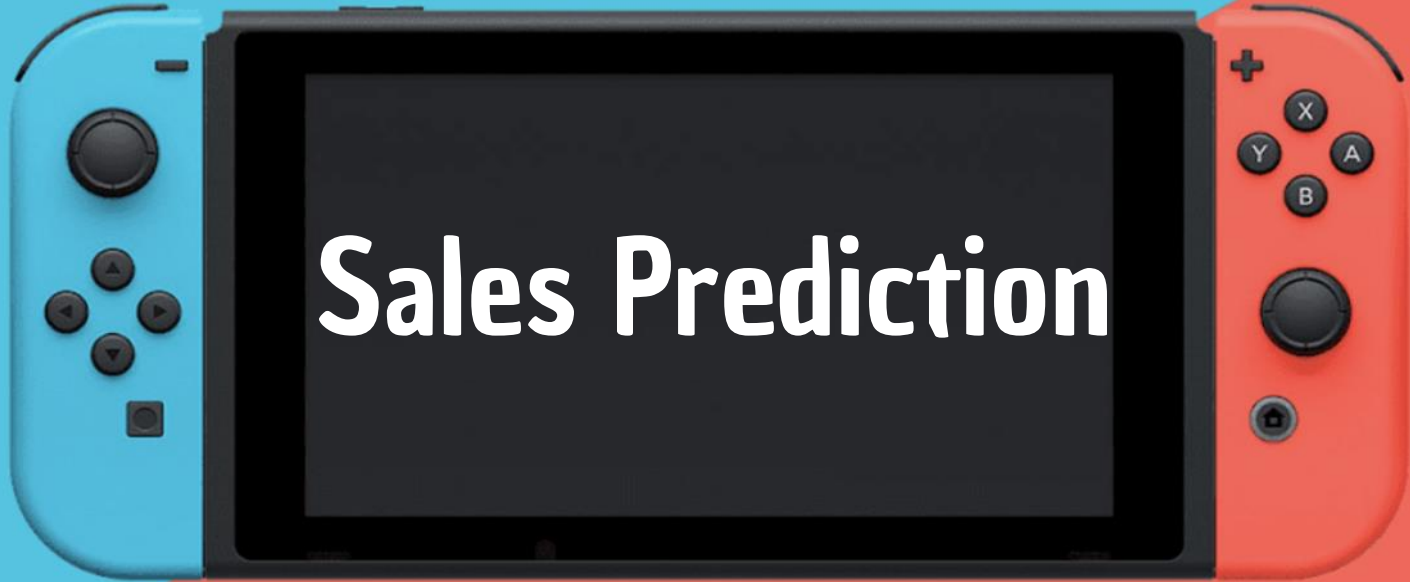


Nintendo Switch



Team 6 Xinbei Jin | Sichun Li | Ze Long | Hongyuan Zhu

A grayscale background image of a hand holding a tablet. The tablet screen shows a news article with a photo of a woman and the headline 'Woman's Fashion Style'. The article text is partially visible, mentioning 'The woman, 40, is a fashion designer'. The background is dark and out of focus.

