Analyzing Pump and Dump Schemes

Kenyon College

Kenyon College

Anav Dutt

IPHS Senior Research Seminar, Spring 2022, Prof Elkins and Prof Chun

Abstract

John Drew was a cattle farmer in New York. The cattle he traded would be sold according to their weight. The night before the cattle were to be sold, Drew would fill them with water to increase their weight. This was the original pump and dump, which is where we get the phrase, "watering down the stock". Greed is an interesting concept and human beings are prone to following crowds and wanting more for themselves. Being blinded by greed, people interested in a get rich quick opportunity are taken for a ride and left holding their tail between their legs.

In India, with the rise of social media and the availability of technology, a large issue has risen. That is the issue I hope to tackle in this project. With this ease of technological access and social media presence, Indians are being roped into pump and dump schemes. Mass messages, through the likes of WhatsApp, Discord, Reddit, Twitter and more are being used to circulate false information. This project looks at some of the stocks that were identified as such schemes to see if our algorithm could help provide an insight into a value that would make streamline such identification. The main issue points back at an educational divide and the widespread use of social media in India. With people being able to have a reach over such a large population, the potential influence is massive.

As trading becomes easier for the individual investor with mobile trading apps and easy sign up, it is easy for these individuals with no investing background to get caught up in these schemes in an attempt to score a quick buck. This project dives deeper into the new nightmare that has been created by the Indian stock market and the plague it brings on novice investors. People have invested their life's savings and have lost it on a whim. India is just a case study for the large scale impact of this increase in mobile investing. Governing agencies are stuck in an era where all they had to govern were brokerage houses to protect investors, but with this new era of investing, there needs to be better laws and strategies in place to protect those that cannot financially protect themselves.

Aim

Of course, till today, there is no clear way to find a pump and dump scheme. This project is a study to attempt to analyze the potential conditions leading to financial crime such as this. If there was a clear analysis to find a pump and dump scheme, there would be a lot of people attempting to profit off such a service, therefore returning the market to equilibrium. It would also make the job of financial governing bodies a lot easier.

This project looks at stocks that have been pumped and dumped in India, and with the use of a human in the loop model, looked at what ratios of prominence and width could be used to classify a pump and dump scheme. The model we used allowed us to find specific peaks and valleys and where they began, their half width and prominence. By taking these factors into account, we were able to use the sliding window to look at specific peaks and valleys to analyze which could be classified as a pump and dump.

In the past, the ways that have been used to analyze financial crime has been to look at the volatility of the stock, the volume of purchases, price fluctuations and availability on the market. These processes are good at finding out which stock may be culpable to a pump and dump and/or which investor may have prodded such a scheme, however, it falls short in helping governing agencies, companies, investors and exchanges protect themselves. It also does not provide a way to keep market stability. By looking at prominence to width ratios and finding a stable value for which to analyze pump and dump schemes gives these entities the ability to protect themselves, and provides a consistent measure on how to look at such schemes.

