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(*University of the City of Manila*)  
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**COLLEGE OF ENGINEERING & TECHNOLOGY  
COMPUTER ENGINEERING DEPARTMENT**

## **COURSE PROJECT #2 (Group Work) DATA SCIENCE**

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# Case Process Documentation

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## Introduction

In the coming Philippines election on May 9, 2022, numerous candidates of various positions – particularly those who are eyeing the presidential seat have been working hard to promote themselves to the public. It's election season once again and so far, the sentiment seems to be divided with no clear or standout winner based on polls and surveys conducted by various organizations in the country. According to the latest Pulse Asia survey conducted last September 6-11, the chances seem to favor four specific candidates – Sara Duterte Carpio (20%), Ferdinand “Bongbong” Marcos, Jr. (15%), Francisco “Isko Moreno” Domagoso III (13%), and finally Emmanuel “Manny” Pacquiao (12%). Other candidates like Maria Leonor “Leni” Gerona Robredo (9%) are also at their heels and there are still several months left to change up the current standing all candidates have.

Determining the chances of winning for each candidate is tricky and merely relying on surveys and polls wouldn't give an accurate prediction on the candidate's current ranks. Social media presence in platforms like Facebook or Twitter, although not an accurate metric, couldn't be discounted.

In the following sections of this paper, we would discuss our research on the Philippines' electoral process, the general profile of each candidate – primarily focusing on those running for president, a detailed explanation on how we would utilize data science and analytics to calculate the chances of winning of each candidate and finally, a user manual of the program we created.

## Electoral Process

The specifics for the electoral process for the 2022 Philippine elections are as follows:

The organization body responsible for overseeing the whole elections is the Commission on Elections (COMELEC). The COMELEC is the principal government agency tasked by the Constitution to enforce and administer all laws and regulations concerning the conduct of regular and special

elections. It is a body that is designed to be constitutionally independent from the executive, legislative and judicial branches of government to ensure the conduct of free, fair and honest elections (COMELEC, 2015).

The COMELEC consists of one Chairman and 6 commissioners, all of whom have a 7-year term without reappointment. In all matters pertaining to election administration and policymaking, the commissioners act as a collegial body. In election cases and pre-proclamation controversies, however, the Commission sits in two divisions initially, but decides en banc on motion to reconsider a division decision (COMELEC, 2015).

The current members of the organization can be seen in the table below:

<b>Name</b>	<b>Term Began</b>	<b>Term Scheduled to End</b>	<b>Position</b>	<b>Appointed By</b>
<b>Sheriff M. Abas</b>	May 23, 2018*	February 2, 2022	Chairman	Rodrigo Duterte
<b>Rowena V. Guanzon</b>	April 28, 2015	February 2, 2022	Commissioner	Benigno Aquino III
<b>Socorro B. Inting</b>	April 17, 2018	February 2, 2025	Commissioner	Rodrigo Duterte
<b>Marlon S. Casquejo</b>	June 19, 2018	February 2, 2025	Commissioner	Rodrigo Duterte
<b>Antonio T. Kho, Jr.</b>	July 11, 2018	February 2, 2022	Commissioner	Rodrigo Duterte
<b>Michael B. Peloton</b>	September 21, 2020	February 2, 2027	Commissioner	Rodrigo Duterte

<b>Aimee F. Ampoloquio</b>	November 24, 2020	February 2, 2027	Commissioner	Rodrigo Duterte
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**Table 1. Current Members of COMELEC**

Sheriff M. Abas was previously a commissioner appointed by former President Benigno Aquino III in April 28, 2015. She was reappointed as chairman by President Rodrigo Duterte in 2018 to serve the remaining term of the previous chairman, Andres D. Bautista who resigned before his term ended.

According to the Republic Act No. 7056 describing the national and local elections in the country (COMELEC, 2017),

- The regular elections held for the president, vice-president and senators are held every 2<sup>nd</sup> week of May unless postponed by the Commission on Elections. For presidential and vice-presidential elections, it's held for every period of 6 years. For senatorial, members of the House of Representatives and elections for other both provincial and municipal offices, it's held every 3 years.
- For terms of offices –
  - An elected president can only serve for 6 years and can't run for re-election after they served their term.
  - An elected vice-president can't serve for more than 2 consecutive terms.
  - An elected senator can't serve for more than 2 consecutive terms.
  - A member of the House of Representatives can't serve for more than 3 consecutive terms.
  - Any elected provincial, city or municipal official can't serve for more than 3 consecutive terms.
  - Voluntary renunciation of the office for any length of time shall not be considered as an interruption in the continuity of the service for the full term for which they were elected.

The qualifications needed in running for President aren't particularly stringent. According to Article VII, Section 2 of the 1987 Constitution, the only requirements necessary to file for candidacy are as follows (Official Gazette, n.d.):

- natural born Filipino;
- a registered voter;
- must be able to read and write;
- 40 years of age at the day of the election; and
- must have resided in the Philippines ten years before the election is held.