1

Data
Exploration

2

Predictive
Analysis

3

Model
Performance

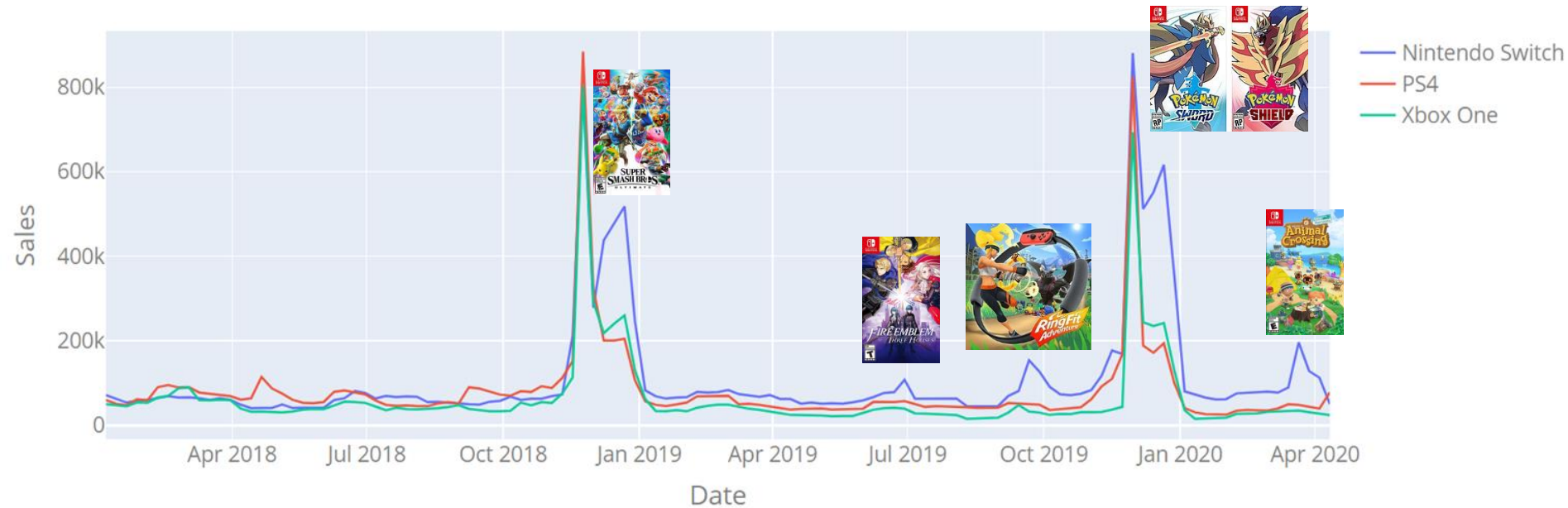
4

Result
Interpretation

Data Exploration



Weekly sales in the US (Jan 1/2018 - Apr 11/2020)



Strong time pattern: Black Friday and Christmas
Release of popular game series

Total sales in the US (Jan 1/2018 - Apr 11/2020)



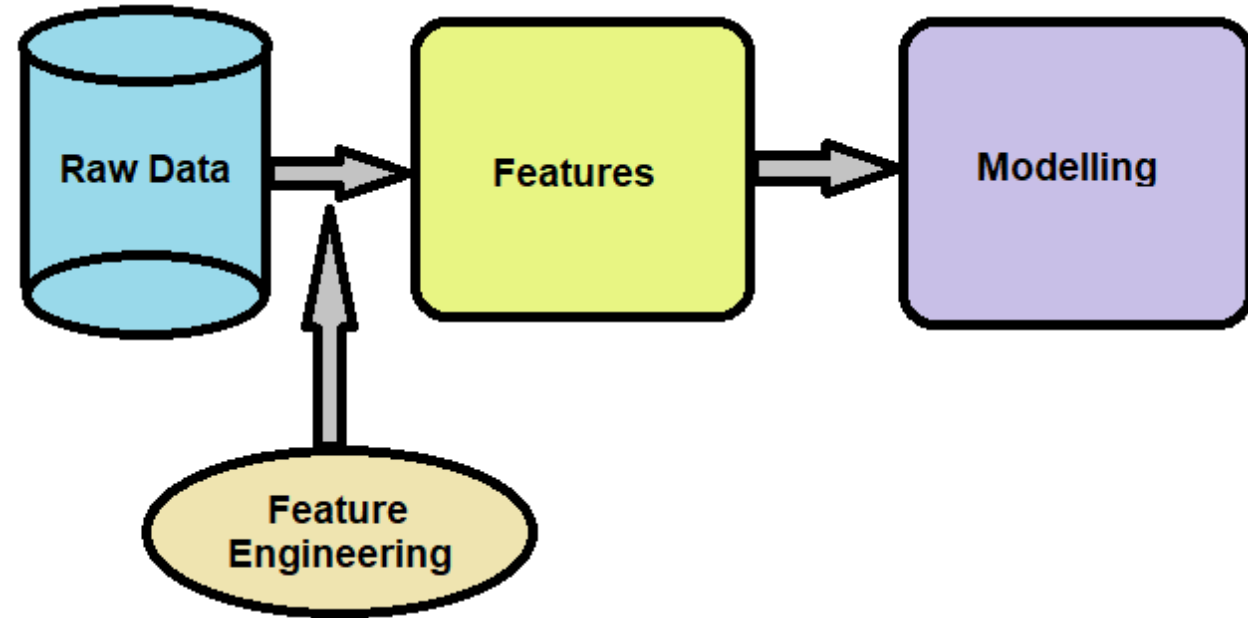
Nintendo Switch outsold PS4 in the end of 2018 in the US



