

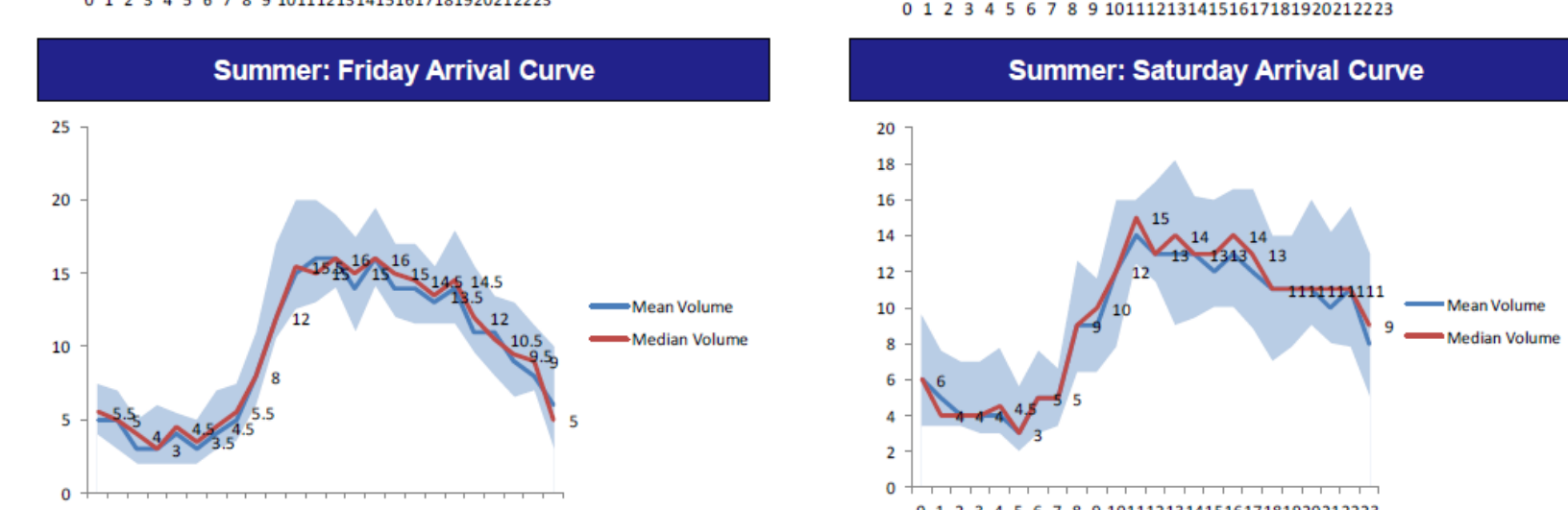
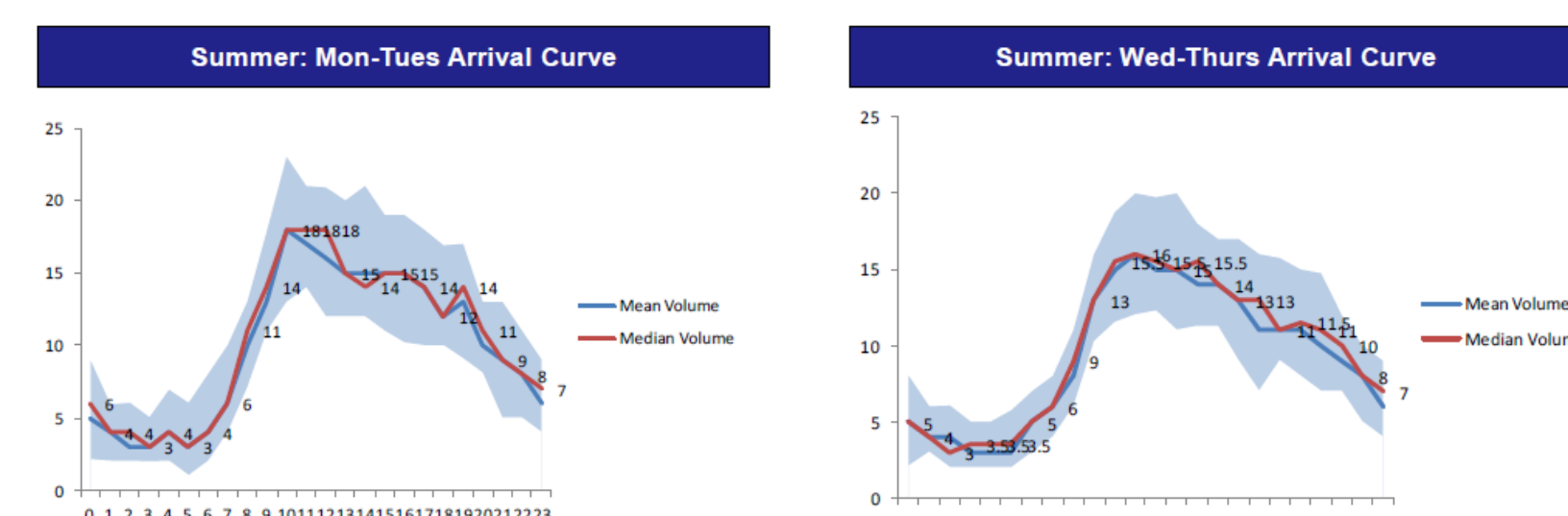
# Real-Time Patient Volume Predictor Instrument