The 4 stocks analyzed here are: 1) Baid Leasing and Financing; 2) Simplex Papers; 3) Adinath Textiles; 4) Tata Teleservices (Maharashtra) Limited
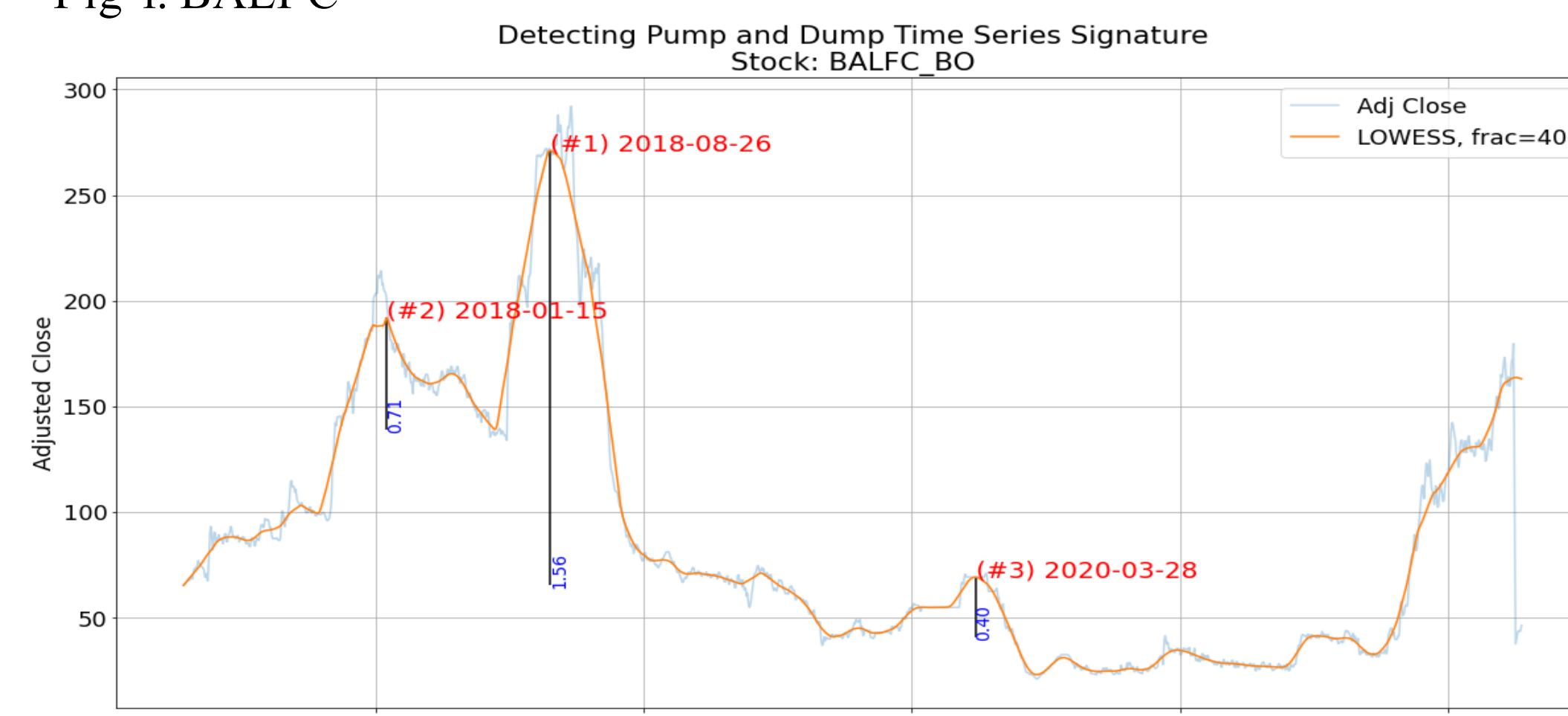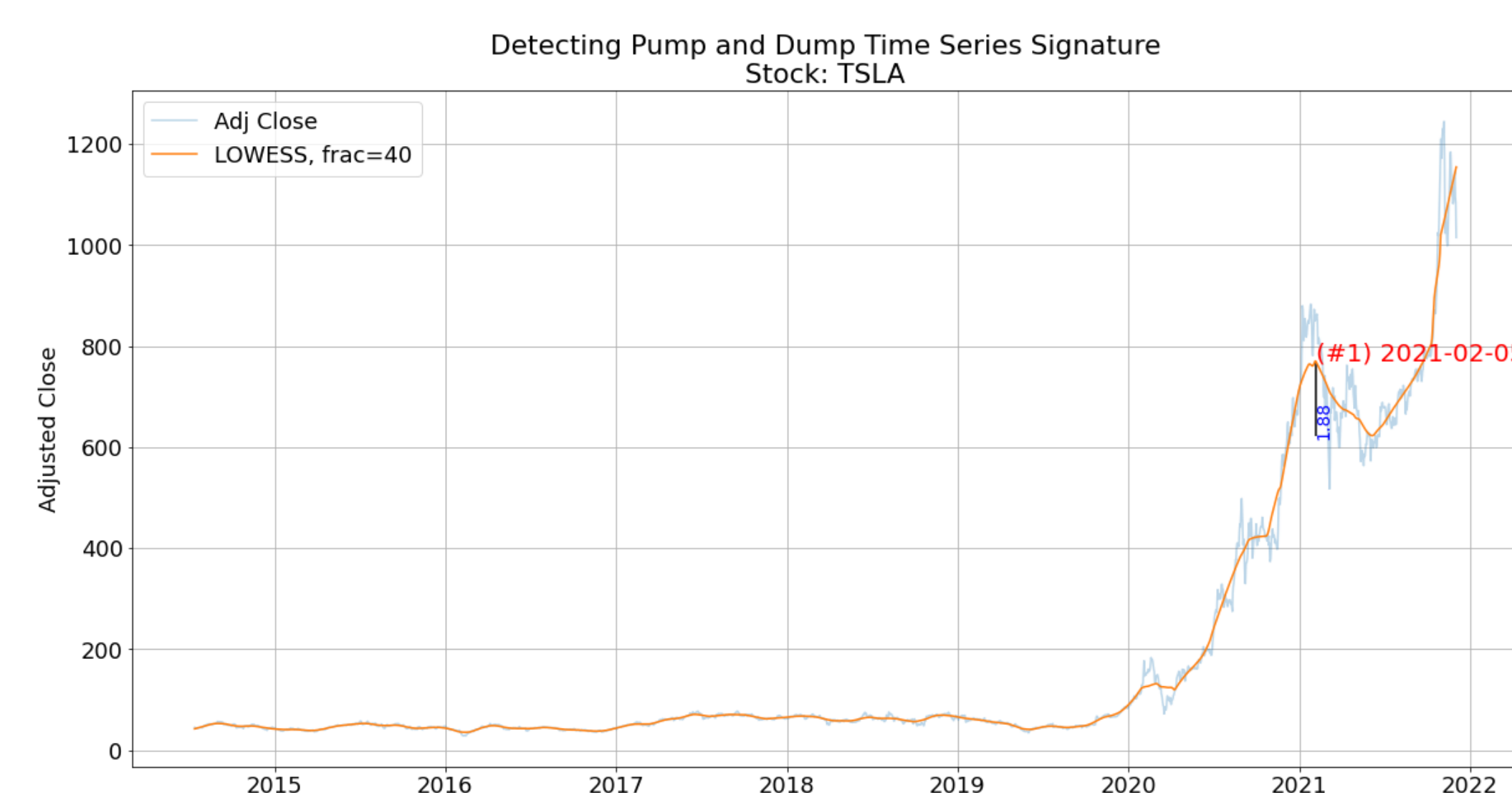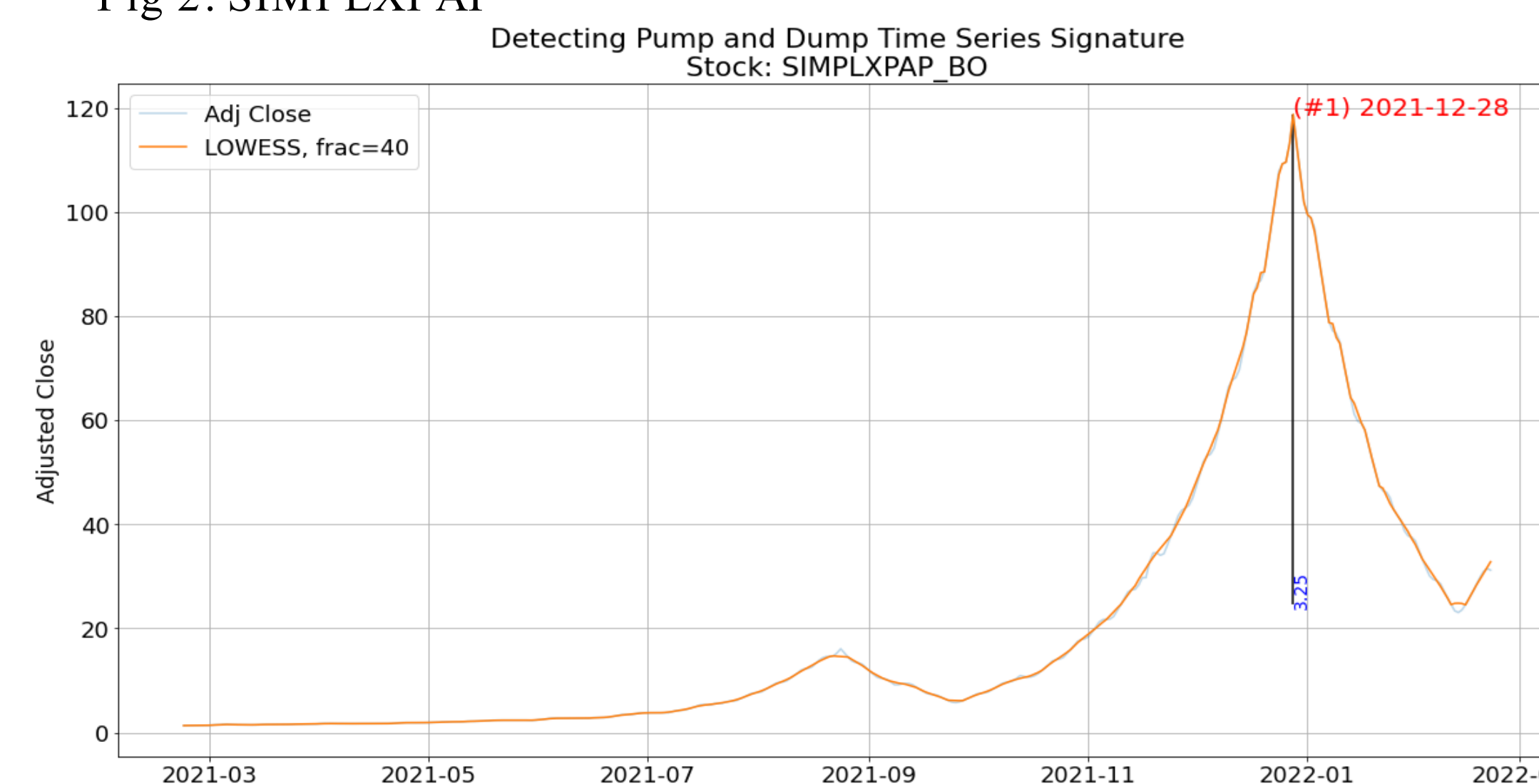
Methodology