Predictive Analysis

Machine Learning

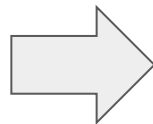
Feature Engineering



Modify the raw data to make them capable of being used by most predictive algorithms

Feature Engineering

	Date	Nintendo Switch Sales	PS4 Sales	Xbox One Sales
0	1/6/2018	71528	59920	49805
1	1/13/2018	62374	50554	46845
2	1/20/2018	53734	47961	44867
3	1/27/2018	58457	61473	54336
4	2/3/2018	59834	58728	53374
5	2/10/2018	64734	90141	65513
6	2/17/2018	68945	95263	69587
7	2/24/2018	65708	89512	87417

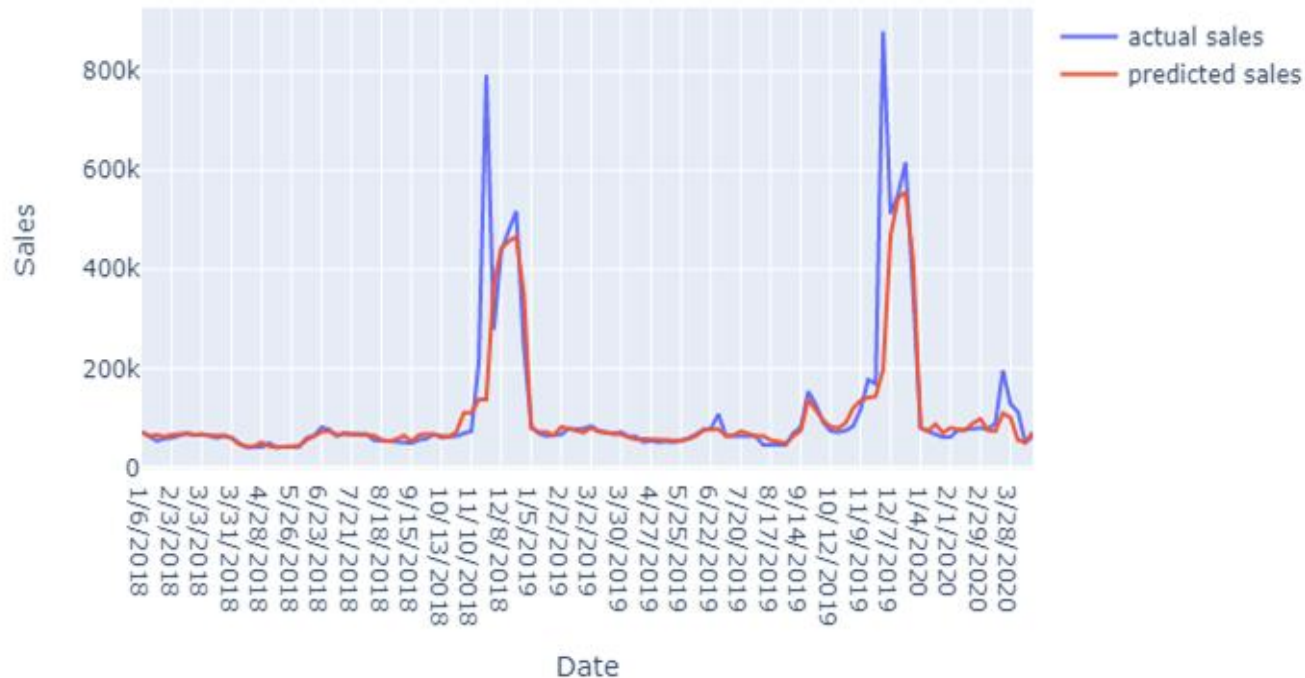


	year	month	week	day	Nintendo Switch Sales
0	2018	1	1	6	71528
1	2018	1	2	13	62374
2	2018	1	3	20	53734
3	2018	1	4	27	58457
4	2018	2	5	3	59834
5	2018	2	6	10	64734
6	2018	2	7	17	68945
7	2018	2	8	24	65708

Extract year, month, week, day from original date variable
Drop useless variables

Modeling - Random Forest

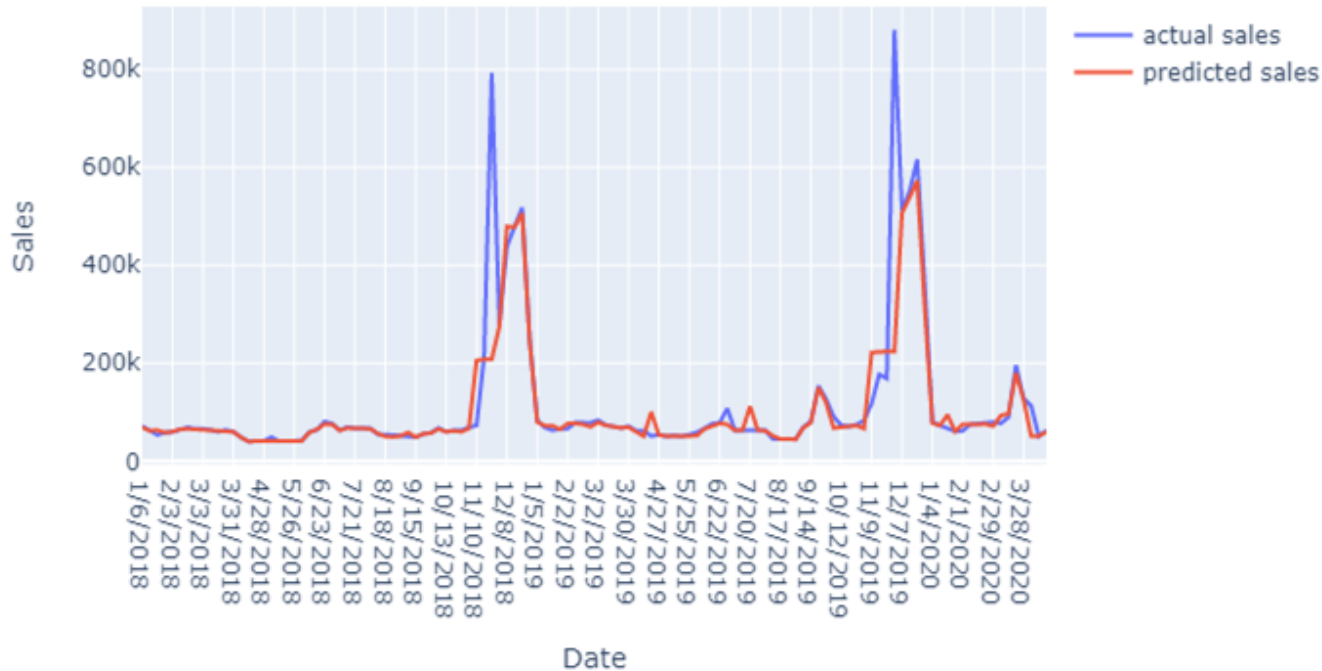
Random Forest Prediction



- ★ Ensemble Method
- ★ Robustness
- ★ Ease of Use

Modeling - Extreme Gradient Boosting (XGB)

