2020 | 02

Length of Stay Forecast

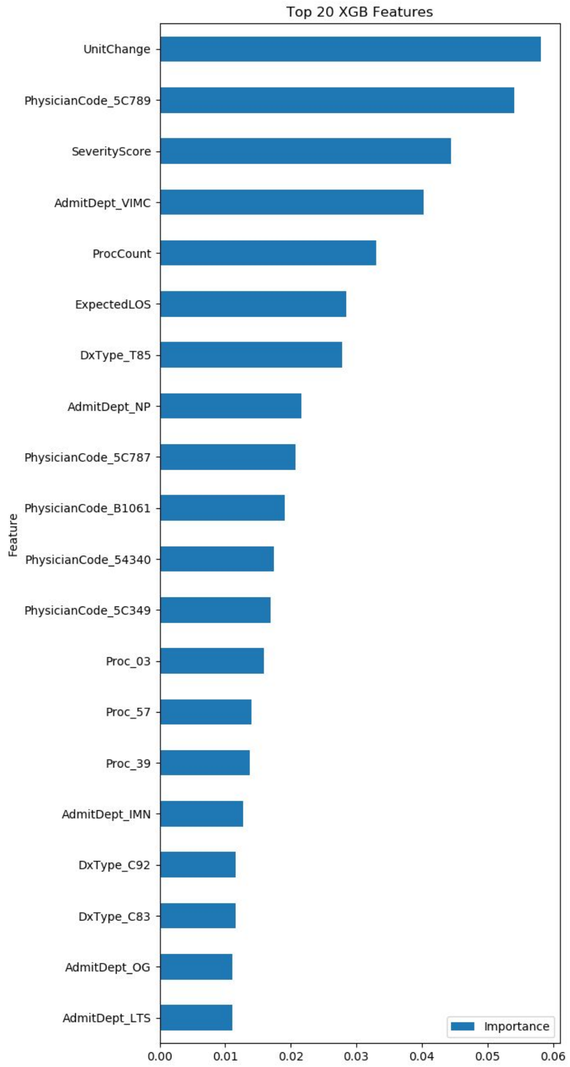
1 Overview

1. 병원의 data 중 입원환자에 대한 table
2. 총 48개 column 중 사용가능하고 관련성 있는 12개 column 선별
3. Categorical 변수 1000여 개 중 feature importance 기준 상위 변수 사용
4. 13개 Regression Model 중 RMSE 기준 가장 성능이 좋은 XGB 사용
5. 예측 결과를 기존 데이터와 합쳐 화면 제작
6. LOS 대시보드 제작 후 지속적으로 피드백 반영 중
7. Bed Occupancy 대시보드 제작 중

2 Selected Features

Selected Features	1차 처리	2차 처리	3차 처리
Admit Date Time	요일 one-hot	KNNImputer	StandardScaler
Admit Unit & Discharge Unit	unit 변경시 1		
Admit Department	one-hot		
Sex	one-hot		
Age			
Attending Physician Code	one-hot		
Discharge DRG Code	one-hot		
Expected LOS			
Principal Dx Code	one-hot		
Principal Proc Code	one-hot, 수술 횟수		
Severity of Illness Score	score 분리		