During the week-long certificates of candidacy (COC) filing from October 1-8, a total of ninety-seven Filipinos filed for Presidency this year (De Leon, 2021). It should be noted, however, that these candidates would first undergo screening by the Commission and that the tentative list of truly eligible candidates would be released on October 29, 2021. Furthermore, substitution laws allow coalitions to file for substitutions. Therefore, the final list of candidates that will be reflected on the ballot can only be seen by November 15, 2021.

A total of 63 million Filipino have registered for the 2022 polls so far (De Leon, 2021). According to James Jimenez – current COMELEC director, 52% of these voters are aged 18-40 years old showing that the vote of the “youth” matters in the upcoming elections (CNN Philippines, 2021).

An updated calendar for the elections provided by COMELEC can be seen in Table 2.

Date	Time	Activity
<b>January 20–March 9, 2020</b>		Voter registration
<b>March 10–August 31, 2020</b>		Suspension of voter registration nationwide due to the COVID-19 pandemic
<b>September 1–28, 2021</b>		Holding of political conventions
<b>September 1, 2020–September 30, 2021</b>		Resumption of voter registration

<b>October 1–8, 2021</b>	Filing of certificates of candidacies
<b>October 1–14, 2021</b>	Extension of voter registration for overseas voters
<b>October 11–30, 2021</b>	Extension of voter registration for voters in the Philippines
<b>October 29, 2021</b>	Commission to post tentative list of candidates
<b>November 15, 2021</b>	Deadline in substituting a candidate for it to appear on the ballot
<b>January 9–June 8, 2022</b>	<p>Election period</p> <ul style="list-style-type: none"> <li>• Prohibition on carrying and usage of firearms</li> <li>• Prohibition on suspending from office of local elective officials</li> </ul>
<b>February 8 – May 7, 2022</b>	Campaign period for nationally-elected positions
<b>March 25 – May 7, 2022</b>	Campaign period for locally-elected positions
<b>April 10 – May 9, 2022</b>	Voting for overseas voters
<b>April 14–15, 2022</b>	Prohibition on campaigning (Maundy Thursday and Good Friday)
<b>April 27–29, 2022</b>	Voting for local absentee voters in the Philippines

<b>May 8, 2022</b>		Election silence
<b>May 9, 2022</b>	All day	<ul style="list-style-type: none"> <li>• Prohibition on campaigning</li> <li>• Prohibition on consumption of liquor</li> </ul>
	TBD	Election day; voting for non-absentee voters in the Philippines
	Mid-day	Deadline in substituting a candidate, with the substituting candidate must have the same surname
	Until 2:00 PM	Voting for detainee voters
<b>May 9–12, 2022</b>		Counting of votes for city and municipal officials
<b>May 10–16, 2022</b>		Counting of votes for regional and provincial officials, and members of Congress
<b>June 8, 2022</b>		Deadline in filing statement of expenditures by candidates
<b>June 30, 2022</b>	12:00 p.m.	Winners' terms start
<b>June 30, 2022</b>	12:00 p.m.	Winners' terms end (local positions and members of the House of Representatives)
<b>June 30, 2022</b>	12:00 p.m.	Winners' terms end (President, Vice President and senators)

**Table 2. General Elections Schedule**

# Candidates Profile

**Notable Candidates:** These are candidates that are relatively well-known and have filed for candidacy last October 1-8

## 1. Maria Leonor Gerona Robredo / Leni Robredo



**Figure 1. Leni Robredo**

**Description:** A public servant and alternative lawyer who is the 14th and present Vice President of the Republic of the Philippines. She started in the political arena last 2013 when she won as representative of Camarines Sur's third district. Leni also led the flagship of anti-poverty program known as "AngatBuhay" which is inspired by the six key advocacy areas including education, healthcare, housing, food security and nutrition, women empowerment, and rural development. In addition, she also launched a program called "Istorya ng Pag-asa" that has an objective to spread positivity and hope through presenting stories about ordinary Filipinos by words, portraits, films, exhibits and social media.

**Party List:** Independent

**Facebook Followers:** 1,626,425

**Twitter Followers:** 600, 858



## 2. Francisco "Isko" Moreno Domagoso



Figure 2. Isko Moreno

**Description:** A former actor who is the 27th and current Mayor of the City of Manila. He began his political career in 1998 when he won as the councilor of Manila's first district and got re-elected in 2001 and 2004. He also became the Vice Mayor of Manila City in 2007. Domagoso was appointed as the Chairman of the Board of the North Luzon Railways Corporation in 2017 and the Undersecretary for Luzon Affairs in the Department of Social Welfare in 2018.

**Party List:** Aksyon Demokratiko

**Facebook Followers:** 5,400,060

**Twitter Followers:** 934, 979

### 3. Ferdinand "Bongbong" Marcos Jr.



**Figure 3. Bongbong Marcos**

**Description:** The son of the late Philippine dictator Ferdinand Marcos who has been in public service for over 25 years. He entered the political arena in 1981 when he got elected as the Vice Governor of Ilocos Norte province and succeeded as its Governor from 1983 to 1986. In 1992, the year after his family had return from exile, Bongbong served as the Congressman in Ilocos Norte's Second District where he authored the landmark law establishing the Philippine Youth Commission. Then he became the Governor of Ilocos Norte again from 1998 to 2007 which is equivalent to three consecutive terms. Bongbong got appointed as the Deputy Minority Leader of the House of Representatives in 2007 as well. In 2010, he became one of the people who got elected in the Philippine Senate.