XGB Prediction



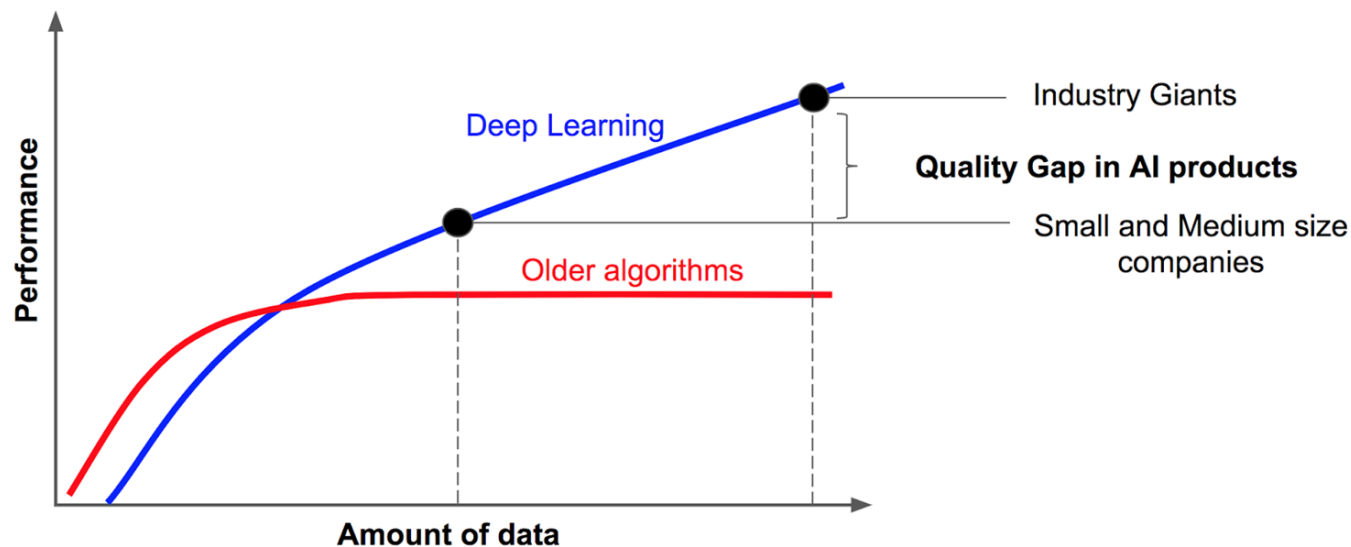
- ★ Fast to Train
- ★ Widely Used
- ★ High Performance



Predictive Analysis

Deep Learning

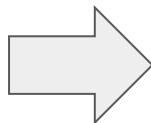
Why Deep Learning



Simulate biological neural networks
Often achieve higher performance in industrial or big data

