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Digital Marketing Tool Analysis and Evaluation

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ABSTRACT OF THE THESIS

Nowadays, we have witnessed the extraordinary growth of the digital marketing all over the world and the rapid progress of the digital marketing tools for the small or big businesses. Besides, with the fast paced lifestyle around the world, it is really necessary to dig out the potential information to manage various businesses efficiently. At the same time, as the application programming interface (API) is emerging on various social network platforms, taking full advantages of the application programming interface (API) of any social network platforms is also extremely fundamental for retrieving various data related to the user, targeting the right audience at right place and right time and refine the supported services to boost the business. After we employ various intelligent tools on the social network platforms, we will retrieve the great wealth of data among customers, marketers and businesses. However, it is not enough. We still need to convert these meaningful data into productive forces and look for efficient marketing strategies for our business.

This thesis is mainly contributed to study how to use the application programming interface (API) for the developers and marketers as well as analyse and evaluate the digital marketing tools for the marketers on the social networks platforms, especially for Facebook, Instagram, taking into account the relevant various scenarios of such promising platforms, in order to hunt for the possible efficient methods to retrieve various data behind the social networks, reach more audiences, refine the marketing strategies and boost the business. The first main part provides the development background of digital marketing and some common digital marketing tools, along with the motivation to do this study in order to draw the main research aspects of this paper. The second main part depicts the characteristics of social media marketing API (application programming interface), including what the API is and how the API works associated with the social networks, which are the prerequisites for the following scenarios. The third main part, one of the most important sections, demonstrates the features of the Facebook platform, which are composed of using the Facebook Graph API to programmatically retrieve the data we want, exploring the Facebook Insights Analytics tools to segment the data based on the interests, demographics and locations as well as applying the Facebook Marketing API to promote the products and services. The fourth main part, another most important section, illustrates the visual content on the Instagram platform, where I also focus on

the Instagram API and the Instagram Business tools. Additionally, after I use my own account to test them which are more efficient and accurate than traditional approaches, I capture the corresponding results. From these test results, we will have a comprehensively clear understand about the Facebook and Instagram plantforms. At the last part, I figure out the challenges in the future.

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1 Introduction of Digital Marketing

1.1 Background

In the past few decades, the marketing has played a vital role in generating sales, managing consumers and establishing brand awareness. With the passage of time, various marketing channels, consumer behaviors and the metrics that measure marketing performance have also undergone tremendous changes. However, it is exciting that the traditional and dated marketing tools like the newspaper, radio are replaced by the emerging and efficient platforms like YouTube, LinkedIn, Facebook, Instagram and so on.

On the word of digital, it is defined as all media participation layer, allowing users to choose their own experiences, providing marketing staff with the ability of bridge media, collecting the relationships and traversing all data from the gained feedback by Bud Caddell[1]. Popularly speaking, digital is the new bridge between the users exploring the content and the marketers communicating with the customers to refine their strategy towards their business.

As we all know, the term digital marketing was first used in the 1990s [2]. Simply put, digital marketing markets products or services to the target audiences and businesses through the Internet or any form of electronic medium. With the development of the Web 2.0, the digital era has begun, which allows the user interact with other users and businesses. Therefore, the number of information traffic used by digital marketers has increased considerably. After that, social network began to rise. Many companies are aware that the digital marketing are bringing a lot of opportunities to their products and brands. To give you a thorough understanding about what the term digital marketing includes, the Figure 1 depicts some of the most important types of digital marketing.

Recent years, we have witnessed the phenomenal growth of the digital marketing in large or small businesses. With the fast paced lifestyle around the world, the digital marketing has created a new chapter for all kinds of businesses. Especially, more and more creative content attract a lot of users and businesses. With the right content, our business can easily reach thousands of audiences. Besides, the marketers and the customers can interact with each other directly and timely, including sharing the business and brand experience, providing valuable real time feedback, and areas can be improved.



Figure 1: What does the digital marketing consist of [3]

In addition, it is convenient to target specific groups or types of users based on various factors such as location, interest, gender and age at the most of the social media platform. More importantly, the intelligent and casual format of the data are provided by the social media to find the best way to refine the products and services for the audiences. Therefore, social networks are becoming more and more popular all over the world.

1.2 Digital Marketing Tool

Nowadays, it is well known that maintaining the brand and increasing the number of customers are not so difficult because of the rapid growth of the digital marketing and social networks. However, in order to grasp each opportunity and take full advantage of them, it is necessary to get the help from digital marketing tools. As Figure 2 described, there are a lot of most effective tools we can use to target the potential customers and define the business strategies. If we don't leverage the right marketing tools to drive our business, it's hard to implement the rapid growth of our business as we want. In the following description, I'll show you some different types of marketing tools available and illustrate the main function of them in the marketing.

- **Google Adwords:**



Figure 2: Digital marketing tools [4]

One of the most popular tools in Google platform is the Google AdWords, which is one widely used advertising system for most of the businesses. Its working principle is like that advertisers make a tender on certain specific keywords so that clickable advertisements show up in Google’s search results. This is one of the key sources of revenue for Google search because advertisers have to pay for these clicks based on the predefined rules. Besides, the advertisers are able to efficiently target the websites, applications, and specific keywords that match the content of the keywords they need.

For instance, we would like to target one topic in a website and select one option to show only our advertisements. Likewise, we are not only targeting specific websites on certain topic but also targeting users based on the products or services they may be interested in. Suppose we are going to sell a product and the potential customers have already read the instructions. In order to make the targeting better, we need consider

the targeting preferences and tell Google Adwords to display advertisements only on the specific website. This means that we can display advertisements to users who read something related to our product description and provide articles that contain keywords for our product for the potential customers. At the same time, in order to make AdWords more suitable for the business of modern marketers, it is certain to understand how to use AdWords to drive business development which is based on the competitiveness of the keywords we bid and the relevance of the keyword to our firm's actual conversion rates.

- **Google Analytics:**

Another important marketing tool of the Google platform is the Google Analytics. It is a free website analytic service and gives us the overview about where customers find and use our website and how to measure our website traffic and the advertisement performance. At the same time, it is possible to track the return on investment (ROI) for our network marketing. Besides, as a social media marketing group, we also will realize that we can easily view traffics from different networks, check the amount of reading time we spend on one specific web page and identify who is on our page at present. From that, we can dig into great and valuable information on our website.

More interestingly, we can not only see what users are searching for on our website but also know whether the users have already found what they are looking for on our website, which also provides us the recommendations about which pages need more particular information and which novel content we need create on our website to further attract the visitors. At the same time, We can visually understand what the most people clicked in Google Analytics by hovering over a link to see more details, which also supports us to clearly know the most popular places on our website and determine where the user clicks on our website. Therefore, if we have a specific link and want visitors to see it, we should make sure to place it on our website where we get the most clicks.

- **Oracle Content Marketing:**

In order to hold competitive, it is extremely important for brands to pay more attention to build large amounts of content and try their best to keep quality. However, it is real for many business to business(B2B) company and business to customer(B2C) which struggle with quality and quantity of the marketing products and services. Therefore, we need not only target the right people and use a reliable content strategy, but also look for one right

marketing tool to integrate our business and implement our objective efficiently. Oracle content marketing sustains customized workflows and releases by custom roles, which simplifies the bulk of the process of creating, distributing, and promoting new content to advance strategic dialogue at each stage of the sales cycle [5]. Its main function is through the relevant plans and processes convey further information to potential customers in order to trigger the dialogue on the conversion.

More specifically, it will obtain sales dialogue function through the provision of marketing approval of the content and the sales categorized channel of the characters and stage. For example, users can share their content through main channels, or even use segments that are specific to the content of the customers interest in order to drive interactions. In addition, Oracle content marketing built a comprehensive content marketing strategy essential indicators, and praised the general analysis package. These knowledgeable reports assist the marketers realise how content works and how to accelerate content emergence by finding any hidden dilemma in the content workflow. If we do not have these metrics, it will be more difficult to maintain the content.

- **MailChimp:**

As well known, most email services restrict the amount of emails we can send at a time in order to block spam. However, the MailChimp allows us send emails based on web to an unlimited number of receivers at the same time. It is extremely convenient to create various types of communications and offer simple options to share them on social networks such as Facebook so as to make your newsletters published on the personal platform. Besides, In order to avoid rewriting the email over and over again, it can help the marketer create the list of people who want to sell the product and then use the custom template created by their products to use this list. At the same time, security issues are not to worry about, because it is with the Internet service providers (ISP) and company domains to make sure our email approved. If the delivery has a problem, it will try to resend the email and tell you why the email may fail to send.

More interestingly, if we send an email using the personal email but don't know if anyone has turned it on, it will support us to format and save the drafts easily so as to track results and analyse the responses from clients. Through these data, it will provide us an better inspiration to refine our campaign to receive a more positive feedback about our page, also offer us a variety of interesting analyses on successful delivery and opening

rates so that we understand what our audiences listen.

- **SimilarWeb:**

At present, there is one popular online competitive intelligence tool to offer marketing insights and traffic management for any website called SimilarWeb. We can have a overall understanding about the number of reaches, engagement and the ranking through this marketing tool. It is possible for users to search specific data by entering corresponding websites based on the category of industry or area and show up of top 50 sites. More importantly, it will help us convert raw data into attractive and insightful web metrics, such as social traffic, organic and paid search, related website and traffic source [6].

By default, SimilarWeb provides a large amount of data based on the visual dashboard, which is composed of many metrics, including the referring sites, social and search traffic, audiences, advertising, geography, mobile applications and so on. It is possible to compare two websites at the same time by the free version SimilarWeb. Last but not least, it also can ensure the barrier free access of multi users for a number of large corporations, including professional services as well as the integration of application programming interface (API).

1.3 Motivation

Nowadays, with the great development of the digital marketing and the rapid progress of the digital marketing tool, more and more people or enterprises are taking good advantage of the social networks to refine their services, attract more audiences and boost their businesses. Therefore, my thesis fixes more attention to the social networks, especially for the Facebook, Instagram. They are real time communication platform for sharing interesting stories and pictures to get the feedbacks. There are a lot of available data collected by the Facebook and Instagram, which can help us to get the feedback timely and determine the efficient marketing strategy. However, if we do not have these meaningful data and intelligent analytic tools, we have to spend a lot of time, money and human resources for calculating the result we want to know. Therefore, in order to access these useful data, dig out the potential information behind these data, predict the future directions and better manage our business, it is necessary for us to leverage the meaningful data, study the different types of application programming interface (APIs) and explore the build in analytic tools on Facebook and Instagram platforms.

Except for the most popular social network and the intelligent build in analytic tool, the Facebook also open a wealth of available programming interfaces for the developers to interact with the platform in order to integrate and test their applications. The available programming interface (API) is based on the web services and the user access token. In order to better integrate our applications and services into the popular platform and manage our business and audiences more efficiently, it is also necessary to understand it very well. In the chapter 3, I will mainly focus on the Facebook Graph API to solve some complicated problems.

At the same time, you may often hear the term of visual marketing at any occasion in recent years. Since most social networks pay more attention to the visual content, including the quantity and quality of the visual content, the access method to the visual content. At present, the Instagram is one of the most popular representatives of the visual marketing platform, which allows any authorized users and businesses to share their original and interesting pictures and videos to other related social media website or embed on other's applications and businesses. In order to retrieve the related data of the pictures and posts, analyse when is the best time to post, know the demographics of the followers and gain a lot of engagements, I will study and illustrate the most popular Instagram Business Tools and the Instagram API in chapter 4.