Fig 1. BALFC

Fig 1. BALFC — Detecting Pump and Dump Time Series Signature, Stock: BALFC_BO

Fig 2. SIMPLXPAP

Fig 2. SIMPLXPAP — Detecting Pump and Dump Time Series Signature, Stock: SIMPLXPAP_BO

Fig 3. ADINATH

Fig 3. ADINATH — Detecting Pump and Dump Time Series Signature, Stock: ADINATH_BO

Fig 4. TTML

Fig 4. TTML — Detecting Pump and Dump Time Series Signature, Stock: TTML_NS

Fig 5. Tesla test — Detecting Pump and Dump Time Series Signature, Stock: TSLA

Overall Rank	Ratio Value	Company
1	11.43	TTML
2	3.25	SIMPLXPAP
3	2.79	ADINATH
4	1.93	ADINATH
5	1.56	BALFC
6	1.56	ADINATH
7	1.47	ADINATH
8	0.71	BALFC
9	0.4	BALFC

Data Summary

Methodology and Graphical Analysis

This Algorithm for detecting signatures in Pump and Dump time series was created by Jon Chun, Professor in the IPHS department at Kenyon College.

For our graphical analysis, we looked at 4 stocks that exhibited pump and dump patterns. These stocks were primarily penny stocks in India, as that was our target market. It becomes clear that the volume for these stocks is low, so any kind of major buying would significantly increase their value.

To set a base level ratio, we ran regular stocks through the algorithm, such as TSLA, which underwent a similar pump and dump pattern in 2021, to see if the algorithm could predict the pump and dump ratio, and it did just that. Over the 7 year Tesla data, the algorithm found just one instance of a pump and dump.