Feature Engineering

	Date	Nintendo Switch Sales	PS4 Sales	Xbox One Sales
0	1/6/2018	71528	59920	49805
1	1/13/2018	62374	50554	46845
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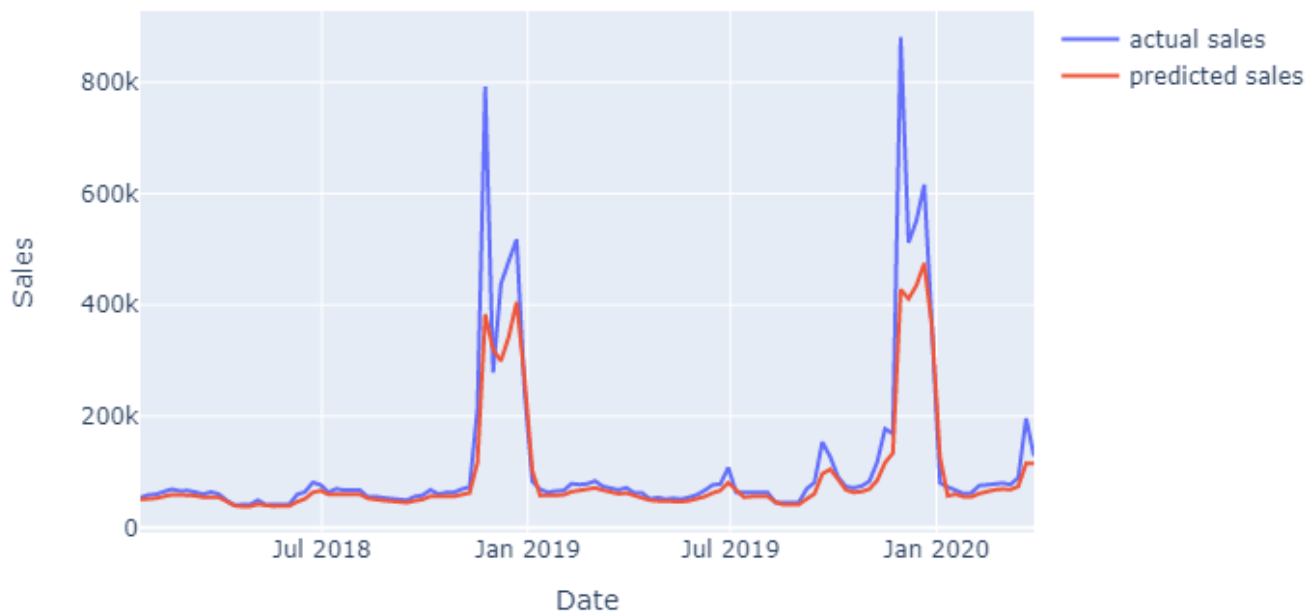


	Nintendo Switch Sales(t-2)	Nintendo Switch Sales(t-1)	Nintendo Switch Sales(t)	Nintendo Switch Sales(t+16)
2	71528.0	62374.0	53734	40765.0
3	62374.0	53734.0	58457	41626.0
4	53734.0	58457.0	59834	42223.0
5	58457.0	59834.0	64734	41793.0
6	59834.0	64734.0	68945	59457.0
7	64734.0	68945.0	65708	64099.0
8	68945.0	65708.0	66374	80980.0
9	65708.0	66374.0	63748	76685.0
10	66374.0	63748.0	59834	63339.0
11	63748.0	59834.0	63831	69671.0

Use current (t) and previous 2 days' (t-1, t-2) data to forecast sales in 16 days

Modeling - Multilayer Perceptron (MLP)