With the great wealth of data retrieved on the social networks and the urgent need for efficient marketing strategies, we need to convert these useful data into productive forces for our business. Therefore, I also study the Facebook Marketing API and the Instagram Ads so as to better determine the marketing strategy, target the right audiences at right place and time, serve and boost our business efficiently.

1.4 Thesis Organization

The major contribution of this thesis is to study how to use the application programming interface (API) for the developers and marketers as well as analyse and evaluate the digital marketing tools for the marketers on social networks platform, especially for Facebook, Instagram, in order to hunt for the possible efficient methods to refine the marketing strategies, reach more audiences and boost the business. During the development of this thesis, the characteristics of Facebook Graph Explorer and Instagram API console will be displayed, they play a very important role in retrieving and aggregating

the data programmngly. After that, I will use the Facebook Insights Analytics tools and Instagram Business Tools to analyse the data and introduce the marketing strategies for the business.

This thesis is organized as following: Section 1 introduces the background of digital marketing, along with some common digital marketing tools. Besides, it will offer the rough idea about what I will discuss and which tools I will use in the subsequent chapters. Section 2 displays the characteristics of social media marketing API, including what the API is and how the API works related to the social networks. Section 3 demonstrates the typical Facebook platform, containing how to use the Facebook Graph API to retrieve data, how to use Facebook Insights Analytics tools analyse data and Facebook Marketing API to market products and services, which are characterized respectively. Besides, I have captured the test results by the Facebook built in methods, which will be helpful when we would like to analyse our business and reach more audiences in the future. Section 4 is composed of three major aspects namely Instagram Business Tool, Instagram API and Instagram ads, which are used to explore the data especially for the visual content on the Instagram platform. Similarly, the built in tools will be used and we also can see the captured result of the retrieved data. The extremely important two parts are Section 3 and Section 4, where you will acquire the further knowledge about the Facebook platform and Instagram platform. In the end, Section 9 concludes the thesis work and figures out future challenges.

After we finish reading them, we will have a clear realization about the reason why the Instagram and Facebook are really more popular all over the world for various audiences and businesses.

2 Characteristics of Social Media Marketing

As we all know, social media marketing is used for promoting products or services on the social media platforms or websites. Although the e-marketing and digital marketing are still the mainstream of the academic community, social media marketing is becoming more and more popular among practitioners and marketers. Generally speaking, there are their own built in data analytics tools for the most social media platforms in order to track the progress, participation and effects of the campaigns held. At the same time, social media marketing connects customers, potential customers and marketers together, which is helpful to build the desired social media marketing culture, implement and manage the social media marketing campaigns. In order to effectively use the social media, it is necessary for the enterprises to allow various users to publish their generated content such as online reviews rather than the use of marketing personnel for advertising. More importantly, social media marketing is not only usually related to companies for their businesses, but also associated with a series of nonprofit organizations for their programs or services.

On the other hand, it is certain that social media can not only serve as a marketing tool based on the public relations, but also as a channel of communication for some specific audiences, such as social media influencers and customer effective interactive tools. Currently, Facebook and Instagram are dominant social media platforms on which users can super target their advertisements, which not only need user's public profile information, but also need the submitted information, instead of hiding information to others. For example, several companies both the Apple Computer and the McDonald have initiated some types of online communications with the audiences in order to promote relationships with customers. Based on that, these companies regularly encourage their customers to freely communicate and express their sensation, recommendations, ideas, or views about the products, the works or companies in order to advance the creation of new products, improve the quality of services and effectively coordinate the cost effectiveness. In addition, the number of fans of the current Indian Prime Minister on its official Facebook page is only lower than President Obama has 21.8 million fans, who uses social media platforms to reach out to more young people in India and collect all kinds of social problems. And most people say this approach is more efficient and popular than traditional media channels.

However, it is remembered that social media marketing should pay attention to the use of various media to assist us implement the marketing goals. Because advancing the interaction among the customers and supporting the timely feedback will improve our brand awareness and increase business value.

2.1 The Generation of API

In order to have a better understand about the social media plantform, it is necessary for us to know the application programming interface (API) well, which is the power behind almost all the social platforms. For those who have no sense about the term before, an application programming interface (API) is an interface to transfer information for one software to another software without the users participation. However, on the computer programming level, an application programming interface (API) is a series of protocols, routines and tools to create software applications [7]. Generally speaking, the application programming interface (API) is used with the graphical user interface (GUI) components and determines how various software components to interact with each other. In addition, a better application programming interface (API) will provide all available building blocks so as to develop the program as easy as possible.

In order to better understand the complicated term, I will divide it into several parts and offer some specific examples. For instance, we must be familiar with the game, tools and other softwares on our smartphone, which are called the applications. And when the computer engineer write the code to implement some functions in our life, which is called programming. If we want to one application interact with another application, it depends on the interface. Therefore, the application programming interface (API) is a fundamental approach for programmers to interact with one particular application. In other words, if we want to buy some products online, it is necessary for us to provide our credit card information which will be send to another application by the application program interface (API) so as to ensure the information provided correct.

Even if we only are able to access limited data of the application, it is still necessary for us to invoke the application programming interface (API) to retrieve the data we want. Besides, we need use the specific language determined by the application. The Figure 3 demonstrates the application programming interface (API) how to work between the programmer and the application. It is clear that application programming interface (API)

will receive the request from the programmer, and then retrieve the data from the application, finally return the response to the programmer. If the application programming interface (API) fails to retrieve the data, it will response corresponding error messages.

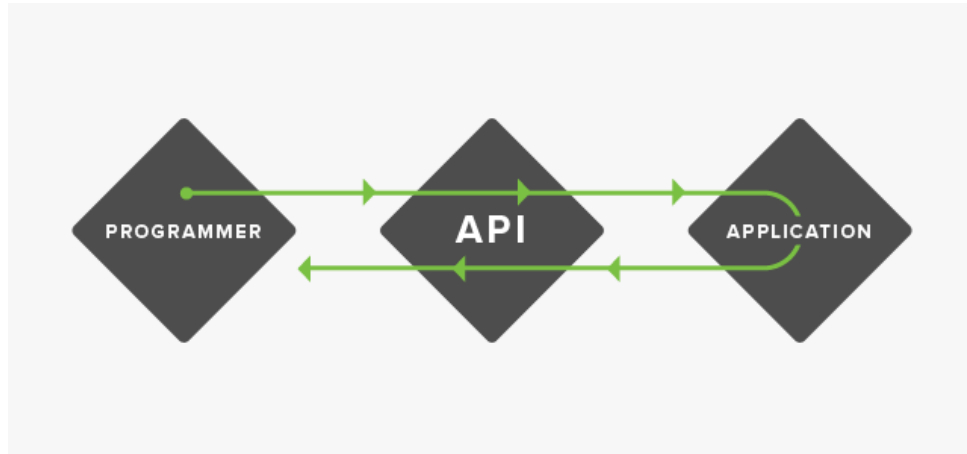


Figure 3: Visualization for the API [8]

Now I will introduce the reason why the application programming interface (API) is so important to the enterprise. Basically, the application programming interface (API) can provide the possibilities for its corporate customers and combine with the tools that the company creates to enhance the functionality of the system in order to make the incredible difficult tasks easier. For example, Facebook has released an application programming interface (API), supporting users to combine social media advertisements with the social customer relationship management (CRM) tools to streamline their advertising processes. At the same time, the application programming interface (API) can also help the client to automatically perform many of the processes that were previously done manually. It is possible for most customers who do not log into a web browser to integrate with the system and build their own environment and fully regulate their stores. As for the developers, the application programming interface (API) can rapidly combine with the programming tools to make the data acquisition and analysis more efficient. Therefore, it will be a popular trend that more and more companies create and use the application programming interface (API) in their businesses.

2.2 Characteristics of Social Network APIs

Recently, as Figure 4 described, the number of API in social media platforms is attracting a variety of attentions and participations. There are many social media companies involved in it, like Facebook, Instagram. Basically, they lead into the specific API in their applications so as to expand their social networks and fascinate more audiences. Even if major API documents and specifications are complex to understand for most of us, it still opens the door for us to the social networks.

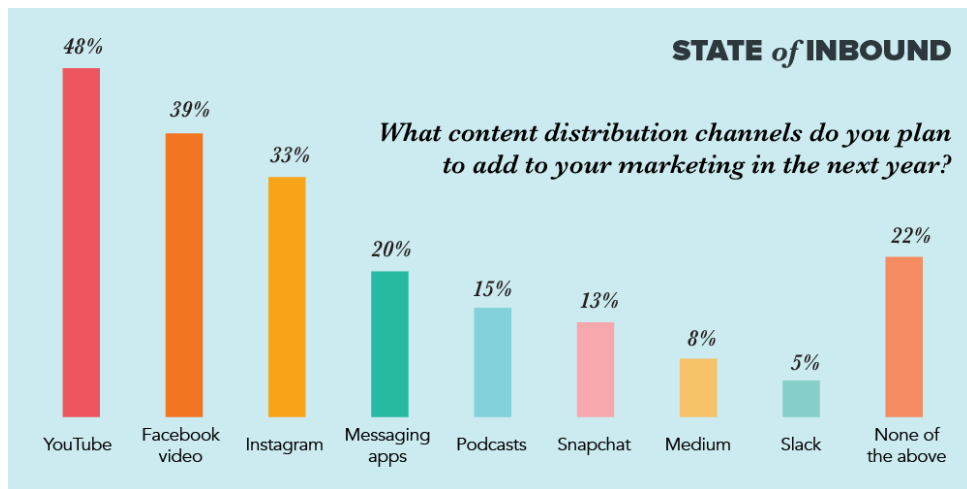


Figure 4: Social Network APIs [9]

For any digital marketers, it is really important to understand the rich information that the social media API can offer so as to support us to make our business more competitive in the social network marketing. In the following sections, I will focus on the popular Facebook and Instagram APIs. However, before we get to know their details, let's take a brief look at how the social media API works on the daily work and what they are able to do for their business in these social media platforms.

On the one hand, when we use these social networking APIs, it is very convenient and efficient to programmatically access the platform in order to provide users with almost all the functions of the project and to access the relevant informations through other similar services. In addition, we can also use the API programming based on our requirements to customize the platform products. That is to say, the social media platform supports to develop the suitable web applications based on their own programming system by the APIs, in order to integrate the third party services into their own website. In addition, if

we want to use social media widgets to share interesting information on our website, the application will employ the API to associate the site to a specific social media network and make the information flow more fluent pass the application.

On the other hand, specific platform API applications are able to automatically access data and metrics associated with certain social media resources such as profiles, feeds, photos. Essentially, it means that users can simply retrieve and manage the data and metrics periodically for multiple resources with one click. That's why most businesses and developers like it.

As a result, the social media API has become a excellent social media marketing tool. In order to guarantee that our business gets the maximum benefit in the social media impacting on consumers, we must be friendly to use the social media API strategy.

3 Facebook Platform Characteristics

As time is going on, it is obvious that Facebook has become more and more important personal social network in the world. Based on the official statistics, there are greater than 1 billion people registered on the Facebook platform now. That is one of every seven people will have the Facebook account. Besides, most of them will be active every day on Facebook. It is no doubt that people spend a lot of time and energy on Facebook, so the advertisers and marketers would like to take full use of these audiences and data resources. Therefore, Facebook is fast becoming an advertising and marketing platform. In fact, Facebook business model is dependent on advertising income. Although the indiscriminate advertising reached almost 725 million people, the effect is not very good as we expected. However, this provides a great opportunity for the marketers and advertisers who are very interested in looking for a way to break up Facebook users so as to target the ads for goods and services effectively.