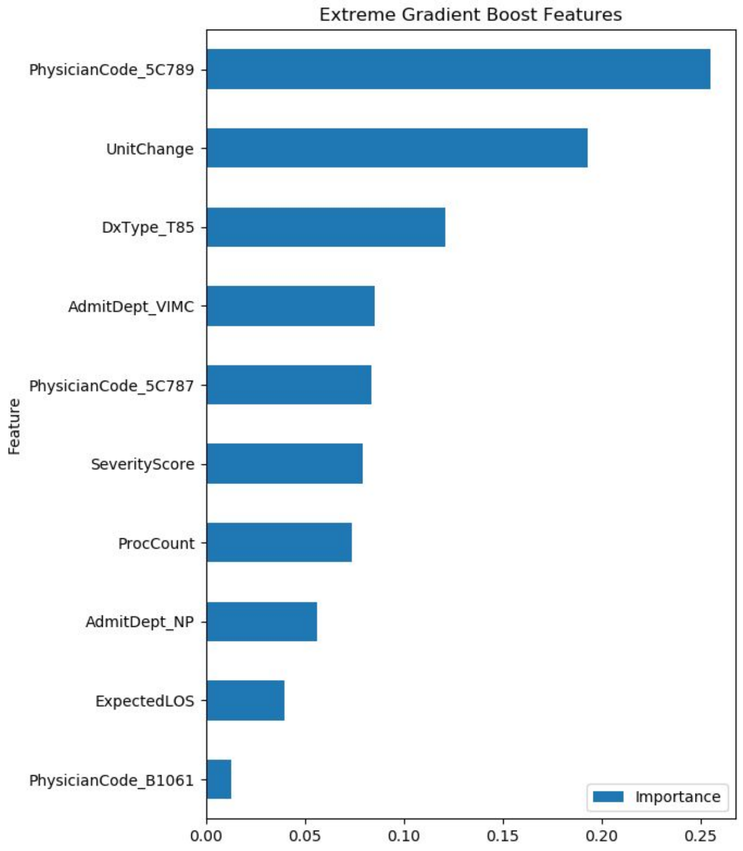
3 XGB Feature Importance(total 1000 features)



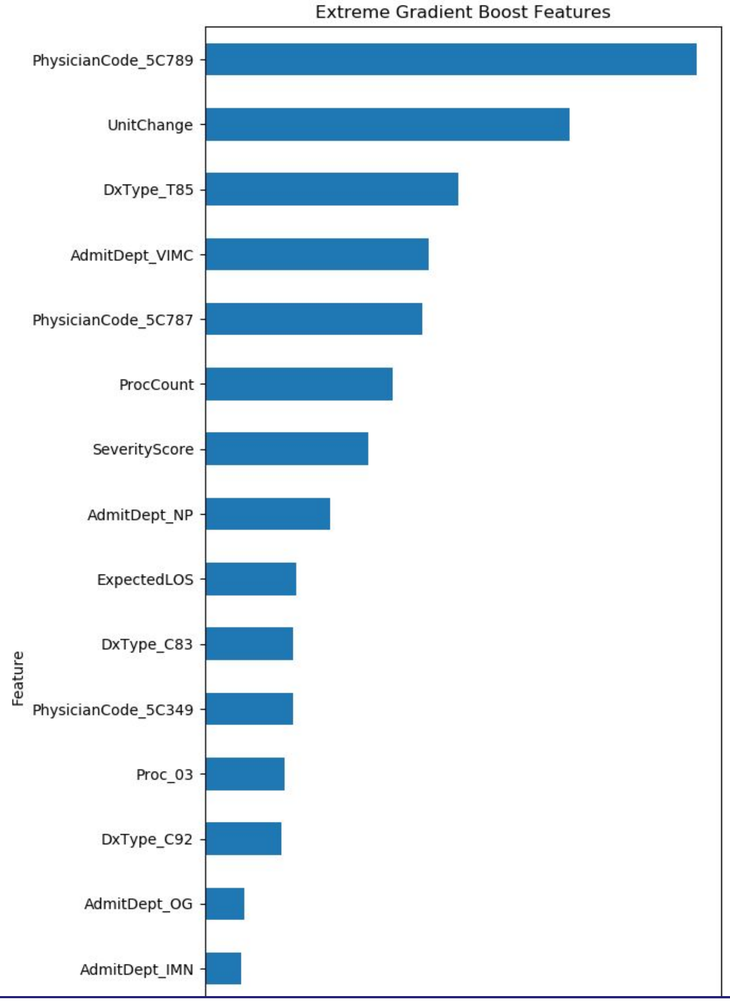
	Extreme GB	Extreme GB (10)	Extreme GB (20)	Extreme GB (50)	Extreme GB (100)
RMSE	5.702	6.176	5.998	5.655	5.656