**Party List:** Partido Federal ng Pilipinas (PFP)

**Facebook Followers:** 3,676,633

**Twitter Followers:** 920,854

#### 4. Emmanuel Dapidran Pacquiao / Manny Pacquiao



**Figure 4. Manny Pacquiao**

**Description:** A former professional boxer who is currently serving as one of the twelve senators of the Philippines. He started getting involved in Politics last May 2010 when he was elected to the House of Representatives in the 15th Congress of the Philippines, representing Sarangani province. Manny also got re-elected on that position in 2013.

**Party List:** Progressive Movement for the Devolution of Initiatives or PROMDI

**Facebook Followers:** 18,389,790

**Twitter Followers:** 2,682,393

## 5. Panfilo "Ping" Morena Lacson



**Figure 5. Ping Lacson**

**Description:** A retired police officer who headed the Philippine National Police (PNP) from 1999 to 2001 and has held a position of senator in the Republic of the Philippines for 17 years. He was elected to the House of Representatives in 12th to 15th and 17th to 18th Congress of the Philippines. Ping Lacson also served as the Presidential Assistant on Rehabilitation and Recovery from 2013 to 2015. He co-authored the Anti-Hazing Law of 2018 and the Free Irrigation Service Act.

**Party List:** Partido Reporma

**Facebook Followers:** 369,226

**Twitter Followers:** 44,139

## 6. Ronald "Bato" Dela Rosa



**Figure 6. Bato Dela Rosa**

**Description:** A former Chief of Philippine National Police (PNP) assigned by President Rodrigo Duterte from 2016 to 2018 to work with the government in its anti-drugs campaign. After his term ended, he managed to placed fifth in the overall Philippine Senate election that was held last 2019.

**Party List:** PDP-Laban

**Facebook Followers:** 146.348

**Twitter Followers:** No Twitter Account

## 7. Ernesto "Ernie" Corpuz Abella



**Figure 7. Ernie Abella**

**Description:** A former evangelist and businessman who started his career in advertising and serves as a Creative Director for Adformatrix in Makati from 1975 to 1977. He also became a columnist for Davao City newspaper San Pedro Express. In addition, Abella established a school in Davao and has an agricultural products manufacturer and local cooperative which he co-founded. He was the former Presidential Spokesperson for the Philippine President Rodrigo Duterte but got replaced last October 2017. However, in November 2017, he subsequently got appointed as the Undersecretary for Strategic Communications and Research at the Department of Foreign Affairs.

**Party List:** Independent

**Facebook Followers:** 1,800

**Twitter Followers:** 739

## 8. Norberto B. Gonzales



**Figure 8. Norberto Gonzales**

**Description:** He served as the 32nd and 34th Secretary of National Defense during the administration of the former President Gloria Macapagal-Arroyo. From the same administration, Gonzales also got appointed as the National Security Adviser and concurrent Director General of the National Security Council. Moreover, he is the chairman of the Philippine Democratic Socialist Party which he has held since 1973.

**Party List:** Demokratiko Sosyalista

**Facebook Followers:** 693

**Twitter Followers:** No Twitter Account



## 9. Leody de Guzman



**Figure 9. Leody De Guzman**

**Description:** A labor rights activist who is the country representative to the International Council of the International Center for Labor Solidarity (ICLS). He is also the chairperson of Bukluran ng Manggagawang Pilipino (BMP) which is known as a nationwide organization comprised of labor and trade union. De Guzman ran for senator in 2019 under the Labor Win Alliance that campaigns for labor rights like ending contractualization and raising minimum wages. However, he only got 38th place.

**Party List:** Partido Lakas ng Masa (PLM)

**Facebook Followers:** 14,394

**Twitter Followers:** 16,823



**Miscellaneous Candidates:** These are candidates that have been included in the public's first choice for Presidential candidacy in polls conducted by Pulse Asia and other research groups. Considering that the list of candidates that would appear in the ballot would be finalized on November 15 – since there's the substitution period to consider, there's still a chance that the following candidates would run for the position.

**10. Sara Zimmerman Duterte-Carpio**



**Figure 10. Sara Duterte**

**Description:** The presidential daughter Sara Zimmerman Duterte-Carpio, commonly known as Inday Sara, was a graduate of law at the San Sebastian College – Recoletos. She was the first female mayor and the youngest to have been elected to the position in the political history of Davao City after she switched roles with her father, Rodrigo Duterte, from 2010 to 2013 as mayor and vice-mayor, respectively. Two years into her father's term as the president of the Philippines, Rodrigo Duterte announced that he wants his daughter to succeed him.