The important reason why most people use Facebook is for impression management. It is quite popular for Facebook users to use the oral and nonverbal expression of the preferred brands, which provides marketers and advertisers with a convenient way to look for the products and services interested by the users[10]. Another attractive point is Facebook's rich source of information. That is, the personal data is published by the Facebook users in their personal profile, including demographics data, personal interests and activity informations. For example, Facebook users usually post 350 million new pictures average every day, which contain a lot of hidden data. So the marketing researchers can take full advantage of these data to understand the impression management, then design a more effective way to locate online advertising.

Interestingly, Facebook provides the Application Programming Interfaces (API) to help the researchers to extract all kinds of data they need and introduces some analytic tools to allow the marketers to manage and analyse these data collected on the Facebook social networking service. In the later sections, I will show up a number of examples for leveraging the Application Programming Interfaces (API) and the analytic tools to target the audience and boost the business.

3.1 Facebook Graph API

In April 2010, Facebook launched its first version of the Graph API, which is the main method to access the data in and out of Facebook's social networks. This is a low level HTTP based API for querying data, publishing new stories, uploading photos, and various other tasks that an application might need to perform[11]. It is a good choice to use the Graph API Explorer to understand how the Facebook Graph API works. As a low level tool, we can use the Graph API Explorer to query, creat, and delete data. When you integrate with Facebook, it is a very convenient resource. Specifically, it allows you to execute Graph API queries such as PUT, GET, POST, DELETE in your browser and test the results using one of your application's access tokens.

The Graph API is named due to the idea of social graphs, which represents all kind of information on Facebook. It contains the edges, nodes and fields three elements. More specifically, the node contains the user, photo, page and commnet, while the edge is the connection between the photos of the page and the annotation of the page. The field is the node's properties, such as the user's birthday, the name of the page and so on. In order to use these APIs, we need to create the corresponding request URL(uniform resource locator) in the Graph API Explorer. Similar to a command line, the URL you call will access the resources and services on Facebook. For example, it is easy to execute a GET request to extract data from the Facebook profile. More than that, we can use the Graph API to post data to our social graphs. In the following elaboration, I will show you all the details about the Facebook Graph API.

3.1.1 Graph API user

In Graph API, the user node means one person on Facebook. It is sensible to use the user id to specify the unique user, since we can access the user information through the user id on the Graph API. In order to use the Graph API to perform actions on the user, you need to use a supported method to send the HTTP request to a user endpoint which can be a collection of the user resource. It is helpful to define the request, knowing the navigation properties of a particular user. For example, the me request is a special endpoint in Gragp API, which replaces the user id to request the user information using the user's access token. By default, it is impossible that all fields in a node or edge are returned when you have one query in the Graph API. You need to select the fields or

edges of the node that you want to use as the query parameter. This is very convenient to make your API calls as efficient as possible. If you want to have a deeper understanding about the fields of the user, you can refer to the [url](#). In Figure 5, I will display the basic fields information of myself and the detailed PHP code in Figure 6.

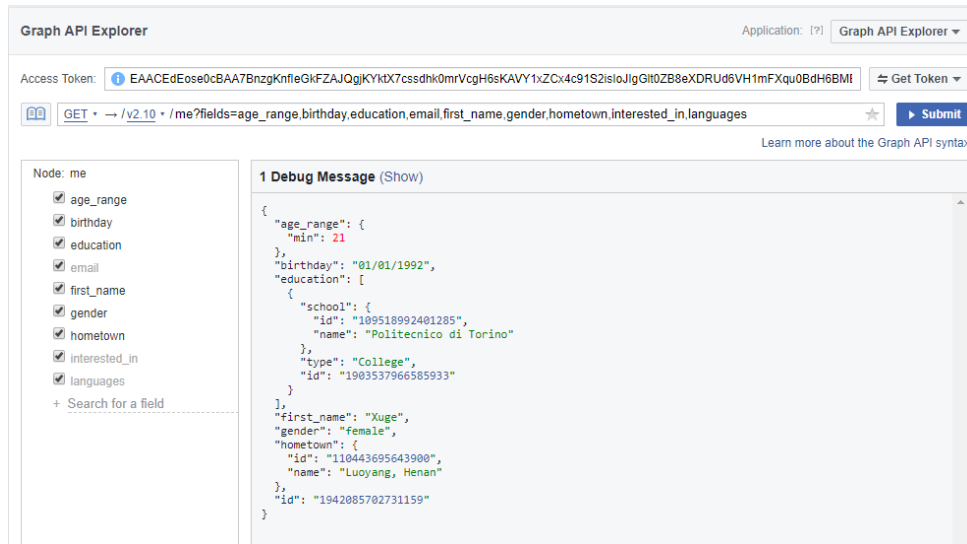


Figure 5: Result of the user fields

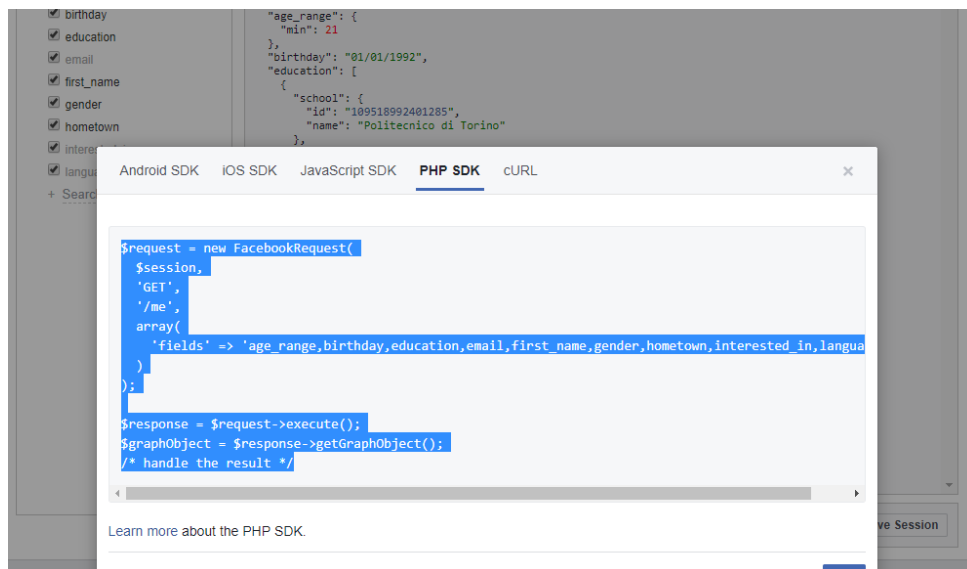


Figure 6: Code of the user fields

From the edge of the user, we can get the further related information about the user. For example, we can read the photos edge including all photos a person has been tagged in. Besides, it is possible to get the like and comment data with limitations by the Graph

API. In order to extract a limited number of objects, you can use the limit parameter on each field or edge, even if there is no restriction on the number of nesting levels. In addition, when you send an API request to a node or edge, you usually do not receive all the results of the request in a single response. The reason is that some responses may contain thousands of objects, so most of them respond to the default paging. However, the cursor based paging is the most effective paging method that should always be used wherever possible. Specifically, a cursor is a random string that marks a specific object in the data list, such as before (which is a cursor that points to the beginning of the returned data page), after (which the cursor points to the end of the returned data page)[12]. You can see the test results in Figure 7 and Figure 8.

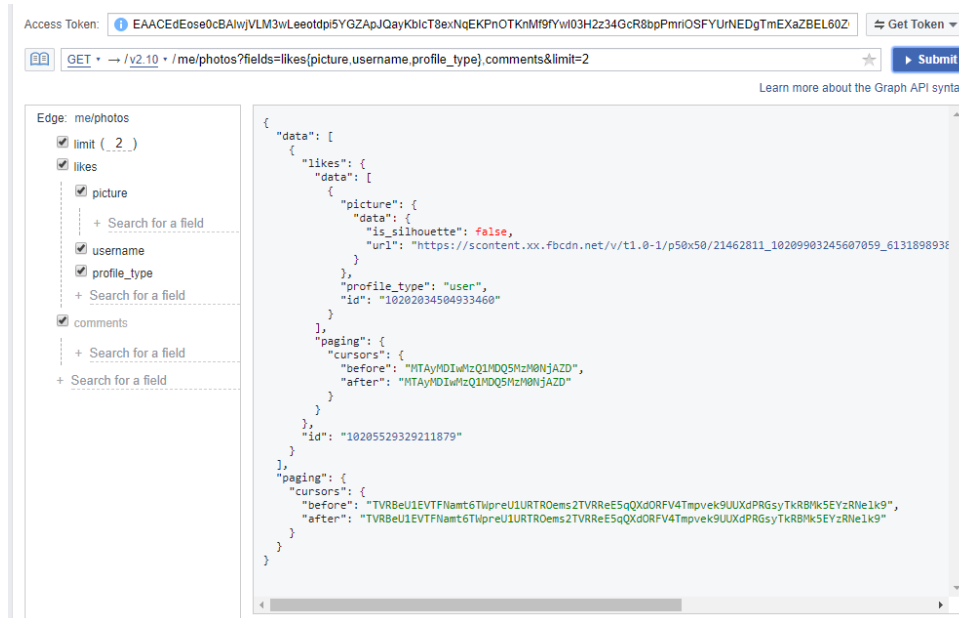


Figure 7: Result of the user edges

3.1.2 Graph API page

On the whole, the Facebook page is the public profile created by anyone who attempts to promote themselves through social media including the businesses, organizations. Similar to the personal profile page, you can manage your page fans on Facebook. In addition, it is possible to see the dynamics of this page online, including status updates, links, events, photos and videos posted. In other words, Facebook pages provide businesses and other organizations with a way to interact with their potential audiences, not just

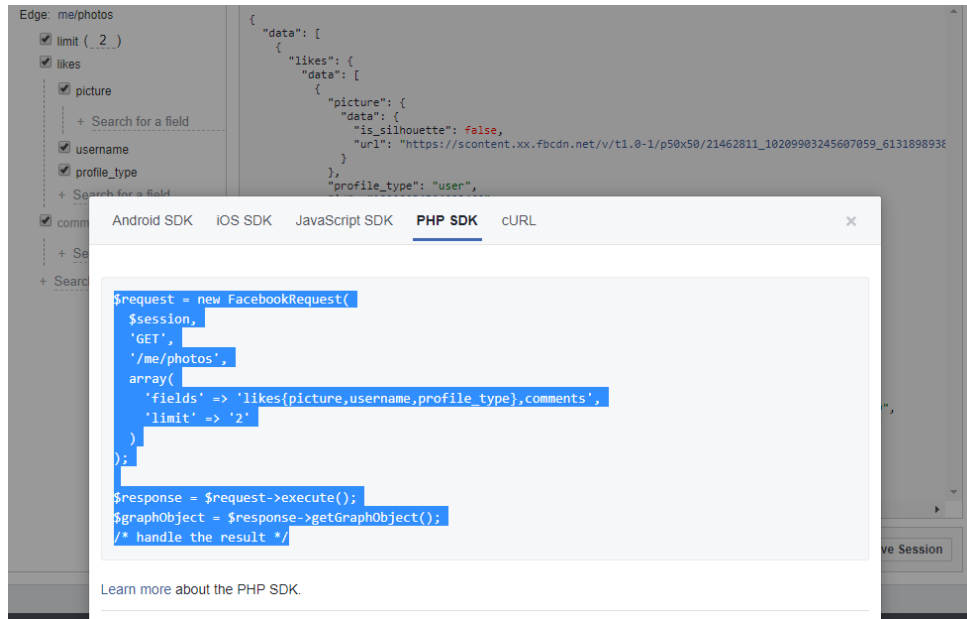


Figure 8: Code of the user edges

advertising to them. At the same time, you can know the basic information about the the owner of the page by the Facebook Graph API.