4 Model Comparison

10개 feature

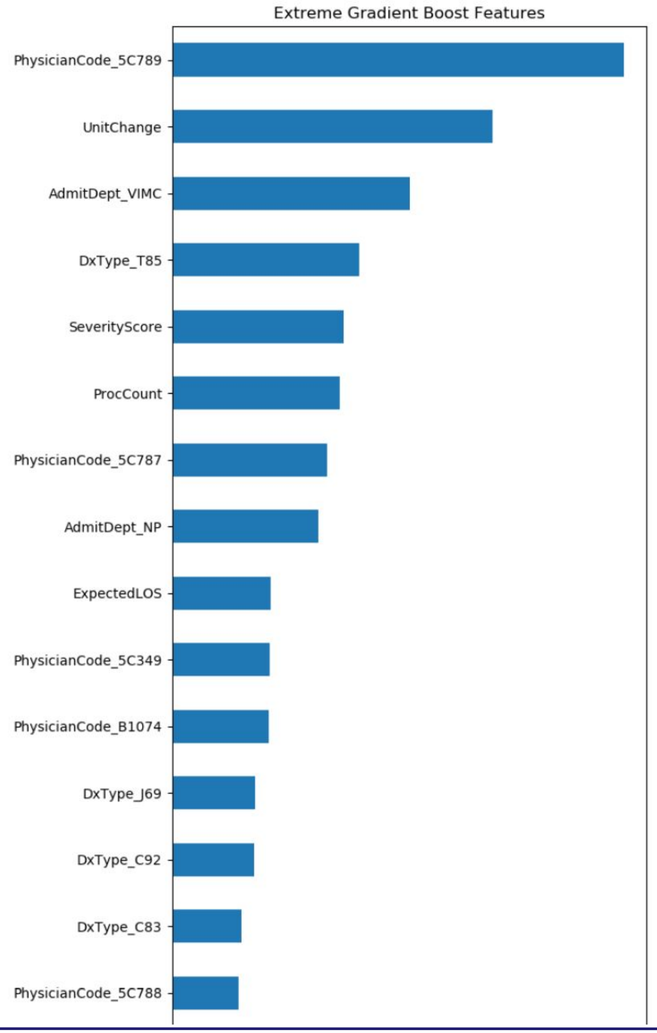


20개 feature

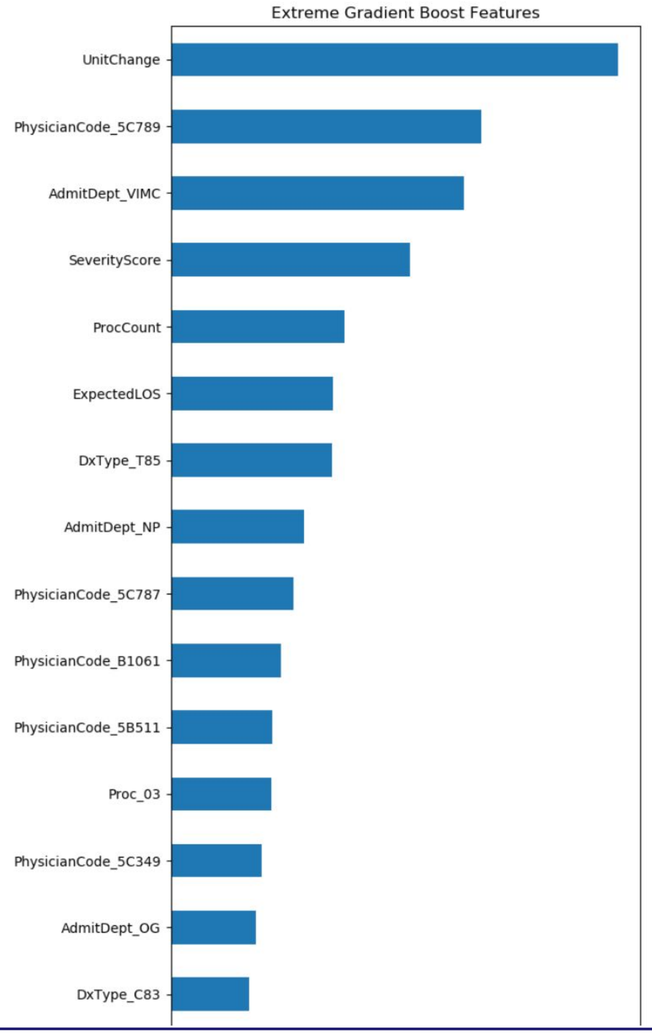


4 Model Comparison

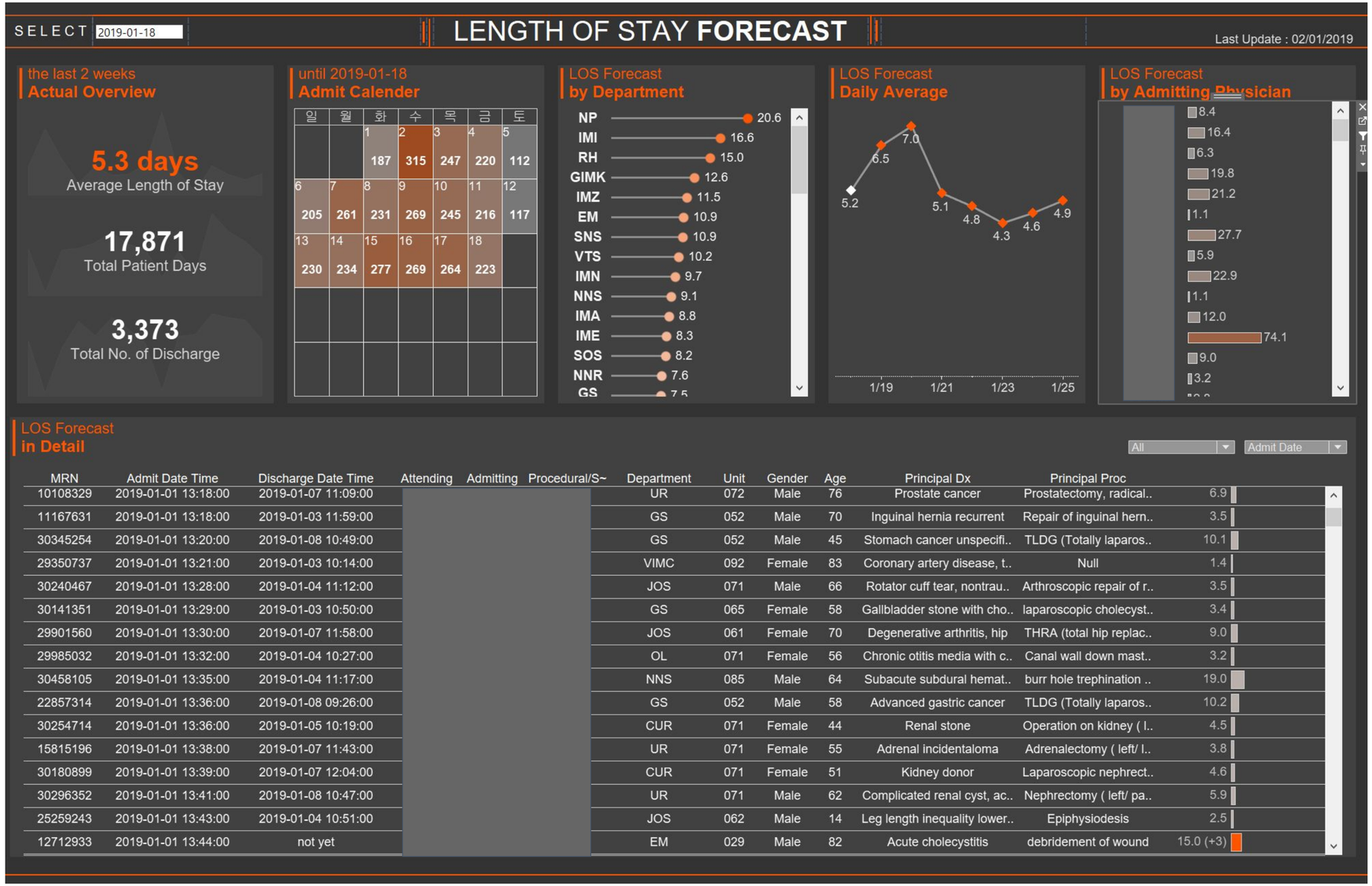
50개 feature



100개 feature



5 LOS Forecast Dashboard



6 Bed Occupancy Dashboard

Forecast - Occupancy

1-12H
13-24H

2019-01-16	Occ	Capacity	Wed 16 01:00	Wed 16 02:00	Wed 16 03:00	Wed 16 04:00	Wed 16 05:00	Wed 16 06:00	Wed 16 07:00	Wed 16 08:00	Wed 16 09:00	Wed 16 10:00	Wed 16 11:00	Wed 16 12:00
CIMH	139%	41	118% (122% / 115%)	118% (122% / 115%)	126% (129% / 122%)	128% (132% / 124%)	130% (134% / 127%)	130% (134% / 127%)	130% (134% / 127%)	133% (137% / 129%)	133% (137% / 129%)	133% (137% / 129%)	133% (137% / 129%)	130% (134% / 127%)
DDC	158%	45	81% (100% / 62%)	90% (109% / 71%)	93% (113% / 73%)	109% (131% / 87%)	111% (133% / 89%)	119% (142% / 96%)	121% (144% / 98%)	122% (147% / 98%)	122% (147% / 98%)	116% (138% / 93%)	99% (116% / 82%)	98% (111% / 84%)
