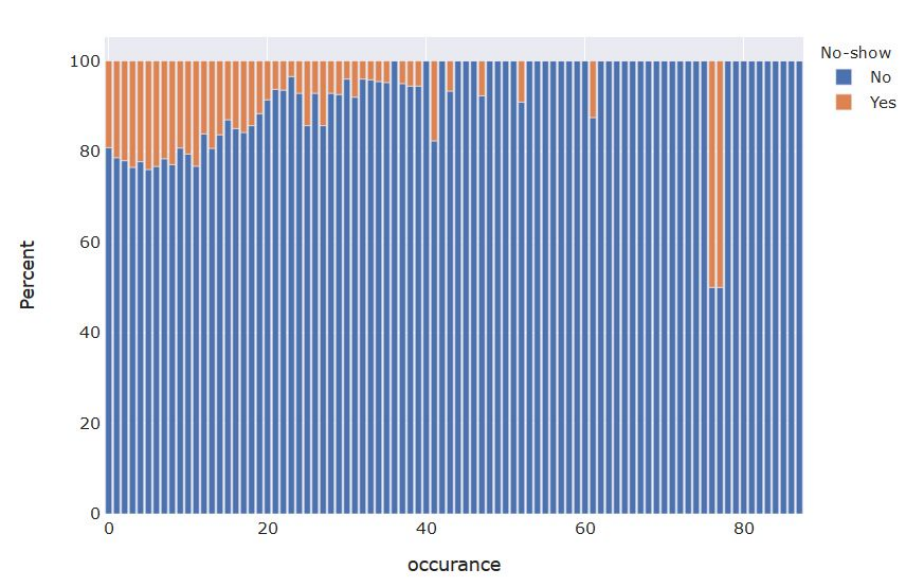


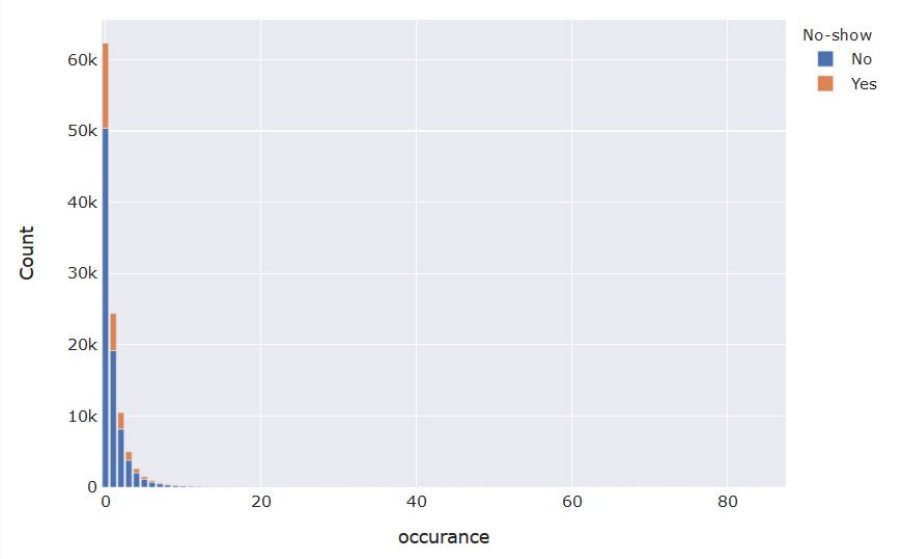


No particular correlation b/w day of week and cancellations

Hospitalization Cancellation

Correlation b/w [Frequent patient and Cancellation status]