Since the Facebook page allows you promote your business and engage with the users on Facebook, the person who likes your page can follow your page to Keep up to date with your business. Additionally, it is possible to use the geographic and demographic insights about people who like your page so as to make marketing decisions. In Figure 9, we can know the category of the page(such as product, service), locaton of the page and how many unique account likes this page so on. If you want to have a further understanding about the page metrics, you can refer to the [offical document](#), which is really useful for us to analyse our business and dig the potential customers to interact with them. More importantly, we can retrieve which person like our picture or page by the page id in Figure 10 rather than only know how many people like our page or picture. Because it is more meaningful for businesses that use the page audience data to understand what their fans most care about.

3.1.3 Graph API insights

As for the Facebook insights, which gathers all pages data on Facebook through the Graph API Explorer. The insights connect one single insight metric to another specific

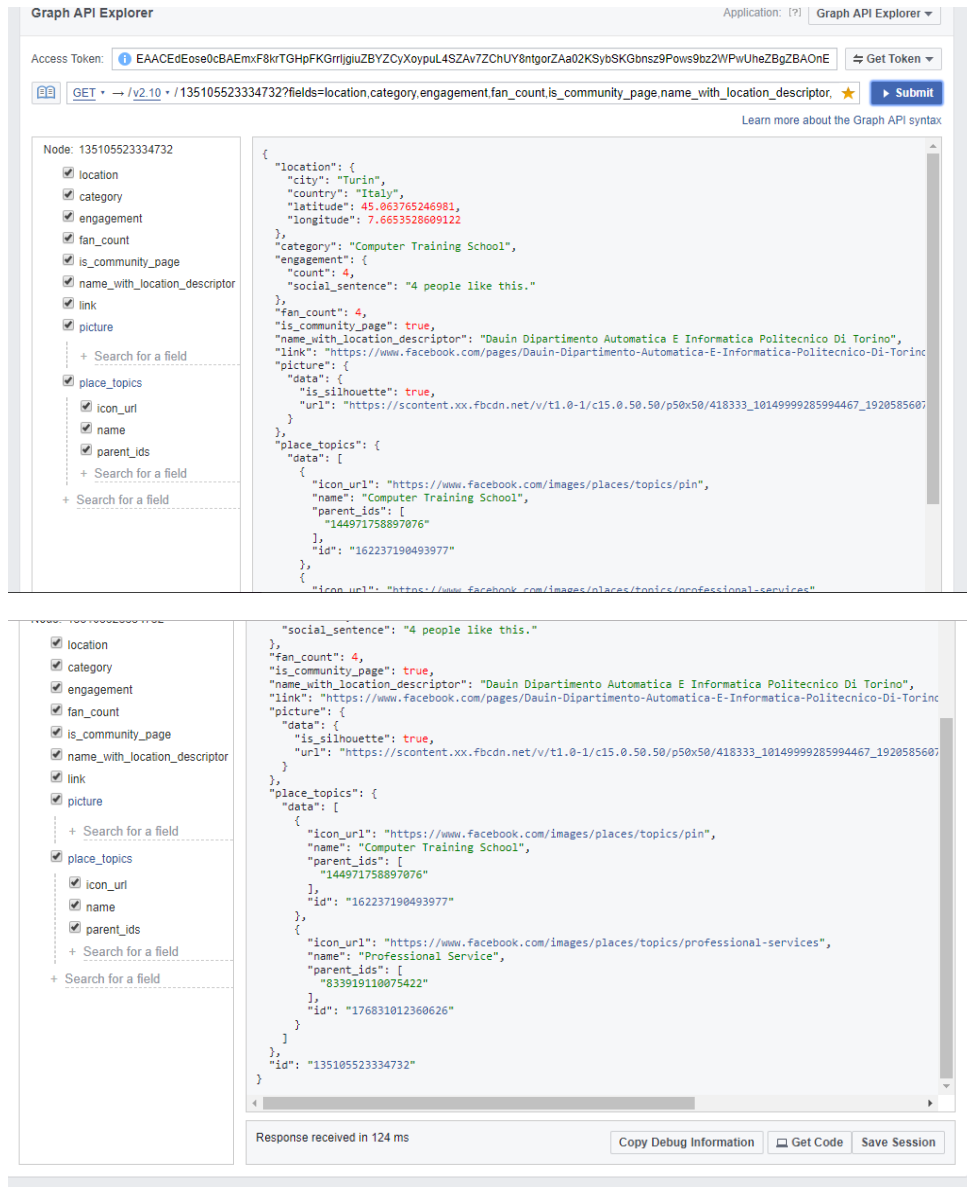


Figure 9: Basic information about one page

Graph API object such as the page or the post. The request is represented by the following template resource `/page-id/ insights/metric` on Facebook Graph API Explorer. Besides, all administrators of your page can see the Facebook insights in order to help you track the number of active users, which is convenient to understand the page performance. With the Facebook insights, it is more efficient for you to determine the best day of the week, the best time of the day to promote yourself and the most popular type of the content. However, it is possible to generate Facebook page insight, only if there are more than 30 people like Facebook page. In addition, you need to remember that the API Insights provides only a two years retention period, data for more than two years will be deleted.

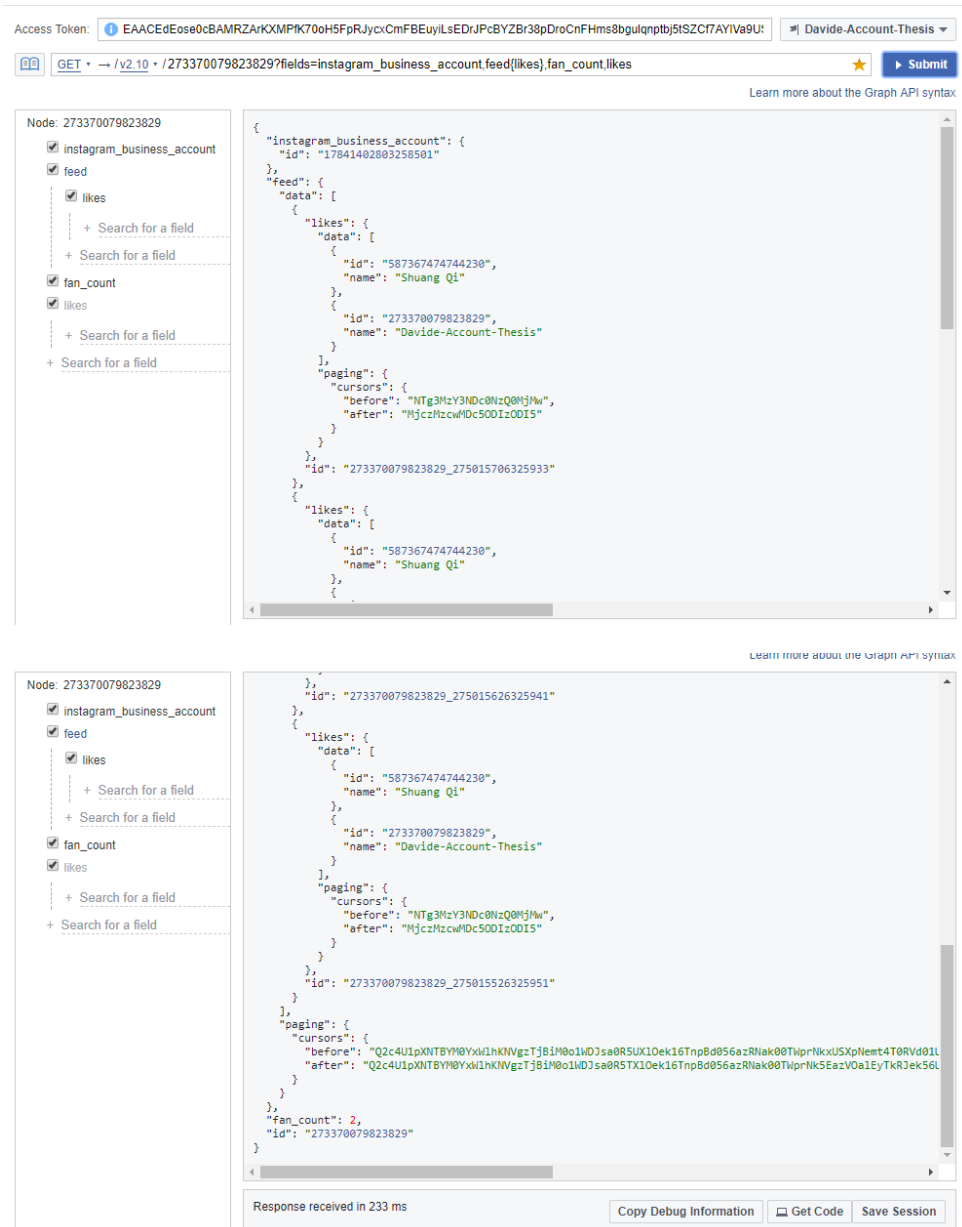


Figure 10: Which person like our page or picture

Another thing is if you ignore a specific metric for a given endpoint, you will receive an error response. The Figure 11 will show you the test result.

Using the Facebook insights, you not only can access the metrics about your Facebook page, but also can segment your audiences by some criteria. It is really important for you to know your fans well in order to boost your business. However, when we segment our audiences by the metrics, not all of them are public. For example, the *pagefans_country* is the public metric, which breakdowns the page fans by the country. From the response

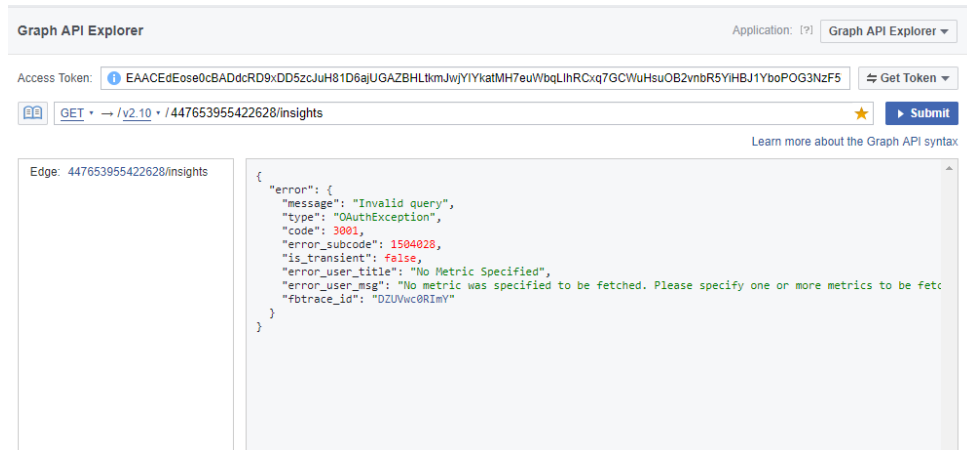


Figure 11: Error response when you miss the metric

on the Graph API, you will know where the fans come from most like your page. In Figure 12, you will see the test results. In that, you will notice two new terms next and previous. As the Figure 13 depicted, the former means when you request on the Graph API, it will response the next page of the data, if not included, this is the last page of data. the latter means when you request on the Graph API, it will response the previous page of the data, if not included, this is the first page of data[13]. Another example is for the private metric like the *read_insights*, from that we can retrieve the total number of impressions made by the user who see the content associated with your page. In order to access such data, we need get the permission. After granted, we can access the metrics for all pages owned by the user. In addition, you can access the insights by the page access token, even if you are not the administrator of the page. If you want to know all available metrics, you can refer to the [insights metric documentation](#).