EM	275%	4	225% (225% / 225%)	225% (225% / 225%)	225% (225% / 225%)	225% (225% / 225%)	225% (225% / 225%)	225% (225% / 225%)	250% (250% / 250%)	250% (250% / 250%)	250% (250% / 250%)	250% (250% / 250%)	250% (250% / 250%)	275% (275% / 275%)
IMN	79%	38	62% (66% / 58%)	62% (66% / 58%)	64% (68% / 61%)	72% (76% / 68%)	75% (79% / 71%)	72% (76% / 68%)	72% (76% / 68%)	72% (76% / 68%)	71% (76% / 66%)	68% (74% / 63%)	63% (68% / 58%)	63% (68% / 58%)
IMZ	146%	46	109% (117% / 100%)	109% (117% / 100%)	104% (113% / 96%)	105% (115% / 96%)	105% (115% / 96%)	105% (115% / 96%)	105% (115% / 96%)	105% (115% / 96%)	105% (115% / 96%)	103% (113% / 93%)	99% (109% / 89%)	110% (117% / 102%)
LIMR	73%	26	70% (73% / 67%)	69% (73% / 64%)	69% (73% / 64%)	69% (73% / 64%)	69% (73% / 64%)	67% (70% / 64%)	67% (70% / 64%)	67% (70% / 64%)	67% (70% / 64%)	69% (73% / 64%)	56% (58% / 54%)	57% (58% / 56%)
LTS	107%	42	85% (86% / 83%)	87% (88% / 86%)	94% (95% / 93%)	94% (95% / 93%)	96% (98% / 95%)	99% (100% / 98%)	96% (98% / 95%)	96% (98% / 95%)	96% (98% / 95%)	92% (93% / 90%)	82% (83% / 81%)	80% (81% / 79%)