The main analysis was in deciding at what ratio value would a stock be considered to have undergone a pump and dump. After running multiple stocks through the model, the evident value that appeared to differentiate such patterns between stocks that had been labeled as pump and dumps, was a value of approximately 1.5. Any ratio value above this could be considered to be a pump and dump scheme. The results for the Indian stocks that we inputted into the algorithm can be seen in the figures above. The numbers in brackets represent the rank of that ratio compared to the rest in that time series, and the numbers in blue represent the ratio values.

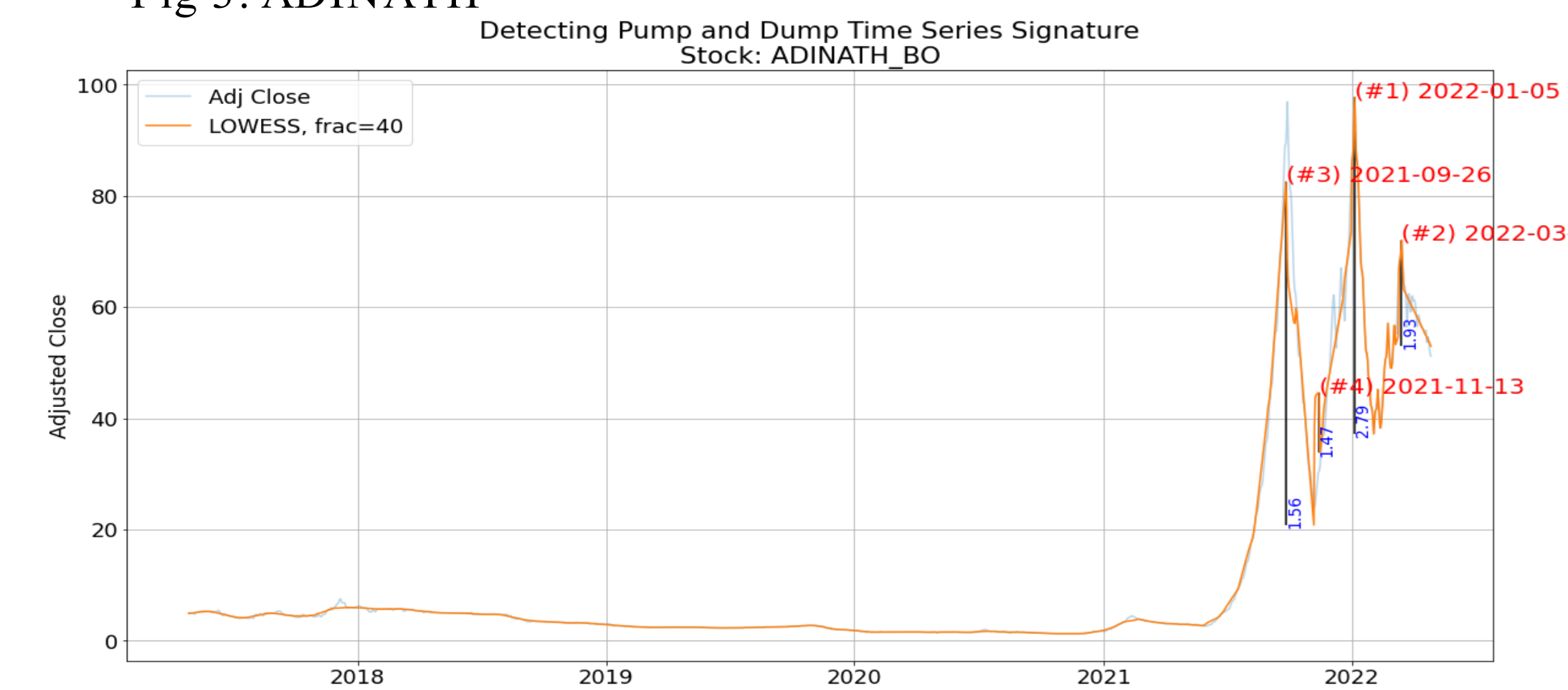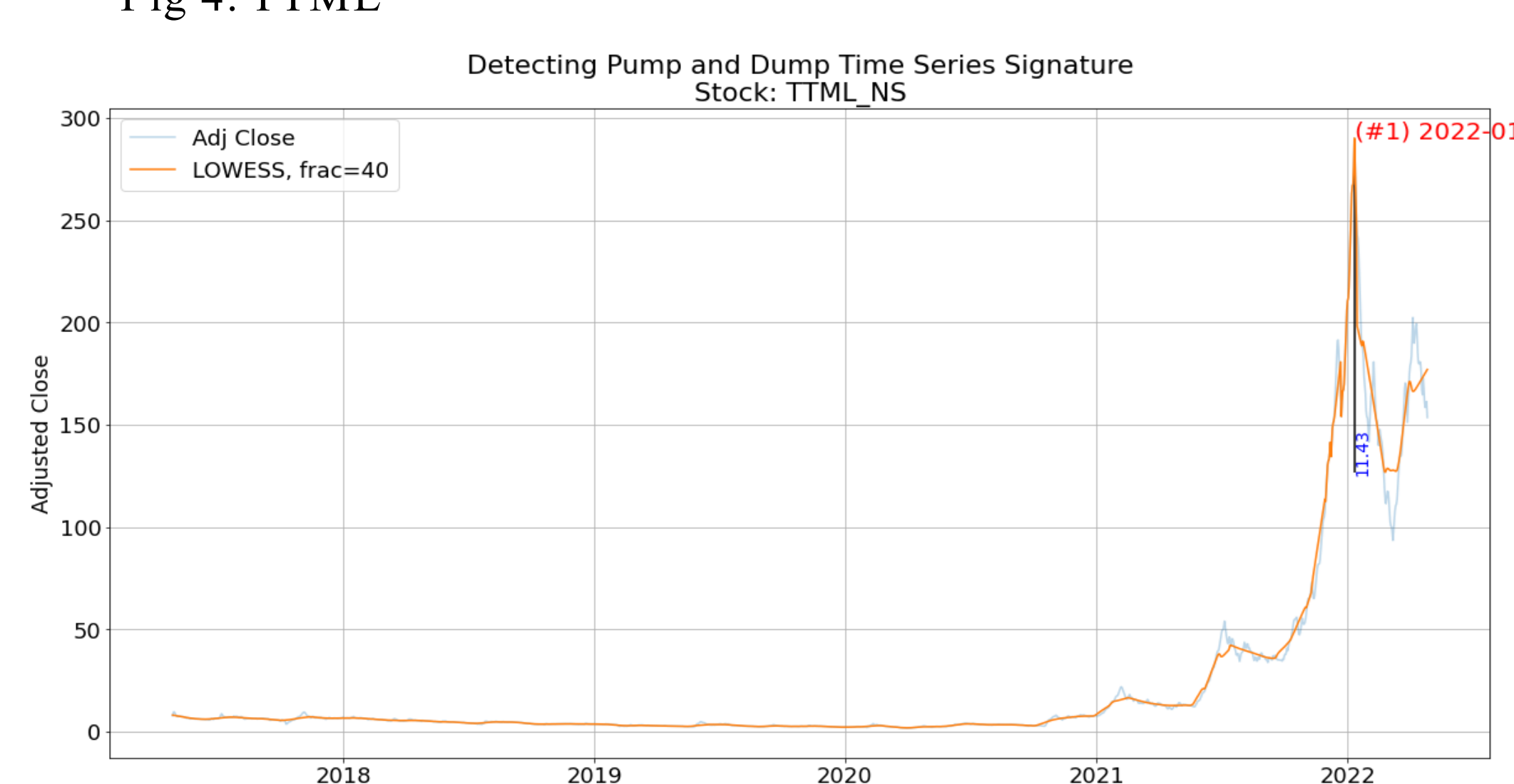Figure 1 is a finance and leasing company, and has 3 rankings, however with our preset value, only one appears to be a pump and dump. For figure 2, a paper company, there is one clear pump and dump scheme that can be seen from the ratio value of 3.25. Figure 3 is a textile company, that appears to have quite a bit of volatility in the past year, so it is a great company to analyze. This figure had 4 rankings of ratios in the last year, and all of them had a value over 1.5, which means that this stock was pumped and dumped multiple times. This is interesting because for a textile company, this volatility is unprecedented. This algorithm would have helped regulators and investors figure out that this stock was an unsafe investment. Figure 4 is a telecommunications company which is actually a prominent player in that market, which is why it is interesting to see such movement in such a stock. The ratio value for this stock is that of 11.43, which is a massive number compared to our other stocks, and should have caught the eye of an educated investor. This stock was clearly blown way out of proportion in terms of its value. These figures represent how the algorithm can be used in a practical sense.