3.2 Facebook Insights Analytics Tools

If we want to track our user interactions and analyse the user behaviors on Facebook pages, the Facebook Insights Analytics is a powerful tool. Besides, when we have the further understanding about the Facebook Insights, including the likes, engagement, reach, and demographics, we are able to retrieve a lot of useful data to help us to learn more about Facebook pages, improve our Facebook page content strategy and increase engagements. In other words, it is quite convenient to know well how our page can provides a perfect overview of our business, how our content resonates with our audiences.

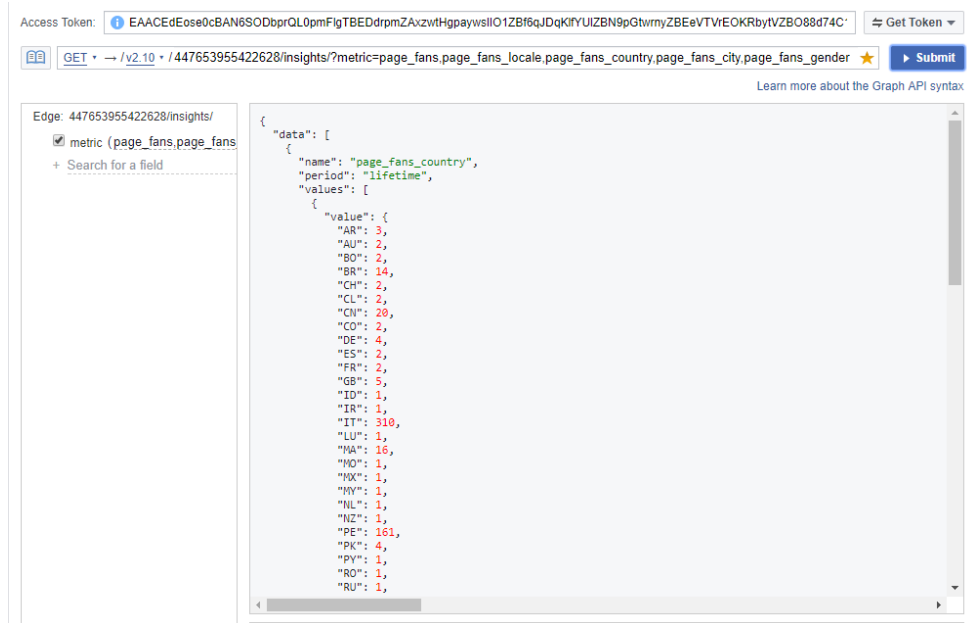


Figure 12: Segment the page fans by country

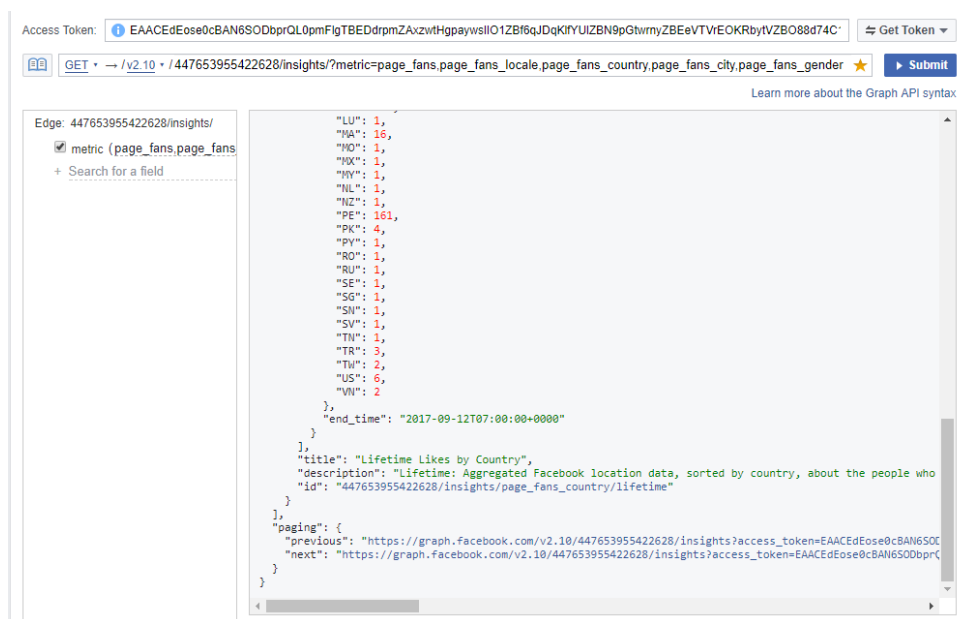


Figure 13: Segment the page fans by country

3.2.1 Overview of your page

After we open our Facebook Page Insights, the overview button will give us overall related data about our page like Figure 14, including the page likes, post reach, page review, page actions and recommendations in the last week. In the upper left corner, we will see the last 28 days as the default time period, but it is possible to change the

date range manually through clicking the date range drop down menu. In the upper right corner, it is possible to choose a different data format for the export file, since it will have the effect on the downloaded data and the analyzed version. At the same time, our layout options vary based on the data type we defined before. Then, we can enter any section we want by clicking the corresponding box. More attractive, there is a good perspective of our recent page posts in Figure 15, including the type of post (such as the link, photo, video and so on), targeting (if we target some specific audiences), reach (the number of people who have seen our post), engagement (the number of people that like, comment, and share our Facebook posts) and the promotion (the number of posts we advertise on Facebook)[14].

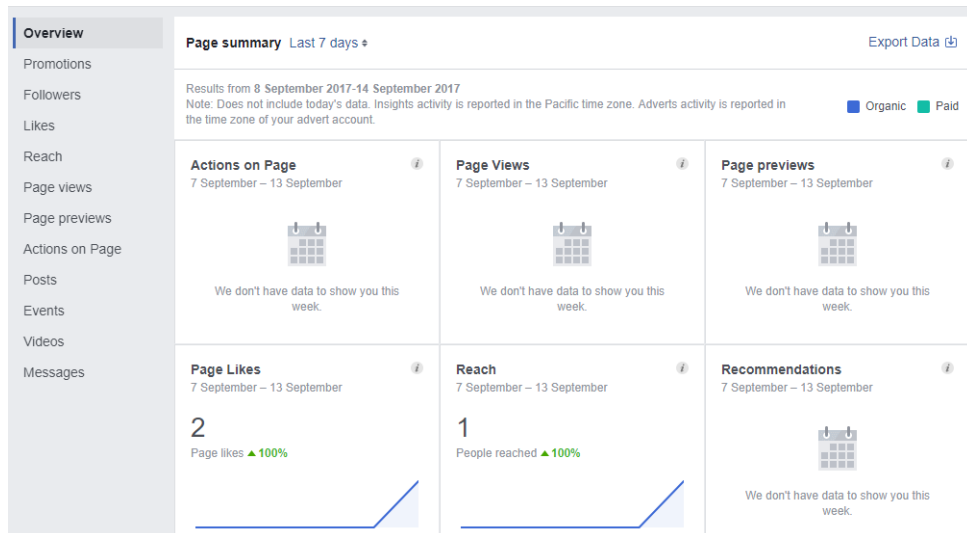


Figure 14: Overview of our page

3.2.2 Basic data of page likes

When we move to the page likes section, it is obvious for us whether our fan group is growing or not in Figure 16. Besides, Facebook's insights analytics will tell us the likes we have obtained and the likes we have lost in the last days or months. The reason why we lost the likes from our audience may be they really do not like our page or the database is cleaned by Facebook. Additionally, it is quite convenient for us to use the date picker to compare the graph data among last week, month or quarter. Especially, when we hover our mouse on the total page likes chart, we will clearly know the number of likes we obtain

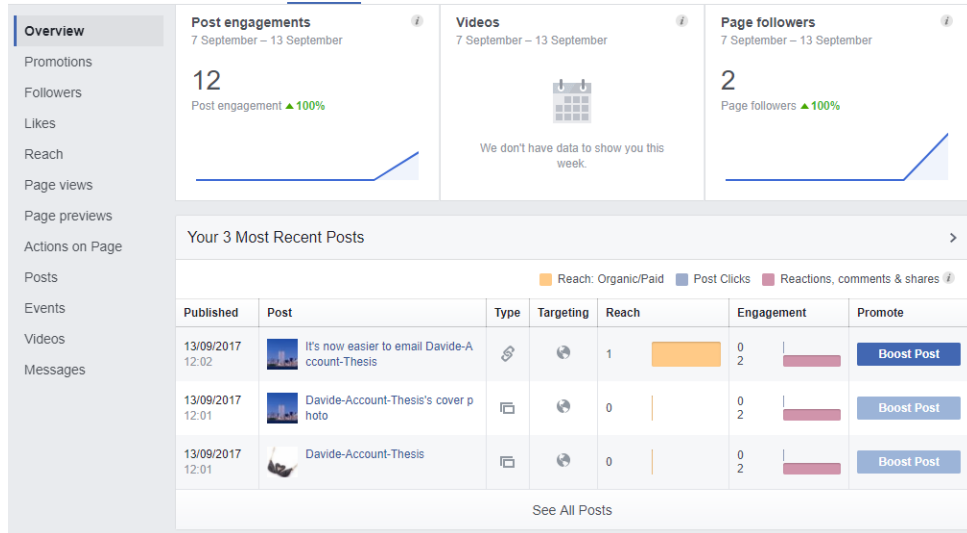


Figure 15: Overview of our recent posts

on a particular time and date.

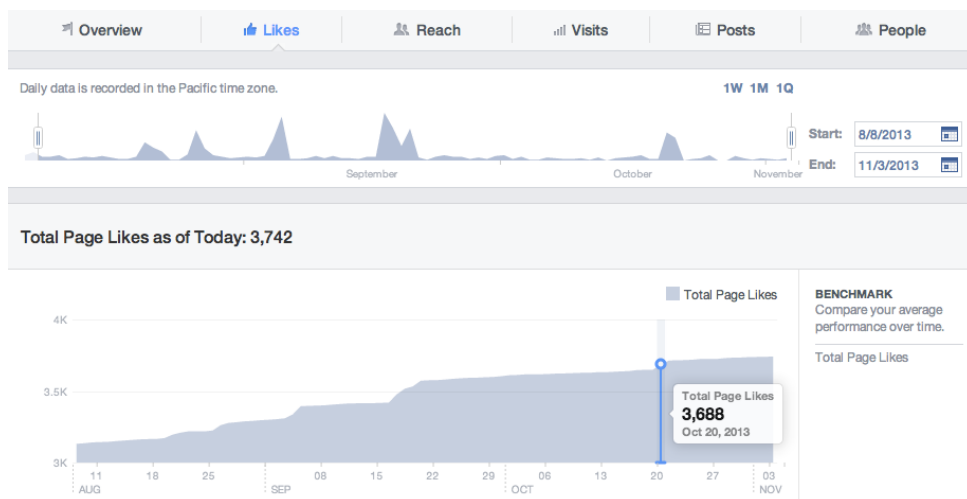


Figure 16: Total page likes as of today

More considerate, we will get a detail graph about how our likes changed based on the date we choosed, containing the unlikes, organic likes, paid likes and net likes (the number of likes subtract the number of unlikes). It is also recommended to use the Facebook ads to target the right audience at the right time and place in order to increase the number of likes and reaches for our business.