**Facebook Followers:** 408, 191

**Twitter Followers:** No Twitter Account

**11. Mary Grace Natividad Sonora Poe-Llamanzares/ Grace Poe**



**Figure 11. Grace Poe**

**Description:** Grace Poe is the daughter of the late action star, Fernando Poe Jr. She earned her bachelor's degree in Political Science from Boston College- Massachusetts and co-founded the Filipino Cultural Club of Boston College. In the 2013 Senatorial Elections, she garnered a historic number of votes, more than 20 million--all while running as an independent candidate. She co-authored the "Balik Scientist" Act and amendment to Comprehensive Dangerous Drugs Act, among other measures. When she ran for the highest post in the 2016 Presidential Elections, she stated that she was against divorce until as late as 2018. In 2019, she took a pro stance, citing the "groundswell of public support" for a divorce law. In the same year, she was elected as senator for her 2nd term in the 2019 Senatorial Elections

**Facebook Followers:** 3,276,680

**Twitter Followers:** 137,407

## **Determining a candidate's chances of winning**

In determining the candidate's chances of winning, our group decided to gather data from different surveys and polls as well as incorporate social media followers and engagement into our formula. With the current pandemic, rallying and promoting traditionally are limited and one way to gauge a candidate's chances of winning is through their online presence and engagement with the audience.

### **Survey and Polls**

The group would utilize the results of the latest survey from four (4) different sources. Each would have different weighting in the final formula depending on how reputable the source is. The aforementioned sources include –

- Pulse Asia

Pulse Asia Research, Inc is an enterprise launched in 1999 by professional academics with acknowledged expertise in their respective fields of study. They are dedicated to monitoring salient socio-economic, political and cultural issues in the minds of the Filipino public. Their mission is anchored on the belief that a periodic measurement of the public pulse is a key ingredient for creating a robust democracy (Pulse Asia, 2021). They are affiliated with the Philippine Social Science Council, the World Association of Public Opinion Research, and the Marketing and Opinion Research Society of the Philippines.

The results of their latest survey last September can be seen in Figure 12.

## 2022 ELECTIONS: FIRST CHOICE PRESIDENTIAL PREFERENCE

September 6 -11, 2021 / Philippines / PR1&2  
(In Percent)

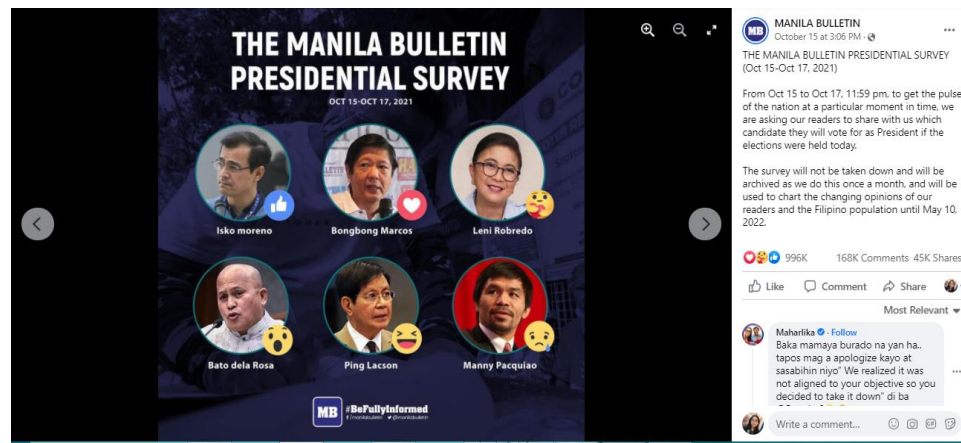
Base: Total Interviews, 100%								
Of the people on this list, whom would you vote for as PRESIDENT OF THE PHILIPPINES if the May 2022 elections were held today and they were candidates? You may mention others not included in this list.								
RP	LOCATION				CLASS			
	NCR	BL	VIS	MIN	ABC	D	E	
DUTERTE, SARA "INDAY"	20	12	8	23	47	16	20	25
MARCOS, FERDINAND "BONGBONG"	15	28	20	5	8	18	16	12
DOMAGOSO, FRANCISCO "ISKO MORENO"	13	19	16	15	3	20	14	7
PACQUIAO, EMMANUEL "MANNY"	12	6	9	21	15	7	11	20
POE, GRACE	9	8	11	10	6	12	9	10
ROBREDO, MARIA LEONOR "LENI"	8	10	8	12	4	8	8	11
LACSON, PANFILO "PING"	6	7	7	7	3	8	6	4
CAYETANO, ALAN PETER	4	3	5	3	6	2	5	4
GO, CHRISTOPHER "BONG GO"	3	2	1	2	7	1	3	3
TRILLANES, ANTONIO "SONNY"	1	0	1	1	0	0	1	1
BELLO, WALDEN	0.1	0	0	0	0	0	0	0
TEODORO, GILBERT "GIBO"	0.1	0	0	0	0	0	0	0
Others	0.3	1	0	0	0	0	0	0
<b>UNAIDED</b>								
Don't Know/Refused/None	7	4	13	1	2	9	8	2
Don't know	3	1	5	0	1	0	4	1
Refused	1	1	1	1	0	2	1	1
None	4	1	7	0	0	7	3	1

Figure 12. Pulse Asia Presidential Survey – September 6-11 results

- Manila Bulletin

Manila Bulletin conducted a poll for their readers in multiple platforms – Facebook, Twitter and website from October 15 to 17, to get the public's opinion on who they would vote for as President if the elections were held today. They specifically mentioned that they would not take down any of their posts and would continue to do this once a month to chart the changing opinions of their readers and the Filipino population until May 10, 2022.