The summary table provided above, shows the rankings of our stock portfolio. This table is part of what we used in determining the value for our ratio. The algorithm, however powerful, needs a human in the loop to determine this value. Based on the results, not all the stocks that looked like they had been dumped, actually were. Only 6 of the 9 values in the data table show a value over 1.5.

Ethical Implications

As the world progresses with newer technologies and accessibility to these services as it spreads to new users. As history has shown, improper investing can lead to devastating consequences. This has become a large problem in developing countries such as India. India has a large population and also has a large number or illiterate individuals who do not earn a lot of money. With the widespread effects of technology, these individuals have been roped into such schemes and have lost money. These are individuals who have to work multiple jobs on a daily basis just to feed their families, that have been hung out to dry.

The issue with this type of financial crime, is that the scope for regulation is pretty slim as the footprint is very small and the data is unreliable. Our hope is that this algorithm, will give regulators a better outlook on pump and dump schemes and quickly help them identify the issue.

Pump and dump schemes have also been used as manipulation strategies by those with considerable power, in order to boost their holdings and get out when it is profitable to them. In India, that may be a TV anchor, a politician or someone you know.

Another primary concern is that those firms that are being valued so highly, have no reason to be there. The sectors are random, the jump is random, and there are masses being harmed in their wake. Regulatory authorities in India are also often subject to turning a blind eye to such issues.

If financial crime is to be reduced in such developing countries, financial literacy needs to improve, there needs to be a certain wage limit at which you can trade, there needs to be better surveillance by these apps to prevent any one particular holder to drive up prices, and ultimately, the regulation has to do a better job, holding those who commit such crimes accountable. This needs to be done otherwise, as we can already see, there appears to be a lot of individuals hurting, and these individuals require the money to live from one day to the next.

Conclusion

This project is a study to showcase the wide range of financial crime that still exists in developing countries and the people that can be affected by it. It displays the magnitude and complexity of the issue. The algorithm used here is an efficient tool to help tackle financial crime as such. The algorithm could be used by regulators and investors to make educated investments and finding financial frauds. This study only looks at one country, however the issue is still widespread and has not been addressed.

Using a human in the loop, we were able to analyze different avenues of penny stocks in India and the extent to which they have been manipulated. We settled on a value of 1.5 as the ratio value at which market manipulation can be identified. The algorithm is still not perfect as it is only able to identify manipulations in the past. In the future, our goal is to expand on the work we have done for this project for more stocks, and modify the algorithm to analyze current time

Citations

- Jon Chun, Kenyon College, chunj@kenyon.edu
- Katherine Elkins, Kenyon College, elkins1@Kenyon.edu
- arXiv:2005.06610v1
- https://towardsdatascience.com/technical-analysis-library-to-financial-datasets-with-pandas-python-4b2b390d3543
- https://github.com/yhilpisch
- https://www.investopedia.com/terms/p/pumpanddump.asp
- https://tradingqna.com/t/the-list-of-pump-dump-penny-stocks/69753
- https://finance.yahoo.com/
- https://www.business-standard.com/article/markets/over-850-indian-penny-stocks-more-than-doubled-in-the-past-18-months-data-1220 1100 1163_1.html
- https://towardsdatascience.com/lowess-regression-in-python-how-to-discover-clear-patterns-in-your-data-f26e523d7a35
- https://www.machinelearningplus.com/time-series/time-series-analysis-python/
- https://direct.mit.edu/asep/article/14/3/1/16966/Detecting-and-Quantifying-Insider-Trading-and
- https://arxiv.org/pdf/2105.00733.pdf