Another more interesting thing is from the Figure 18, it is obvious for us to know where

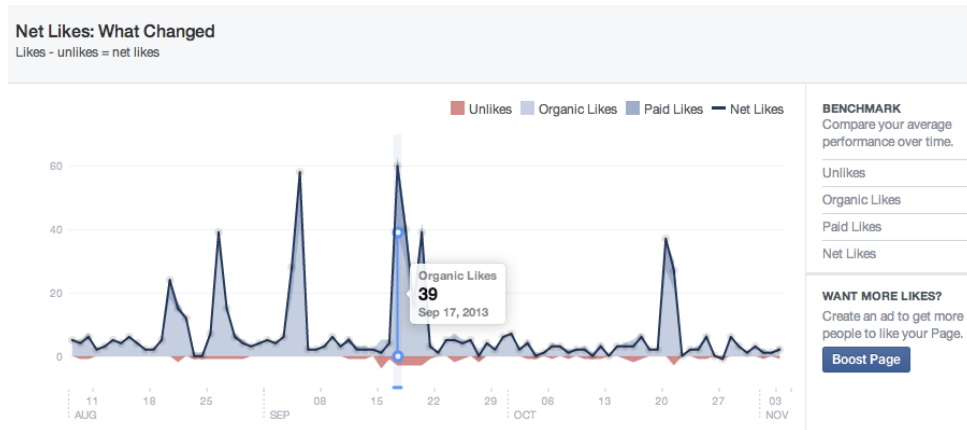


Figure 17: Net likes

our page likes come from. In general, most people like our page through the like icon on our page, page suggestions from Facebook insights, advertisements or stories poseted by other people who like our page. It is really helpful for us to evaluate whether our pages grow at the rate we want and whether we get the most likes out of our natural traffic or advertising. In addition, it is very nice to pop up one number, when we click one specific day in the chart.

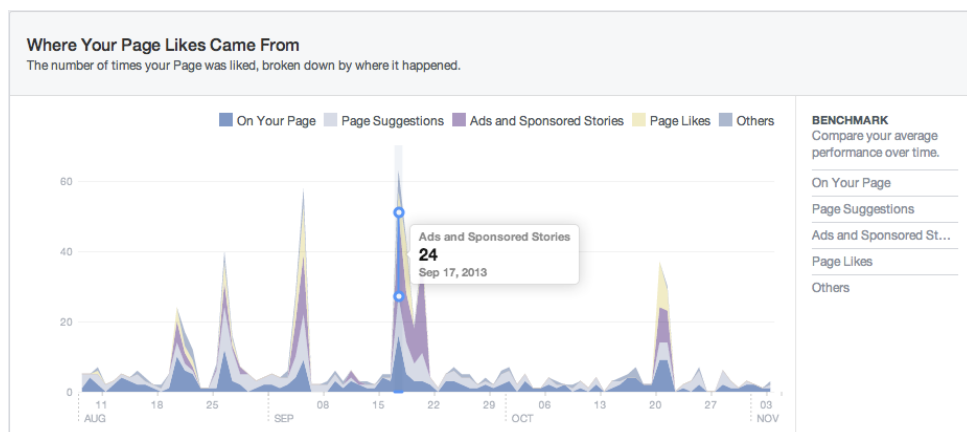


Figure 18: Where your page likes happened

3.2.3 Related data about page reaches

In terms of the page reach in Facebook Insights, it is one of the more common metrics used by many social media marketers. Similar to the likes section, we will see the organic reach compared to paid reach in the graph, which shows us what types of posts do the

best and gives us a new inspiration for improving the page reaches. Compared to the likes, the reach is the number of people who may see our pages. In other words, when the customers open our page without the scrolling action, it still seems to be regraded as one reach. However, the reach section is particularly focus on the engagement. Except for the comment, claim and share, there is another interesting thing. We will find the negative feedback from the audience who have viewed our page, including reported as the spamming, unlike our page. According to that, Facebook will show our page to some audience who may be interested in. More importantly, we can refine our page and decrease the negative feedback by using this graph.

I will display the test result in this part. As Figure 19 described, I promoted the basic SEO training post, which sparked many impressions and engagement. However, it also increases the number of posts hidden from the timeline in Figure 20. Fortunately, this could lead to only one person dislike my page. Additionally, it could help me to regulate the strategy for targeting the audience when I post once a day. Therefore, it is extremely convenient for us to dig the potential information from the data.

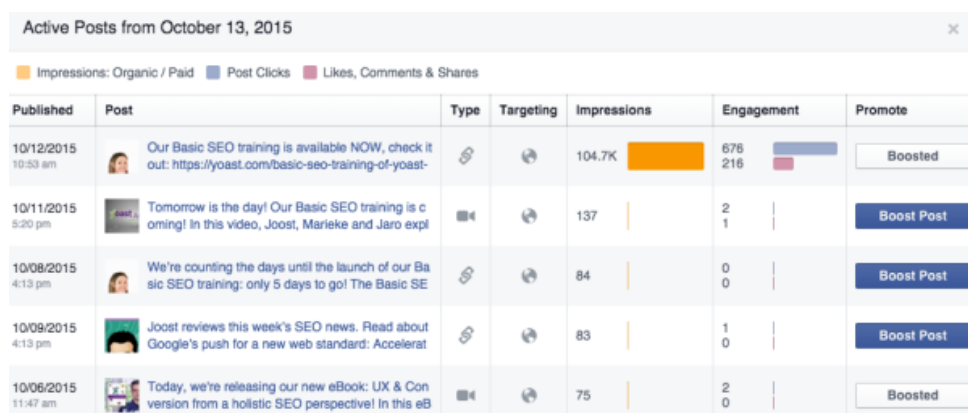


Figure 19: Boost the post of my page

3.2.4 How well your posts are performing

In order to know how well our posts are performing, the post section is worth exploring for us, which mainly focuses on our content. The main function is that it can help us to segment different category of our posts content so as to see how they perform. There are two parts on the top of this section. The first one is like Figure 21, which helps us to identify the best time to publish the specific content based on the data from recent one

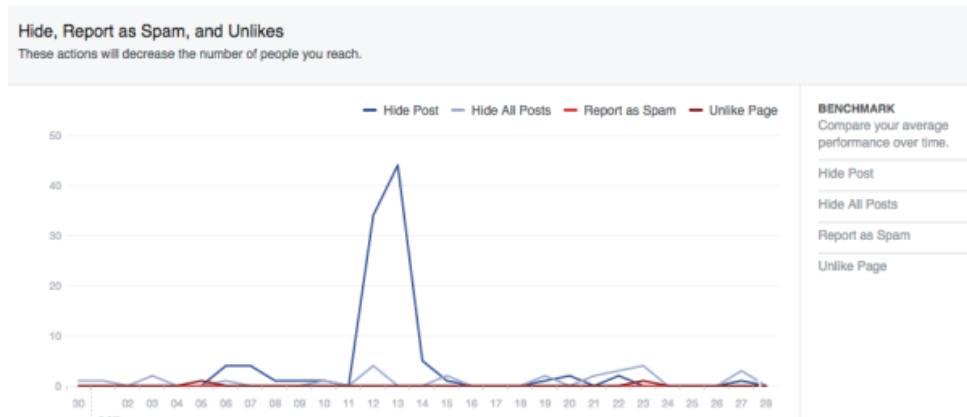


Figure 20: Hide decrease the number of people you reach

week. More specifically, the information having great value to us is based on when the audience most common on Facebook. The second part is like Figure 22, which is devoted to evaluate the success of different posts based on average reach and engagement. It is obvious for each type of post hold the number of reaches and engagement. If we apply them to our business, we can save a lot of time and money.

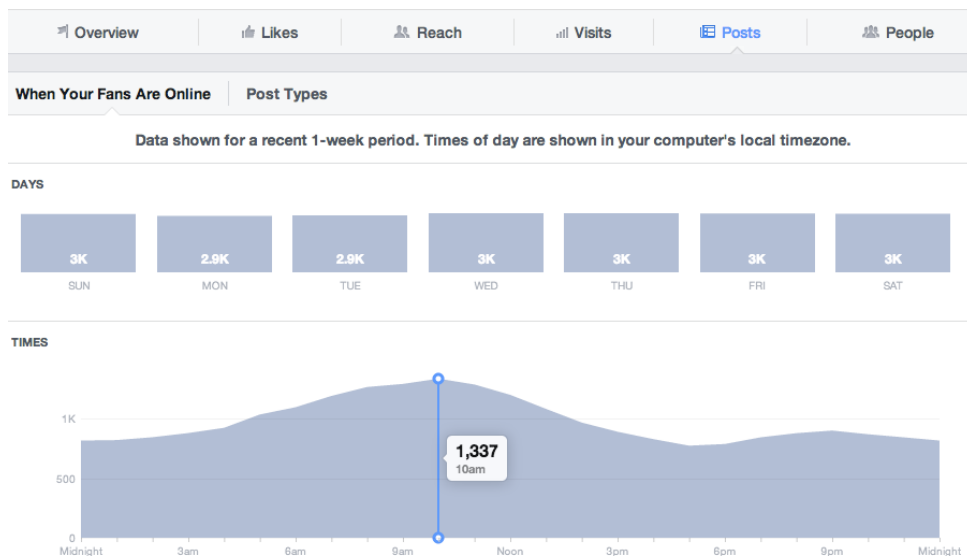


Figure 21: When your fans are online

When we scroll down to the bottom of this section and right click on any specific post we want, it is able to have some deeper operations on that post. For example, we can boost the post directly in Figure 23. At the same time, it is necessary to set the target people, money we want to spend and duration the promotion last. Compared with the

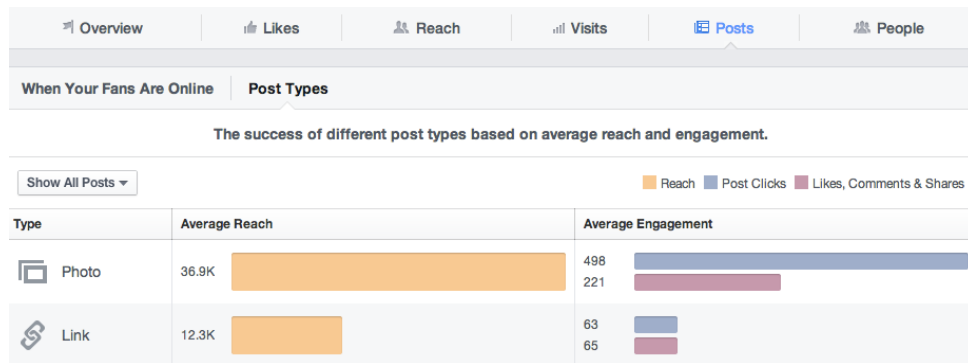


Figure 22: Post type

Marketing API, it is more simple and efficient. Besides, it is more friendly for the audience to communicate with us.