for real-time clinical operation decision making and staffing



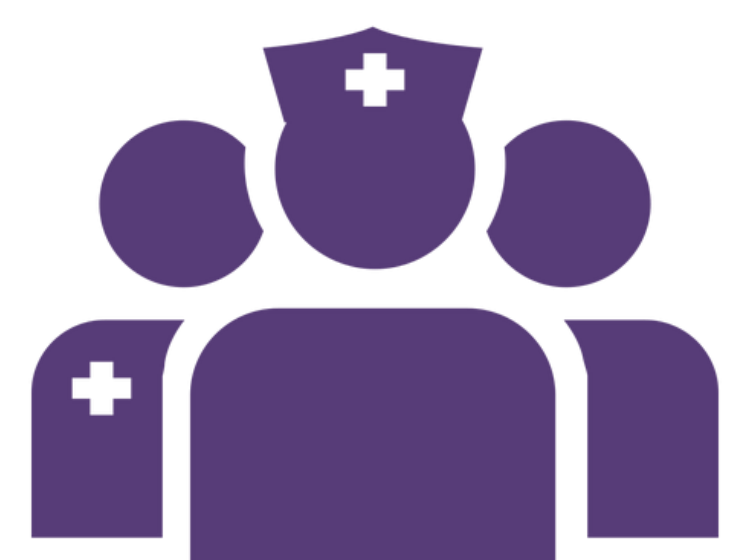
## What are our goals?

Patient arrivals are **predictable**



Summer Months: May- August (FY 2012). Note: Upper & Lower volume threshold represents 95th percentile and 5th percentile respectively

**Predicting** arrivals allows managers to optimally **match resources to patients**

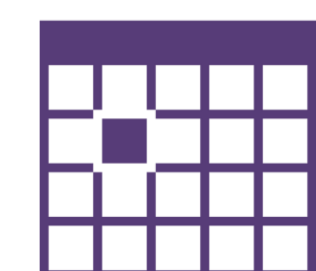


## What data did we use?

Independent variables included in the model were screened and selected by consulting with clinical experts, literature research, and data exploration:



**Hourly volume** (continuous)



**Day of week** (flagged)



**Month of year** (flagged)

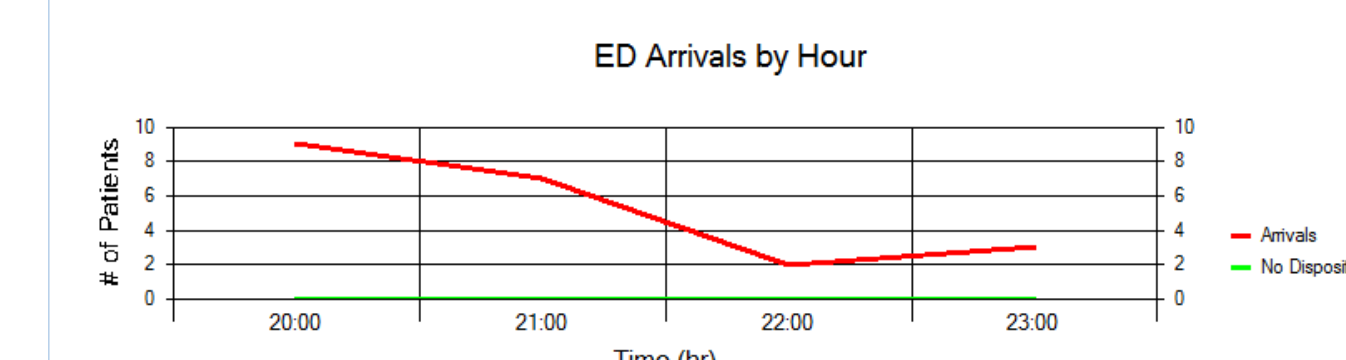


**Holidays** (flagged)

## How did we build this?

Hourly Arrival Count from the EMR

ED Arrivals by Hour			
For: ED Tracking Group		Printed At: 03/05/15 11:00	
Location: ED All Beds		Printed By: Gordon, Brandon	
From: 03/04/15 20:00 To: 03/05/15 00:00		Total Patients = 37	
Start Interval	End Interval	Arrival Count	Disposition Count
03/04/15 20:00	03/04/15 21:00	4	0
03/04/15 21:00	03/04/15 22:00	5	0
03/04/15 22:00	03/04/15 23:00	6	0
03/04/15 23:00	03/05/15 00:00	3	0
Patients who Qualify = 21		No Discharge Disposition Selected	
		Selected	