In Facebook alone, there are a total of ~996,000 reactions while on Twitter, there are 46,845 votes all in all.

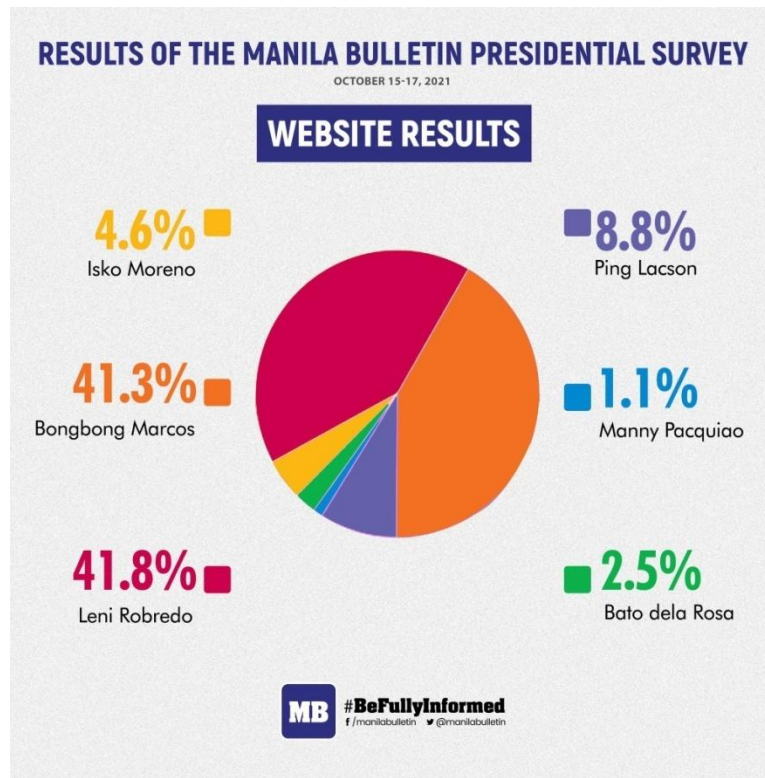


**Figure 13A. Manila Bulletin Presidential Survey – Facebook**



**Figure 13B. Manila Bulletin Presidential Survey – Twitter**

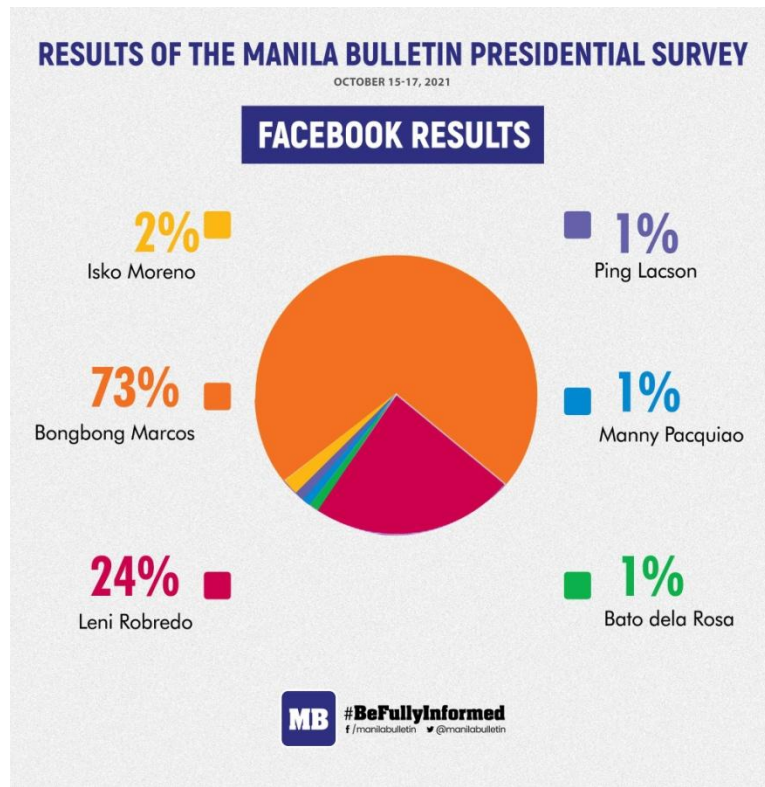
The results of the survey in all three (3) platforms can be seen in the following figures:



**Figure 14A. Manila Bulletin Presidential Survey Results – Website**

Candidate	Results
Maria Leonor “Leni” Robredo	41.48%
Ferdinand “Bongbong” Marcos Jr.	41.3%
Panfilo “Ping” Lacson	8.8%
Francisco “Isko Moreno” Domagoso	4.6%
Ronald “Bato” de la Rosa	2.5%
Emmanuel “Manny” Pacquiao	1.1%

**Table 3A. Manila Bulletin Presidential Survey Results – Website**

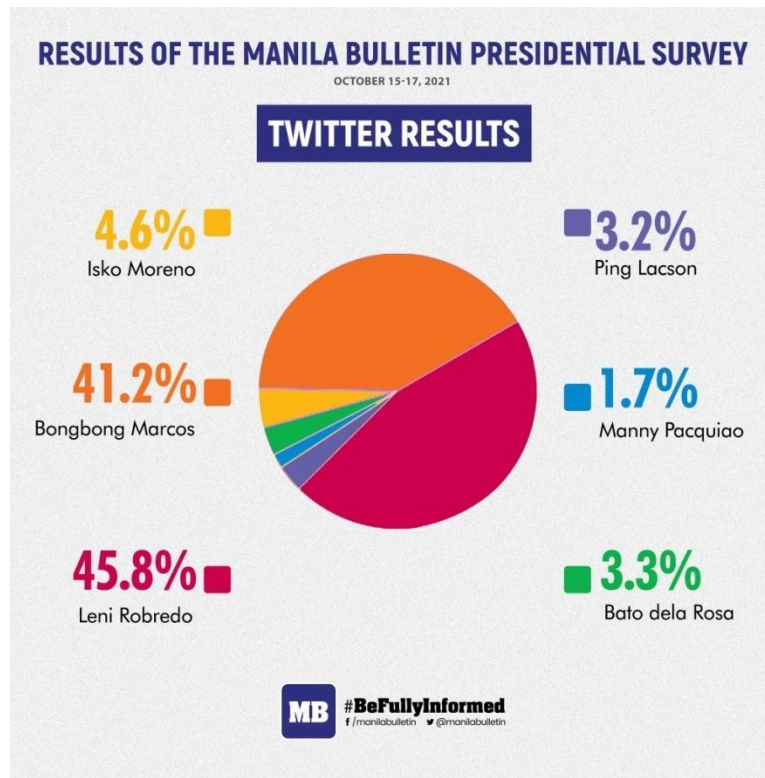


**Figure 14B. Manila Bulletin Presidential Survey Results – Facebook**

Candidate	Results
Ferdinand “Bongbong” Marcos Jr.	73%
Maria Leonor “Leni” Robredo	24%
Francisco “Isko Moreno” Domagoso	2%
Panfilo “Ping” Lacson	1%
Ronald “Bato” de la Rosa	1%
Emmanuel “Manny” Pacquiao	1%

**Table 3B. Manila Bulletin Presidential Survey Results – Facebook**





**Figure 14C. Manila Bulletin Presidential Survey Results – Twitter**

Candidate	Results
Maria Leonor “Leni” Robredo	45.8%
Ferdinand “Bongbong” Marcos Jr.	41.2%
Francisco “Isko Moreno” Domagoso	4.6%
Panfilo “Ping” Lacson	3.2%
Ronald “Bato” de la Rosa	3.3%
Emmanuel “Manny” Pacquiao	1.7%

**Table 3C. Manila Bulletin Presidential Survey Results – Twitter**



- “Kalye” Survey

On October 1-11, a group of vloggers conducted a survey in Metro Manila and Region 4A (Cavite, Laguna, Batangas, Rizal and Quezon) where people on the streets, buyers in mini-groceries and vendors in public markets, among others, were randomly asked who they would vote for president on May 9, 2022. Although the respondents are randomly chosen and couldn't serve as a real measurement to predict the outcome of next year's polls, they “manifest the sentiment of the common people” (Tamayo, 2021).

A total 2,137 respondents were interviewed. The results of the survey can be seen in the table below:

Candidate	Results
Ferdinand “Bongbong” Marcos Jr.	1,307
Francisco “Isko Moreno” Domagoso	345
Maria Leonor “Leni” Robredo	231
Emmanuel “Manny” Pacquiao	125
Panfilo “Ping” Lacson	89
Ronald “Bato” de la Rosa	23
Sara Duterte-Carpio	17

**Table 4. Kalye Survey Results**

## **Social Media Followers and Engagement**

As mentioned earlier, social media presence matters during the elections. It can't be considered as an accurate metric because followers don't automatically translate to actual votes. Furthermore, issues with fake followers and “fake engagement” couldn't be discounted since these things can be bought nowadays to make an account seem relevant and popular. Despite this, it couldn't be denied that considering the current pandemic situation and limited ways of promotion (compared to the rallies and

campaigns of previous elections), it's more important than ever to build a strong online presence to capture a sizable part of the voting population especially since a large part do use them everyday.