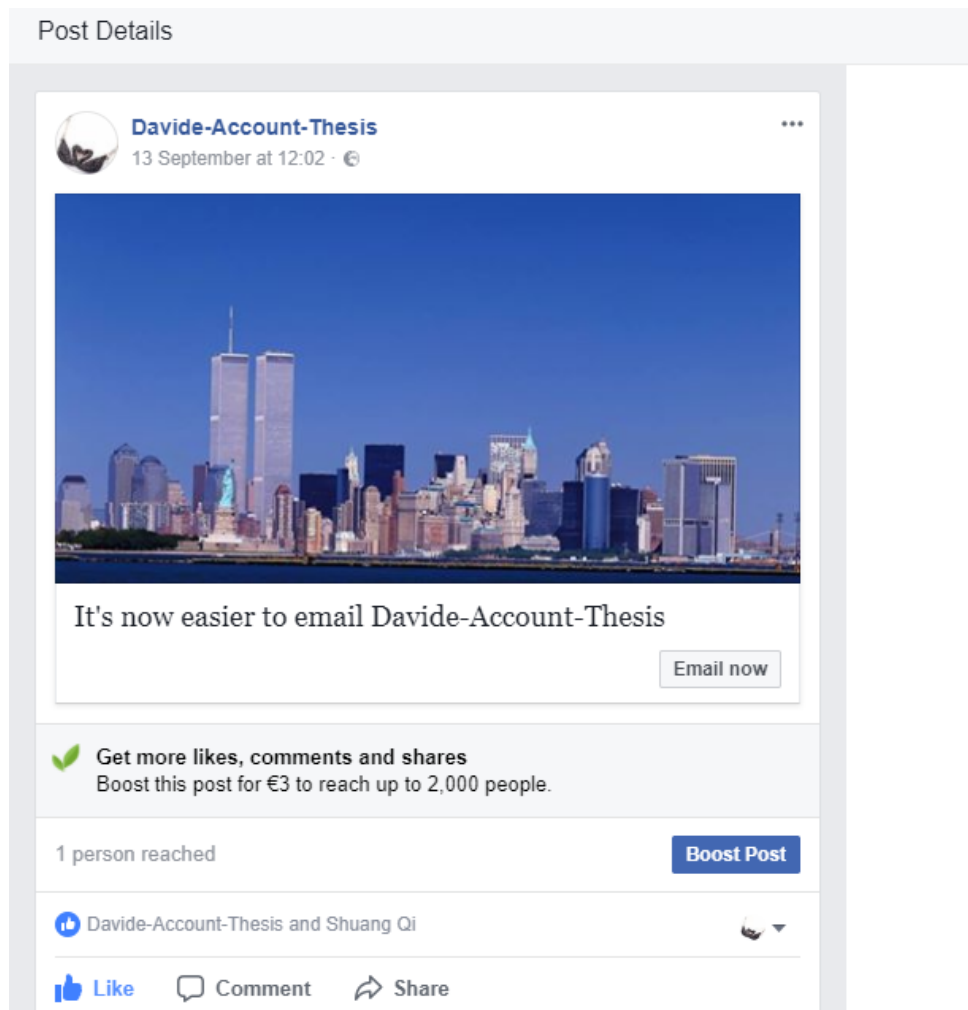


Figure 23: Detail about the video post

3.2.5 Actions on page

In this section, we will have a clear understanding about which kind of action is more popular among different audience and device. There are many actions that could be used such as the get directions clicks, website clicks, phone number clicks and the action button clicks. At the same time, the audience can be segmented by the Insight Analytics intelligently based on the country, city they come from, equipment they use, gender and age.

As Figure 24 described, we are able to see the change of each action on our page over time. Since we are the online business, we take more consideration on the website clicks and the action button clicks. However, if we are the local business, we will be more concerned about the number of get directions and the phone number clicks. According to the graph, we are able to adjust our strategy towards our business.

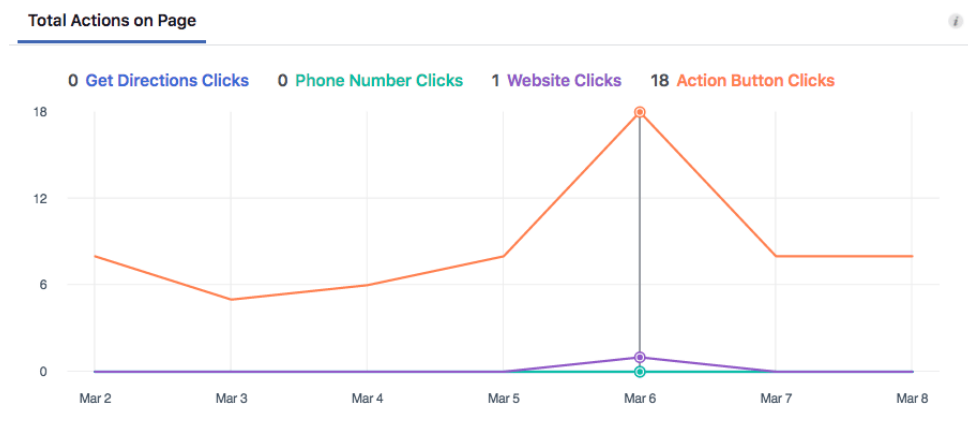


Figure 24: Total actions on the page

More specifically, when someone clicks the action button, they will be redirected to our main page. Figure 25 displays the trend of the audience clicking the action button on our page over time. In addition, It is quite obvious for us to know where these audiences come from, how old they are, which device they use and which sex they belong to from the graph. Through analysing these data, it is better to help us to target the right audience at the right time and place.

Except for the insights we test above, we also can find some other useful insights, such as the followers, page views, page previews, promotion, video, event and messages. When

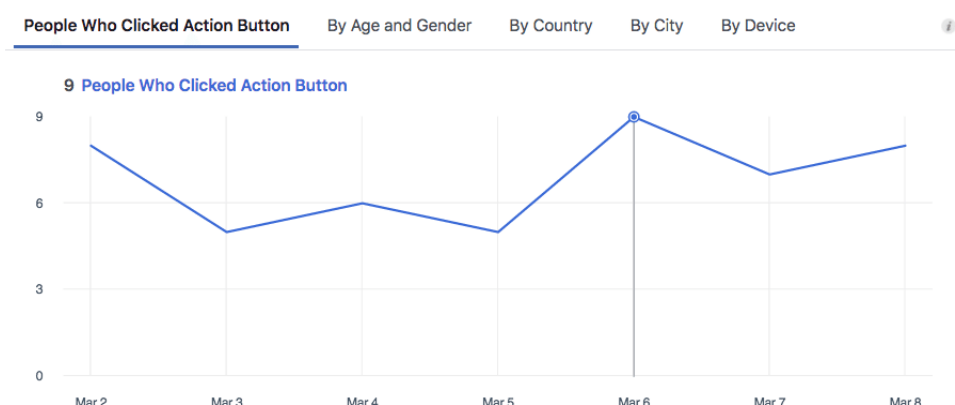


Figure 25: People who clicked action button

we click on them one by one, we will see that the functions of the follower is similar to likes section, the page views and page preview are similar to the section of actions on page. Therefore, if we are familiar with one of them, others will be very understandable. In terms of events, it will enable us to generate more data by providing us with critical data for the event, such as the number of people who sees our event, the number of people who reacts to the event, and the demographic data of the audience in order to let us know the type of person most interested in our event. From that, we also can learn what is working properly and what is not suitable for our campaign promotion. Besides, If we want to learn more about the latest promotions, we can go to the promotion section directly, which is a great place to view our recent promotions when we are in our Facebook Insights. The last opinion is the message, which will show us the total amount of conversions at a certain period.

It is necessary to remember that Facebook Insights Analytics are useful only if the information you collect is associated with your social media goals. Besides, we need to know it very well and focus on several key statistics and use them to inform our Facebook page strategy to help us boost our business.

3.3 Facebook Marketing API

It is worth mentioning that the marketing API is another powerful tool to access the advertisement insights and manage the Facebook advertisements based on the application. There are there main use cases for the marketing API, such as ads insights, audience management, and ads management. Working principles like the Facebook Graph API,

while you still need the *ads_mmanagement* permission to access the ads of the user. What is more, before your application is published, Facebook needs to grant it.

In order to retrieve the statistics of the advertisements, it is a good choice to use the ads insights edge in the marketing API, which offers a unique and consistent interface for us. There are many elements we can leverage, such as feed like, filter fields, action breakdown and limits so on. When you request a specific ad object, it is convenient to use the comma separated lists in the specific fields and aggregate or sort results at the defined object level.

As for the audience management, it mainly can help us reach the right audiences at the right place and time for our business. However, it is really important to determine the target options including the interests, demographics, behaviors and locations. Besides, Facebook Marketing API only offers the ads to the specific users who meet the criteria you specify. Through the basic demographics and location based targeting, you can usually access the related data from the location search where you can define the targeting objects and specify the options.

Let me give you some test examples about the audience management. You can reach men aged between 10 and 24 years old at 10 miles from Menlo Park, California, or living in Texas or Japan[15]. Firstly, we need to retrieve the Japanese country code in Figure 26, then retrieve the Texa area code and the Menlo Park of the California city code in Figure 27 and 28 separately, and finally filter the sex and age range in Figure 29. Besides, in

```
use FacebookAds\Object\TargetingSearch;
use FacebookAds\Object\Search\TargetingSearchTypes;

$result = TargetingSearch::search(
    TargetingSearchTypes::GEOLOCATION,
    null,
    'japan',
    array(
        'location_types' => array('country'),
    )
);
```

Figure 26: Retrieve the country code of the targeting audience

order to get suggestions from the interest targeting, it is possible for you to learn about someone's interests from their timeline, a favorite page, or a keyword associated with a

```

use FacebookAds\Object\TargetingSearch;
use FacebookAds\Object\Search\TargetingSearchTypes;

$result = TargetingSearch::search(
    TargetingSearchTypes::GEOLOCATION,
    null,
    'texas',
    array(
        'location_types' => array('region'),
    )
);

```

Figure 27: Retrieve the region code of the targeting audience

```

use FacebookAds\Object\TargetingSearch;
use FacebookAds\Object\Search\TargetingSearchTypes;

$result = TargetingSearch::search(
    TargetingSearchTypes::GEOLOCATION,
    null,
    'menlo',
    array(
        'location_types' => array('city'),
    )
);

```

Figure 28: Retrieve the city code of the targeting audience

page or application used by them. More advanced, you also can intelligently target based on relationships, behaviors, education, finances, and life events.

Based on the targeting in the audience management, it is extremely helpful for us to build the lookalike audiences, which are the potential customers in our business. On the other hand, Facebook can establish a similar audience set based on the customer seeds. Therefore, you can use them to define your business objective accurately.

Another important thing is ads management. Firstly, it is necessary for us to create a new campaign and set goals for our ads, such as the link click asking customers to visit our site, improving the page interaction. Since the campaign is the top level of the ad accounts structure and can represent the target of a single advertiser. All the instructions can be found at the [official documentation](#). However, the campaign goal will validate the ads that are added to the campaign in order to make sure they have the right goals.

```

AdSetFields::PROMOTED_OBJECT => array(
    'page_id' => <PAGE_ID>,
),
AdSetFields::TARGETING => (new Targeting())->setData(array(
    TargetingFields::GEO_LOCATIONS => array(
        'countries' => array('JP'),
        'regions' => array(array('key' => '3886')),
        'cities' => array(
            array(
                'key' => '2420605',
                'radius' => 10,
                'distance_unit' => 'mile',
            ),
        ),
    ),
),
TargetingFields::GENDERS => array(1),
TargetingFields::AGE_MIN => 20,
TargetingFields::AGE_MAX => 24,
TargetingFields::PUBLISHER_PLATFORMS => array(
    'facebook',
    'audience_network',
),
TargetingFields::DEVICE_PLATFORMS => array('mobile'),
)),
));

```

Figure 29: Retrieve the targeting audience within the age range

When we want to read the ads in the campaign, we need to request the connection of the advertising account we are using. After that, we can create a set of ads based on the daily or lifetime budget, plans, settlements, ads format and target data. Finally, we can arrange the delivery on Facebook and optimise them in the next period.