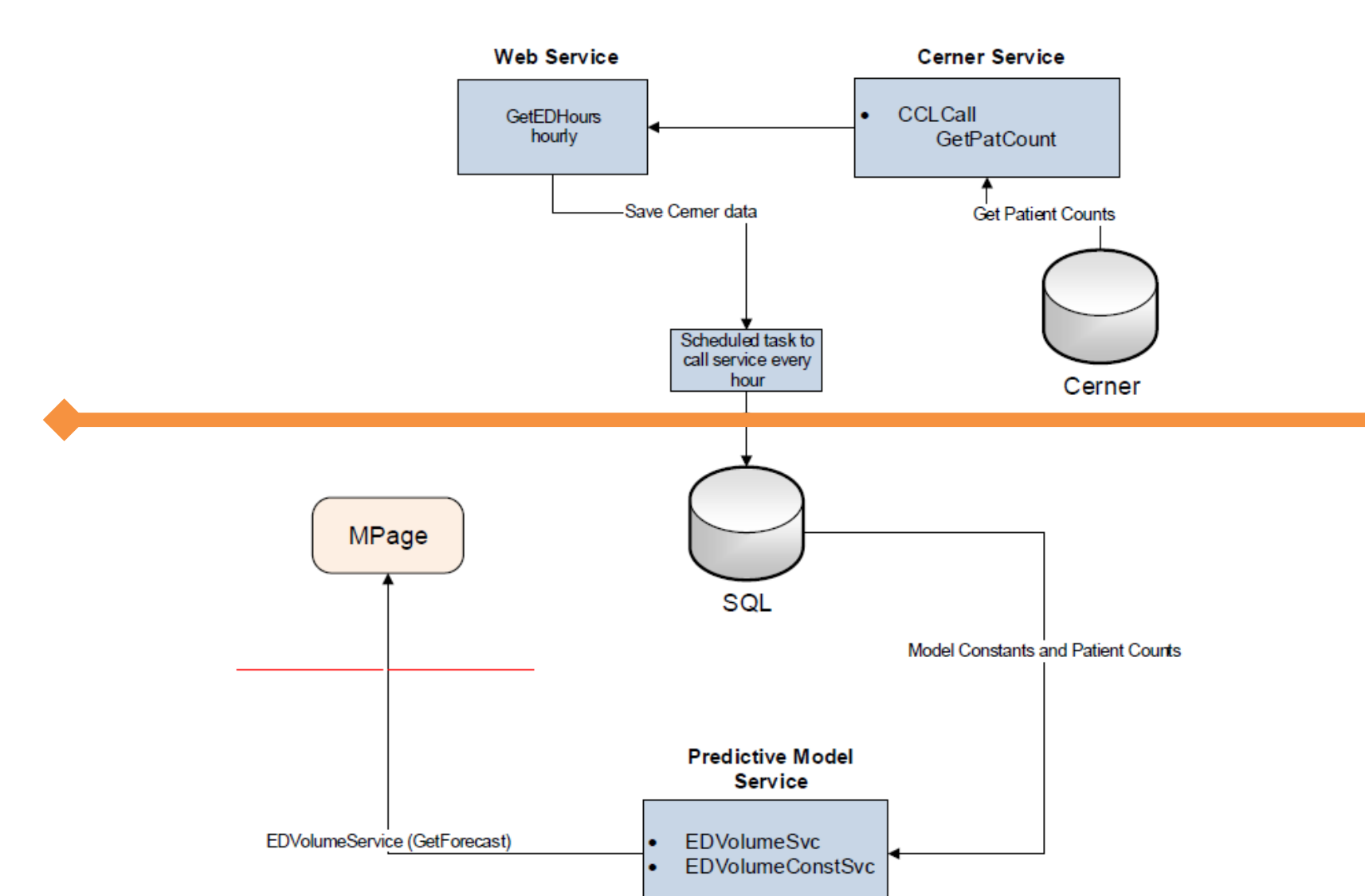
Initial Mockup

Hour	Census	Predictions for 3/5/2015
Hour 0	4	
Hour 1	5	
Hour 2	6	2 AM Prediction: 227
Hour 3	3	
Hour 4	2	
Hour 5	2	
Hour 6	5	6 AM Prediction: 225
Hour 7	4	
Hour 8	2	
Hour 9	8	
Hour 10	5	10 AM Prediction: 200
Hour 11	9	
Hour 12	3	
Hour 13	9	
Hour 14	7	2 PM Prediction: 169