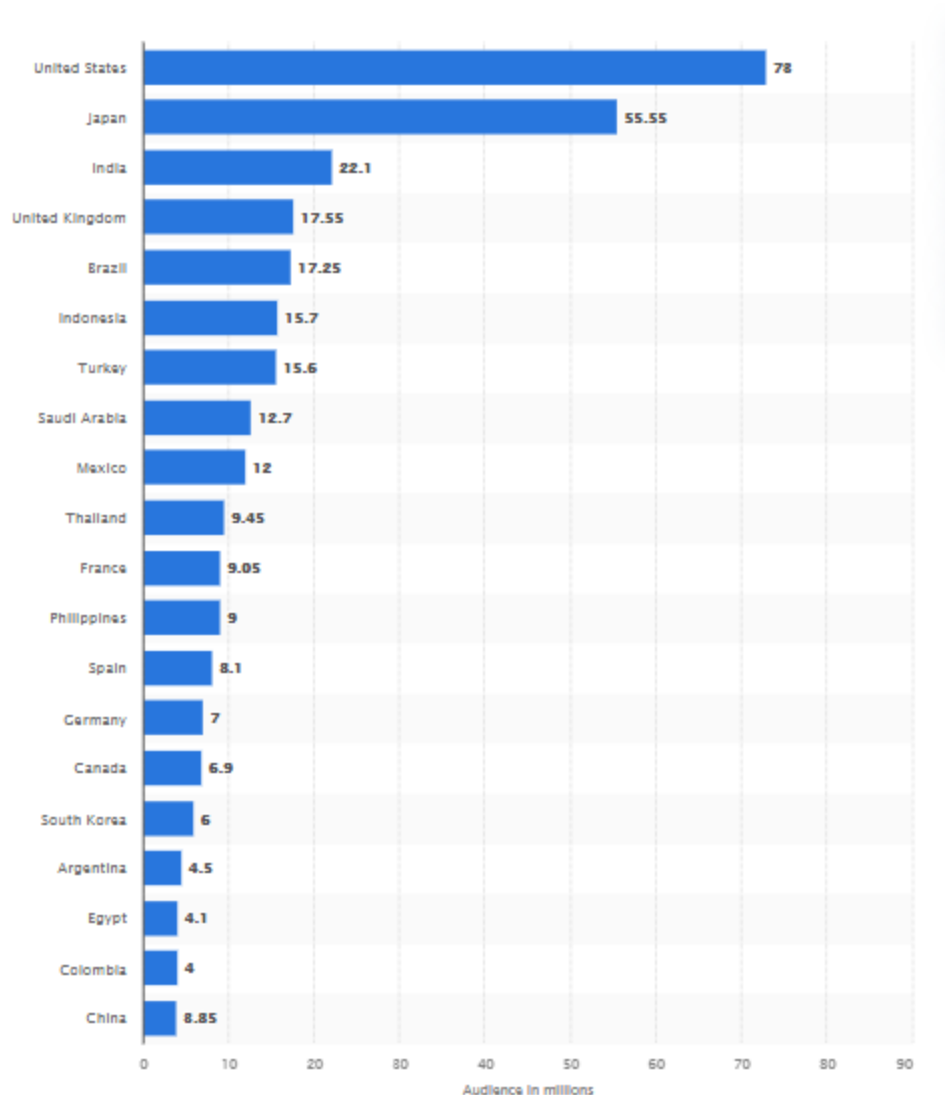
In computing the chances of winning of each Presidential candidate, we would take into account the two (2) biggest social media platforms in the country – Facebook and Twitter.

According to NapoleonCat (2021), there are 88.4 million Facebook users in the Philippines with people aged 18-24 being the largest user group with 28 million.



**Figure 15. Philippines – Facebook Users in 2021**

On the other hand, Twitter users in the Philippines according to Statista (2021), are approximately 9 million.



**Figure 16. Leading countries based on number of Twitter users as of July 2021 (in millions)**

Do note that the numbers available aren't completely accurate since users can and do create multiple accounts on either platforms. However, even with that taken into consideration, it couldn't be denied that a huge chunk of the Philippine population use these social media sites actively.

Unfortunately, there currently aren't any tools available online that can measure the engagement another user or page has in Facebook therefore, we would only use the number of followers as our basis.

On the other hand, on Twitter there is a site called SparkScore that can measure the engagement another user has compared to other accounts with similar followers for free.

The summary of all the candidate's social media sites followers along with their results in Sparksfun can be seen in the table below:

<b>Candidate</b>	<b>Facebook Followers</b>	<b>Twitter Followers</b>	<b>Twitter Analytics</b>
Ferdinand "Bongbong" Marcos Jr.	<u>3,676,633</u>	<u>920,854</u>	47.4% Fake Followers (HIGH) 43– Engagement Score
Maria Leonor "Leni" Robredo	<u>1,626,425</u>	<u>600, 858</u>	13.4% Fake Followers (LOW) 78– Engagement Score
Francisco "Isko Moreno" Domagoso	<u>5,400,060</u>	<u>934, 979</u>	37.6% Fake Followers (HIGH) 48– Engagement Score
Emmanuel "Manny" Pacquiao	<u>18,389,790</u>	<u>2,682,393</u>	32.6% Fake Followers (LOW) 72– Engagement Score
Panfilo "Ping" Lacson	<u>369,226</u>	<u>44,139</u>	37.5% Fake Followers 75– Engagement Score
Ronald "Bato" de la Rosa	<u>146.348</u>	No Account	No Account