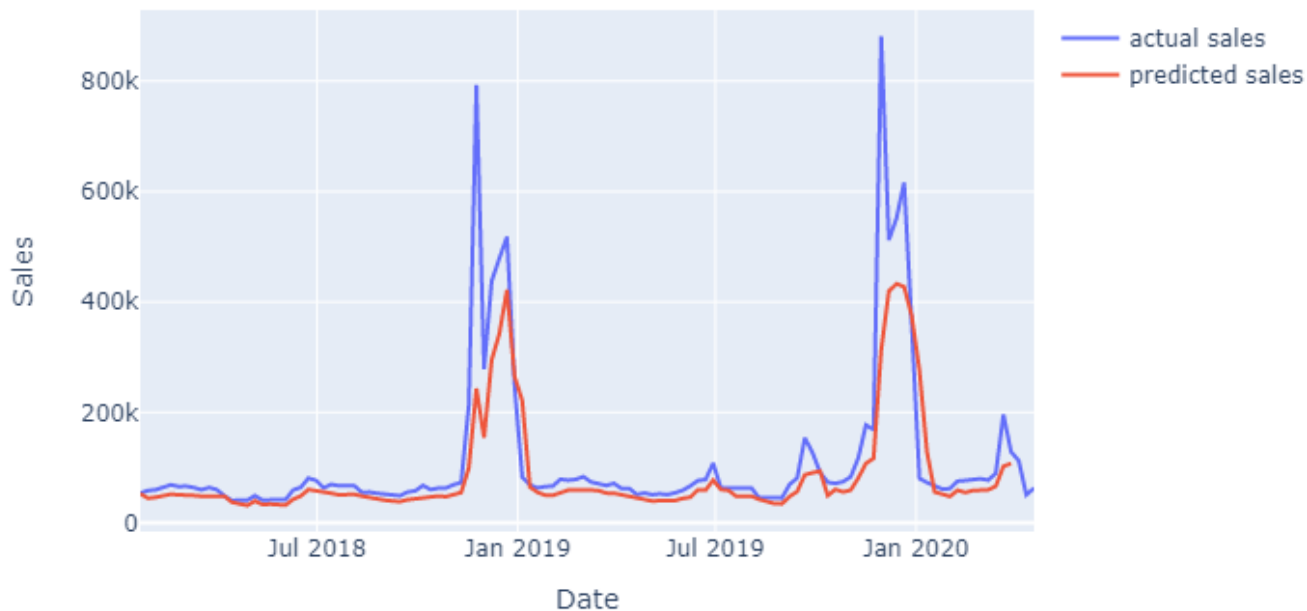
MLP Prediction



- ★ Basic Neural Network
- ★ Commonly used for regression
- ★ Easy to build and use

Modeling - Long Short-Term Memory (LSTM)

LSTM Prediction





- ★ Special kind of recurrent neural network
- ★ Good at dealing with time series data
- ★ Works well over a broad range of parameters

Model Performance



Sensitivity Analysis Based on MAE

	Random Forest	XGB	MLP	LSTM
MAE	47193	52083	64821	61376
			get reciprocal and normalize	
Weights	0.29	0.27	0.21	0.23
		 times		
Prediction	51410	51552	57487	64076



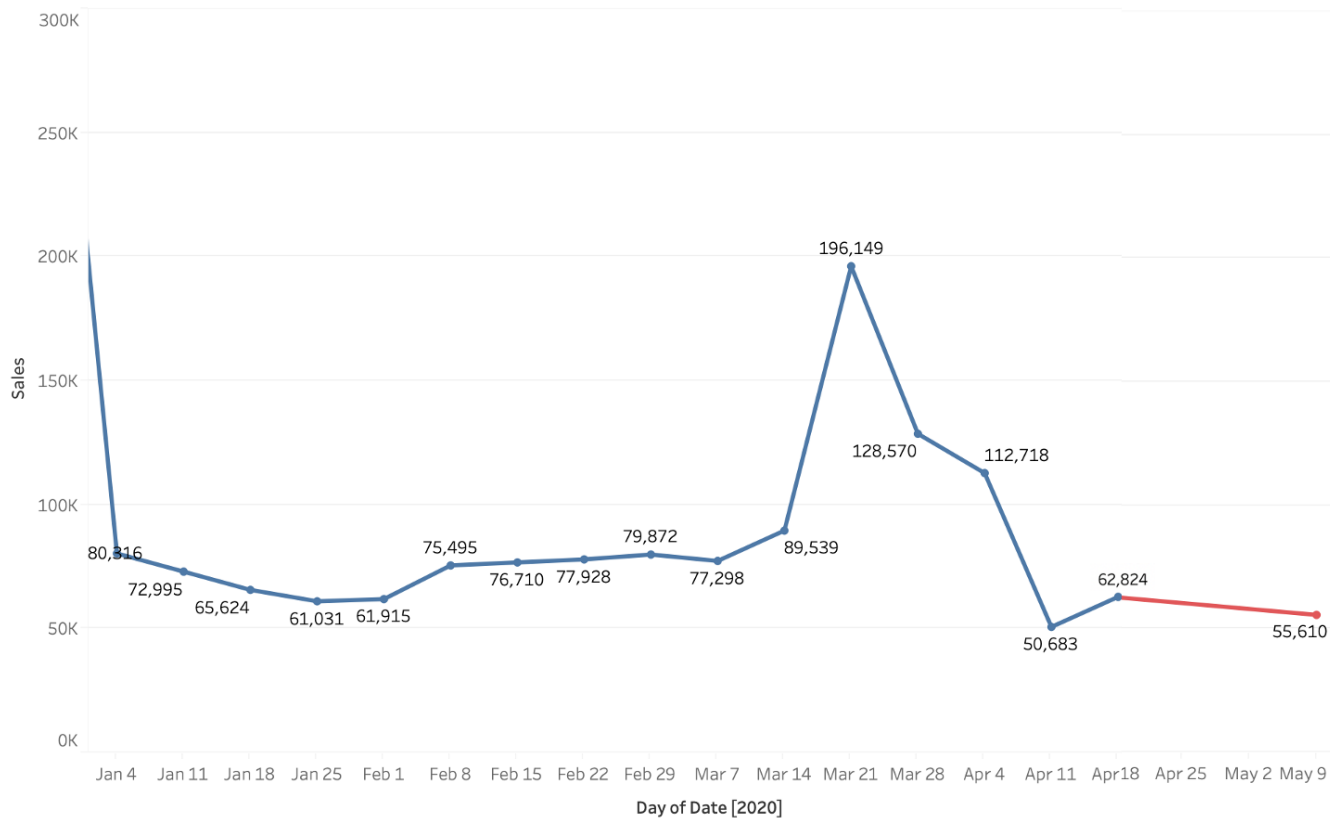
Final Sales Prediction for week ending on May,9