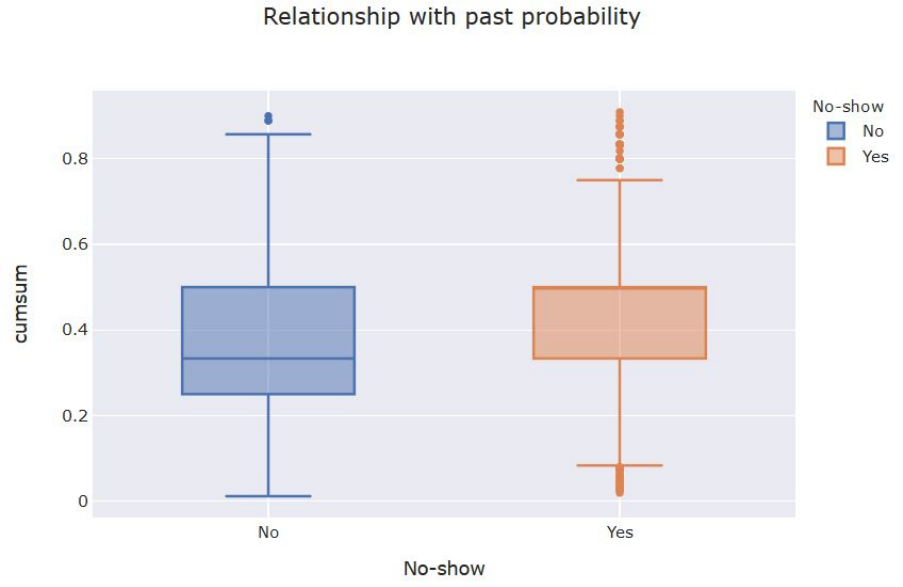




People who come more frequently are less likely to cancel the appointment

Hospitalization Cancellation

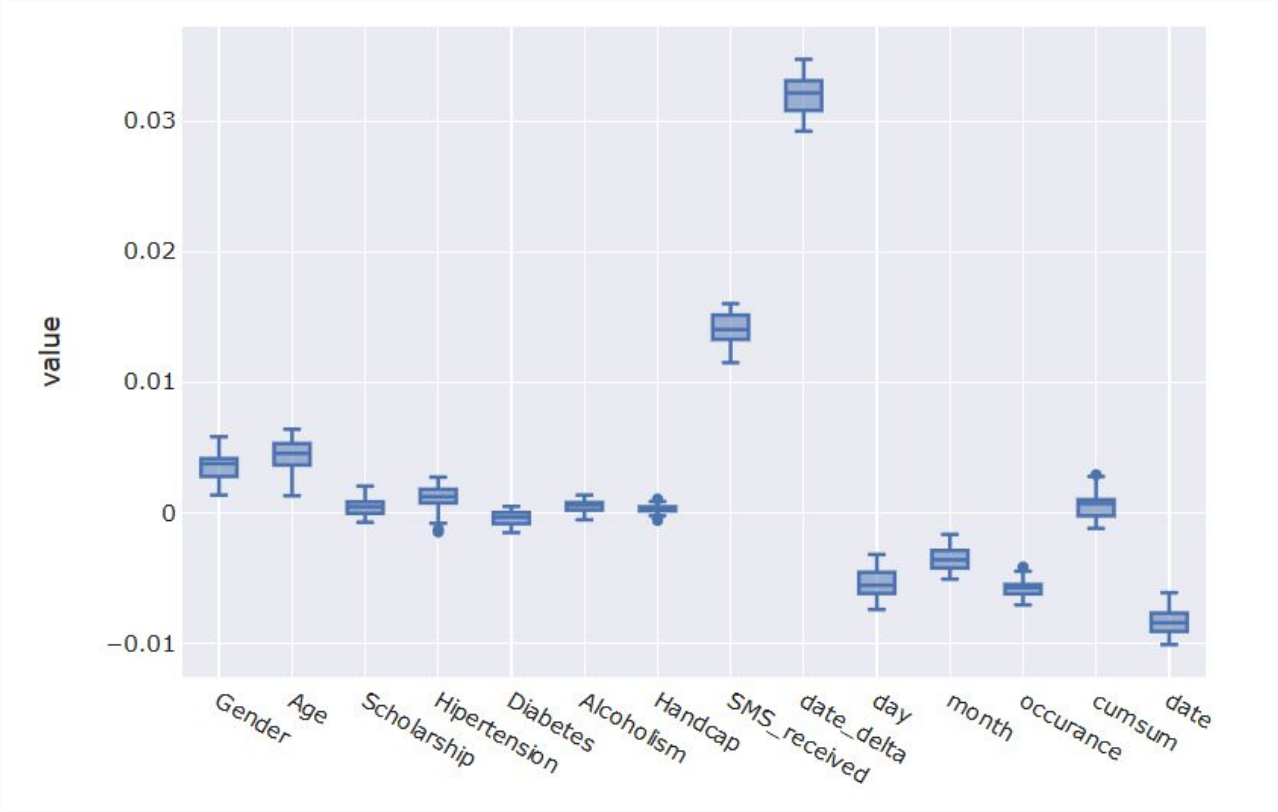
Correlation b/w [cumm. previous cancellation and Cancellation status]