NNS	162%	13	154% (154% / 154%)	154% (154% / 154%)	154% (154% / 154%)	154% (154% / 154%)	154% (154% / 154%)	154% (154% / 154%)	154% (154% / 154%)	154% (154% / 154%)	154% (154% / 154%)	154% (154% / 154%)	154% (154% / 154%)	146% (146% / 146%)
OL									0% (0% / 0%)	0% (0% / 0%)	0% (0% / 0%)	0% (0% / 0%)	0% (0% / 0%)	0% (0% / 0%)
RH	40%	47	28% (30% / 26%)	28% (30% / 26%)	28% (30% / 26%)	30% (32% / 28%)	30% (32% / 28%)	32% (34% / 30%)	32% (34% / 30%)	31% (34% / 28%)	31% (34% / 28%)	30% (32% / 28%)	28% (32% / 23%)	27% (30% / 23%)
VIMC	178%	9	122% (144% / 100%)	122% (144% / 100%)	133% (156% / 111%)	133% (156% / 111%)	133% (156% / 111%)	133% (156% / 111%)	133% (156% / 111%)	139% (167% / 111%)	139% (167% / 111%)	139% (167% / 111%)	128% (156% / 100%)	122% (144% / 100%)
VTS	22%	18	19% (22% / 17%)	19% (22% / 17%)	19% (22% / 17%)	19% (22% / 17%)	19% (22% / 17%)	19% (22% / 17%)	19% (22% / 17%)	19% (22% / 17%)	19% (22% / 17%)	14% (17% / 11%)	14% (17% / 11%)	14% (17% / 11%)