## How did we integrate to EMR?

**Backend Service Process**

Hourly data gather and storage

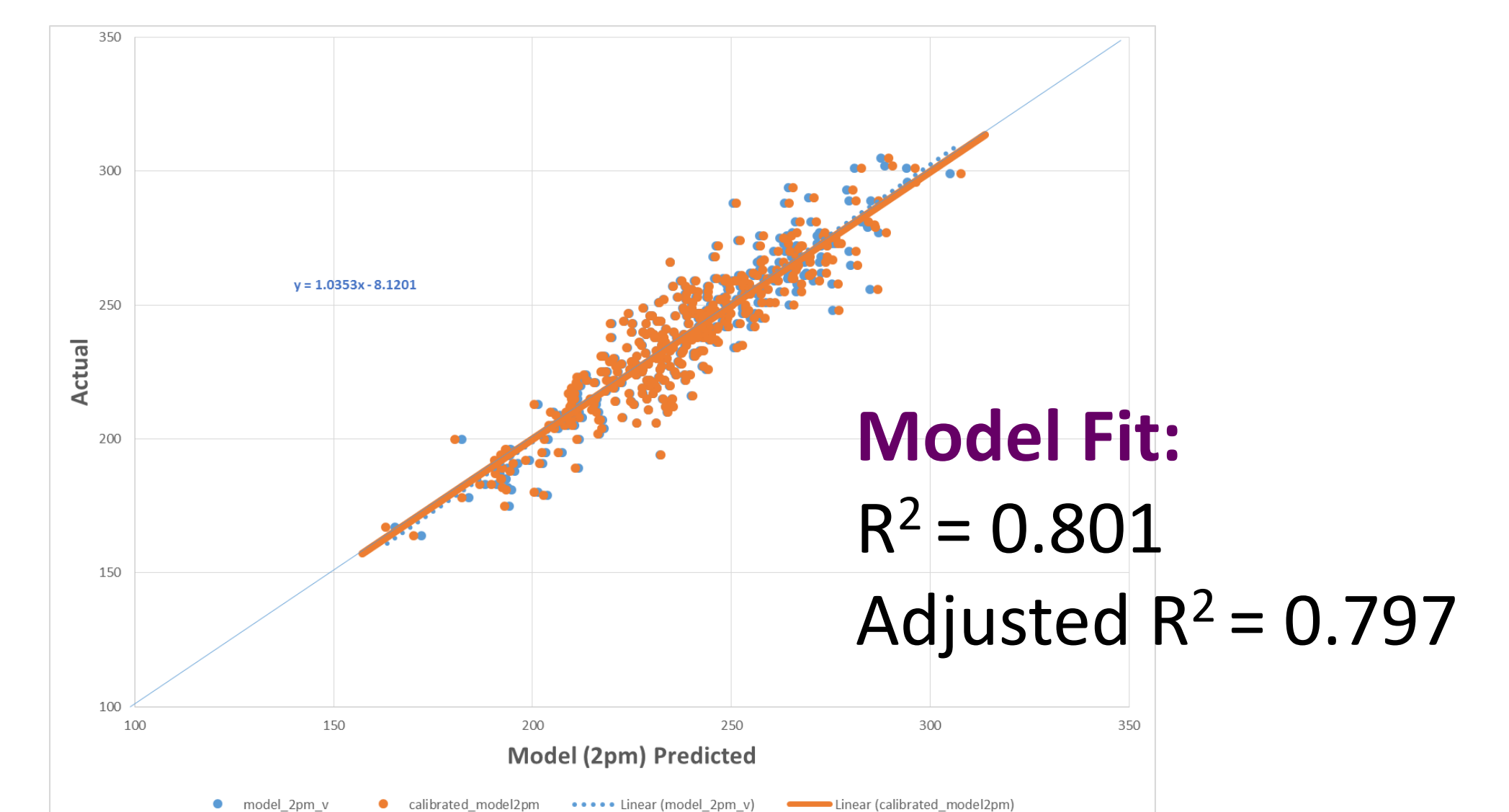


**Frontend Service Process**

On demand data retrieval & calculation of model value on web page launch

## How do we define success?

Multivariate linear regression was used to predict ED daily volumes



Prediction	90% CI	95% CI	99% CI
3pm	+/- 13	+/- 17	+/- 21
11am	+/- 16	+/- 22	+/- 27
7am	+/- 20	+/- 27	+/- 33
3am	+/- 21	+/- 29	+/- 34

The linear regression prediction model became more **powerful and accurate** throughout the day, with **97% of 3p** predictions falling **within 10%** of the actual daily volume.

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This technology (algorithm / process) is Patent Pending, # 62/293,243