55,610















Result Interpretation

Sales of 2020 + Our prediction (55610)



No new popular games to be released in the week



	Maneater		Tripwire Interactive	N/A	N/A	N/A	N/A	22nd May 20
	The Wonderful 101: Remastered		PlatinumGames	N/A	N/A	N/A	N/A	19th May 20
	Naruto Shippuden Ultimate Ninja Storm 4: Road to Boruto		Bandai Namco Entertainment	N/A	N/A	N/A	N/A	24th Apr 20
	Trials of Mana		Square Enix	N/A	N/A	N/A	N/A	24th Apr 20
	Bokuhime Project		Nippon Ichi Software	N/A	N/A	N/A	N/A	23rd Apr 20
	MotoGP 20		Milestone S.r.l.	N/A	N/A	N/A	N/A	23rd Apr 20

released on 20th Mar. 2020
- a month ago

no new games released recently

relatively stable sales in the week ending on May 9th

The impact of COVID-19 on sales

A screenshot of an Amazon product page for the Nintendo Switch w/ Gray Joy-Con + Mario Kart 8 Deluxe (Full Game Download) - Switch. The page shows the product title, a 4.5-star rating from 1,479 customers, and a price of \$549.98. A pink arrow points to the price. The page also shows shipping options, delivery dates, and seller information. The product is listed as 'Collectible - Like New' and includes the original Mario Kart 8 Switch bundle box and all physical...

Refine by	Price + Shipping	Condition	Delivery	Seller Information	Buying Options
Shipping <input checked="" type="checkbox"/> Prime <input type="checkbox"/> Free shipping	\$549.98 + \$3.99 shipping + \$49.16 estimated tax	Collectible - Like New Includes original Mario Kart 8 Switch bundle box and all physical... Read more	<ul style="list-style-type: none">Arrives between April 21 - May 6.Want it delivered Friday, April 24? Choose Expedited Shipping at checkout.Shipping rates and return policy.	Quantum Express 4.5 stars (193 total ratings)	Add to cart
Condition <input type="checkbox"/> New <input type="checkbox"/> Collectible	\$579.99 + FREE Shipping +	New	<ul style="list-style-type: none">Arrives between April 20-23.Want it delivered Thursday, April 23?	Holiday Electronics Deal	Add to cart

“We should start to see the Switch back in stores as early as June.”

(Source: *Forbes*, 4/20/2020)

Sales of 2020 + Our prediction (55610)