People who come more frequently are less likely to cancel the appointment

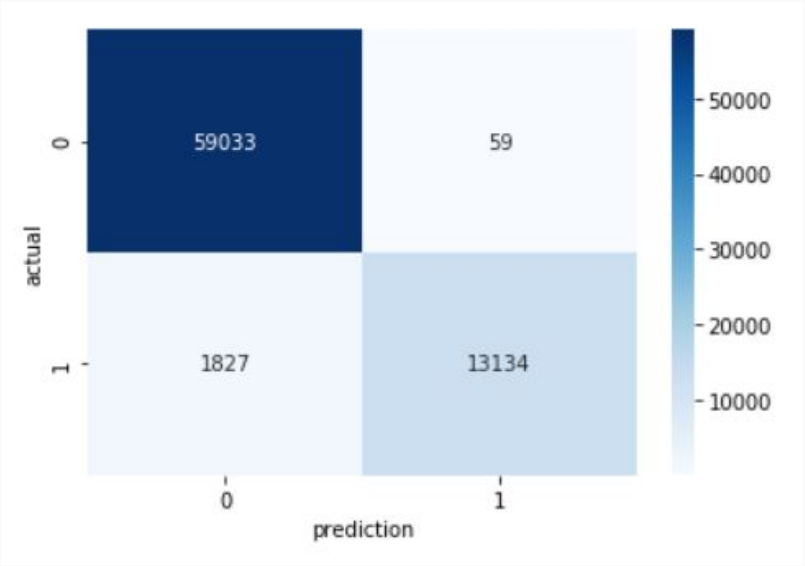
Hospitalization Cancellation

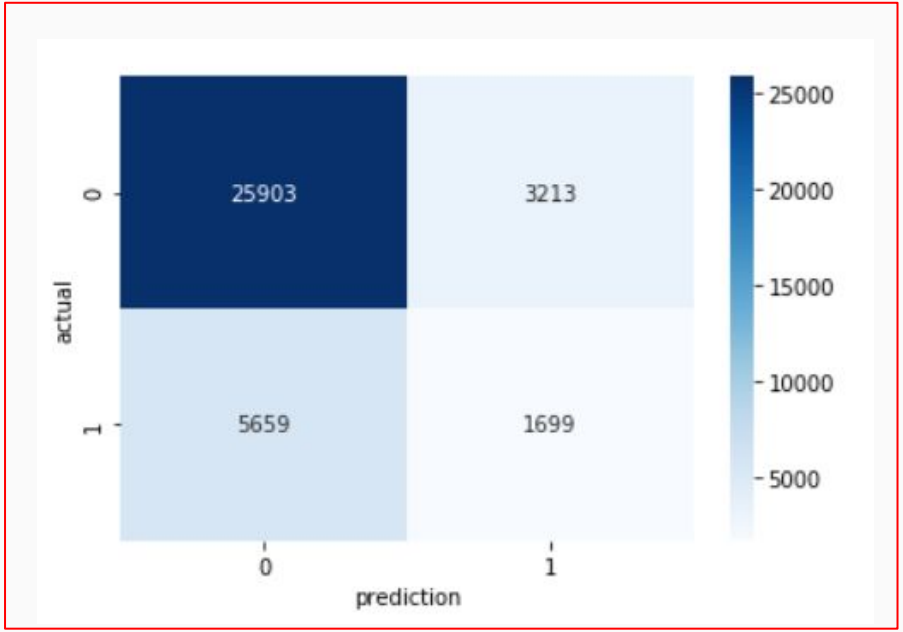
Feature Importance [Permutation Importance]



Hospitalization Cancellation

Machine Learning Model [Random Forrest]





Train Precision: 1.0, Test Recall: 0.88

Test Precision: 0.35, Test Recall: 0.23 [Model to be tuned further reducing Model Variance]

Approximately 23% of the Cancellations can be predicted with current model