Ernesto "Ernie" Corpuz Abella	<u>1,800</u>	<u>739</u>	33.7% Fake Followers (HIGH) 71– Engagement Score
Norberto Gonzales	<u>693</u>	No Account	No Account
Leody de Guzman	<u>14,394</u>	<u>16,823</u>	5.6% Fake Followers (LOW) 82– Engagement Score
Sara Zimmerman Duterte-Carpio	<u>408, 191</u>	No Account	No Account
Grace Poe	<u>3,276,680</u>	<u>137,407</u>	54.6% Fake Followers (HIGH) 48– Engagement Score

**Table 5. SNS Followers and Engagement of Notable and Miscellaneous Candidates**

The fake followers in SparkScore's Twitter analytics are defined as accounts that are unreachable and will not see the account's tweets (either because they're spam, bots, propaganda, etc. or because they're no longer active on Twitter). They are determined through the system analyzing a sample of 2,000 random accounts from the most recent 100,000 accounts that followed each of the candidates, then looks at 25+ factors correlated with spam/bot/low quality accounts. None of these, alone, indicate a spam/low quality account; but, when many factors are present, there's strong correlation with said account being a bot or inactive (SparkScore, 2021).

On the other hand, engagement score refers to the comparison of an account with other accounts that have followers within similar range. It measures the average likes and retweets an account has per post then compares it all other counts with the same amount of followers.

## **Data Science – Formula and Criteria**

In determining the chances of a candidate winning the elections, we have created our own formula to determine their chances of winning considering all the data we have gathered in this paper.

The formula would depend on the presence of that candidate being in the all polls or social media platform in the criteria set first before computing their overall chances of winning.

If a candidate fail to qualify for all the criteria mentioned below, individual results of those parts in the criteria that they did qualify for would be the output presented by the program.

	Formula	Output	Notes
<b>Facebook</b>	(Candidate's followers/Total followers of all 11 candidates) * 100	Percentage of winning in Facebook in terms of followers	This isn't an accurate measure of popularity or winning by any means. Especially since there isn't any tool available to identify which accounts are bot/spam in the platform. Furthermore, as mentioned earlier, followers don't translate to votes.
<b>Twitter</b>	[{(Candidate's followers/Total	Percentage of winning in Twitter	This isn't an accurate measure

	followers of all candidates listed here with Twitter accounts) * 100} * .50] + (Engagement Score * .50)]	in terms of followers and engagement.	of popularity or winning by any means alone. Although there are tools available to identify the candidate's engagement in comparison to other account with the same amount of followers as well as identify how much of these followers are real to begin with, there are too few Filipinos on the platform in comparison to Facebook.
<b>Manila Bulletin</b>	(result on Facebook poll * .50) + (result on Twitter poll * .25) + (result on website poll * .25)	Overall percentage of winning according to the polls done by Manila Bulletin in 3 different platforms.	Considering the amount of users that reacted to the poll in Facebook alone, it made the result in that platform the one with the heaviest count in the overall percentage of winning.
<b>Kalye Survey</b>	(result/2137) * 100	Percentage of winning according to street survey.	As mentioned earlier, this survey alone couldn't serve as a real

			<p>measurement to predict the outcome of next year polls due to the limited amount of respondents interviewed. Furthermore, it only covers the sentiments of those living in the NCR and Region 4.</p>
<b>Pulse Asia</b>	-	Results as depicted in the latest percentages given by Pulse Asia.	As one of the most reputable research groups in the country, the results of this poll can and does reflect the general public's sentiment to the elected candidates.
<b>Overall Chances of Winning</b>	<p>(Computed percentage for Facebook * .15) + (Computed percentage for Twitter * .15) + [(Overall computed percentage for Manila Bulletin * .70) + (Computed percentage for Kalye Survey * .30)] * .30] +</p>	Overall percentage of winning a candidate has considering all the data gathered by the group	<p>Note that the results of this can only count if the candidate satisfies or is present in all the polls and social media platforms in this table.</p> <p>Facebook and Twitter has similar percentage</p>



	(Results in Pulse Asia * .40)		<p>because both have weaknesses that complement each other.</p> <p>Facebook has a larger Filipino user base compared to Twitter but, due to the lack of tools available to determine the amount of fake followers along with authentic user engagement, online presence can be manipulated for propaganda. On the other hand, Twitter has more transparent analytics, however there are too few users using the site compared to Facebook.</p> <p>Other surveys and polls makes up 30% of the overall percentage. They're valid results, however it's not as reputable as Pulse</p>
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			Asia results are.  Pulse Asia has the heaviest weight overall, since it's a trusted research group with clear results and sound methodological analysis.
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**Table 6. Formulas used in the program**

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