To be honest, it is not very easy to know the marketing API well. However, that is worth spending time since it enables you to build the efficient marketing solutions to improve the performance and productivity in your ad management process. Whether you are a advanced marketing developer or just getting start, there are many powerful features in the Facebook Marketing API that your business can take advantage of. I only study the functionalities of the Facebook Marketing API in social media analytics and marketing, which hardly scratches you can use the marketing API to do. If you would like to study further, you can refer to the [official document](#).

4 Instagram Platform Characteristics

Instagram is a mobile, desktop and Internet-based photo sharing application and social networking platform that allows users to share images and videos in public or private. It was created by Kevin Systrom and Mike Krieger and was launched in October 2010 as a free mobile app for iOS operating systems. Two years later, it released the Android device version, followed by the feature limited web interface in November 2012, as well as in April 2016 and October 2016 Windows 10 Mobile and Windows 10 applications respectively[16]. At the same time, Instagram was acquired by Facebook in April 2012, with the cash and stock of approximately 100\$ million. After the launch in 2010, Instagram quickly spread. There are one million registered users two months later, 10 million a year. As of 2017 April, eventually reached 700 million. What is more, users have uploaded more than 40 billion photos to the service until October 2015. And by June 2017, Instagram's story has more than 250 million active users[17]. The popularity of Instagram raises an attractive community, including specialized trends, where users can publish specific types of photos on specific dates of the week, where the title is a label that represents a common topic. Instagram has received a positive evaluation of its iOS app and has been named one of the world's most influential social networks.

Instagram allows users to edit and upload photos and movies via mobile apps. Users can add titles to each post and use thematic labels and location-based geolabels to index these posts and make them available to other users within the app. Each user's post will be displayed on their followers' Instagram feed, which can also be viewed by the public when using labels or geotagging tags. Users can also choose to make their profile private so that only their followers can view their posts. As with other social networking platforms, Instagram users can like, comment on others' posts, and send private messages to their friends via the Instagram Direct feature. Photos can be shared on one or more other social media sites, including Twitter, Facebook and Tumblr.

Instagram offers a wide range of digital filters that can be applied to users' photos, including photos that add retro or faded look. Other editing functions including Lux, a kind of reducing the shadow effect, make the window dim, increase the contrast, and move light tool to allow the user to adjust the brightness, contrast, saturation, sharpness, structure, straightness and tone. The manual tilting and motion sickness can also be added to the photo[18]. Instagram also has a series of additional apps available. These

applications are boomerang, which creates custom gifs, delay videos, and layout. It creates image collages with multiple images. Once installed, these applications can be accessed directly from the Instagram application.

Instagram is not only a personal tool, but also a tool of the enterprise. Photo sharing apps offer companies the opportunity to create free business accounts to promote their brands and products. Companies with business accounts can access free interaction and display metrics. According to Instagram's website, more than a million advertisers worldwide use Instagram to share their stories and drive corporate performance. In addition, 60 percent of the people said they found new products through the app. In order to know our audiences and businesses clearly, we need to learn the Instagram tools and application programming interface basically.

4.1 Instagram Business Tools

Instagram provides tools for businesses to help customers stay in touch, switch to a business profile on Instagram, and get contact information, new features like Instagram Insights and promotion. The Instagram business tool is a key part of any Instagram marketing strategy. Without analysis, your Instagram marketing job might be a little disappointing. How do you know if your Instagram marketing strategy is going well? How do you track your Instagram performance and improve your content? The Instagram business tool is often critical to answering your questions. Through the Instagram business tool, you can get a lot of valuable data and information to learn about your brand's performance on Instagram and how to improve the results. Additionally, you'll learn about the metrics and insights available, how to get all the information for free, and how to use them to boost your Instagram marketing. In early 2016, Instagram confirmed that they were developing new business profiles to help brands and small businesses succeed on Instagram[19]. Next we will learn and test all the features of the Instagram Business Tool together.

If you want to visit the Instagram Business Tool, firstly you need to convert your Instagram profile to the business profile. The business profile on Instagram will help your customers connect to your business. When converting to the business profile, you can add additional information about your business in your profile. For example, you can add phone numbers, email addresses, and business addresses. When you add contact

information, the contact button will appear near the top of your profile. When people want to communicate with you, they can click that button. Secondly, you need to confirm your identity through Facebook and connect your Facebook page to your business profile. Connecting to your Facebook Page, the Instagram can quickly include your page's business information in your Instagram Business Profile. For example, your Facebook page contacts and category information will be imported to the Instagram. In addition, through Facebook confirming your identity, you will be able to use Facebook ads account to promote on Instagram platform. More importantly, you need have more than 100 followers on Instagram Business Profile so as to use the tool to analyse the data. In the next section, we will see the every function the Instagram Business Tool provided one by one.

4.1.1 Profile analytics

After you convert into the Business Profile, it will show you the general information about you clearly in Figure 30. In the left side picture, you can see how many post you have totally, how many followers you have totally and how many followings you have totally. Which will be useful for you to have a rough idea about your business. And most important thing is the person interested in your business can have the option to get in touch with you by the phone. After you click the chart icon in the right top, you will have the access to your Instagram Insights. In two right pictures, you'll see the changes of your followers and posts for your account in the last seven days. Additionally, you will see the section about the number of impressions, the number of reaches and the number of profile views in the last week, when you slide the section left or right.

Followers: The number of people following your Instagram account.

Posts: The number of Instagram posts you have published.

Impressions: The total number of all of your posts have been seen.

Reach: The number of unique accounts that saw any of your posts.

Profile views: The number of times your profile was viewed[20].

It is worth mentioning that there is a heart button at the bottom of each picture. When you click it, you will have the access to the information about your following and

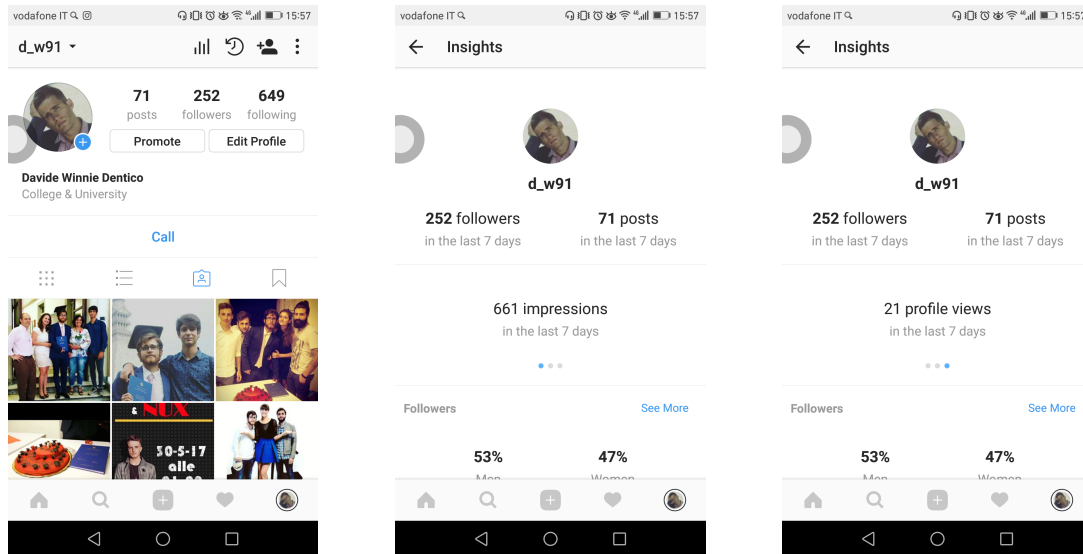


Figure 30: Your business profile

your activity including the promotion. As the Figure 31 depict, you will know your recent promotions and corresponding actions about you including the which post someone likes, when someone start following you and who is on Instagram without your following.

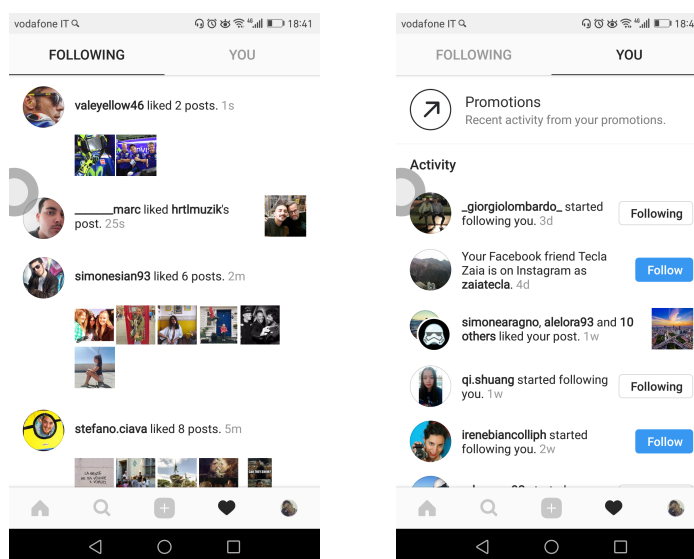


Figure 31: The activities after you click heart button

In order to make your business stand out and get more followers, you should to optimise your business profile. Firstly, your username is very vital, which is also what your users are using to find you. So you should be sure to use identifiable username in your business profile. At the same time, you should make your profile public so that it is as easy as possible for your audiences to follow you. Secondly, It is essential to add your full business

name so that the customers can recognise your business in many businesses directly. Last but not least, it is better for you to add a link to your profile in order to the followers visiting your website straightly[21].

4.1.2 Audience insights

The Audience Insights can help you learn more about who your followers are, when they are online more often and people interacting with your business on Instagram. For example, you will find information such as gender, age range and location. By learning more about your audience's behavior and demographics, you can create more relevant and timely content.

In Figure 32, it shows you the total number of followers, including how many new followers you got or lost in last week. Then you can view the collapse of the ratio of the male followers and the female followers on a circular chart clearly. More specifically, depending on the age of decomposition, you can view the age range of men, women, or both. According these information, you can also track interest and online buying behavior. As a result, it is helpful for you talk to your followers on this platform. Then you will view the top locations, which can be segmented by the country or even the city of your followers. With these information, it will be useful for larger brands, until a small local business to understand the basics of most users in order to help companies better determine where and when should be more pay attention. More interesting, The followers section also displays the average time of your fans are on Instagram by each hour on that day of the week.(for example, the average time on Monday if it is Monday), or you can organize them in each day of the week. Knowing when your followers are most active on Instagram can help you arrange the best post in right time.

Gender and Age: The gender and age distribution of your followers.

Top locations: The top five countries and cities where your followers are.

Followers Hours: The average times your followers are on Instagram on a typically day by the hour.

Followers Days: The days of the week when your followers are most active.

More specific, businesses can find value in different insights, while it depends on your business and your goal on Instagram. For example, some businesses may be interested

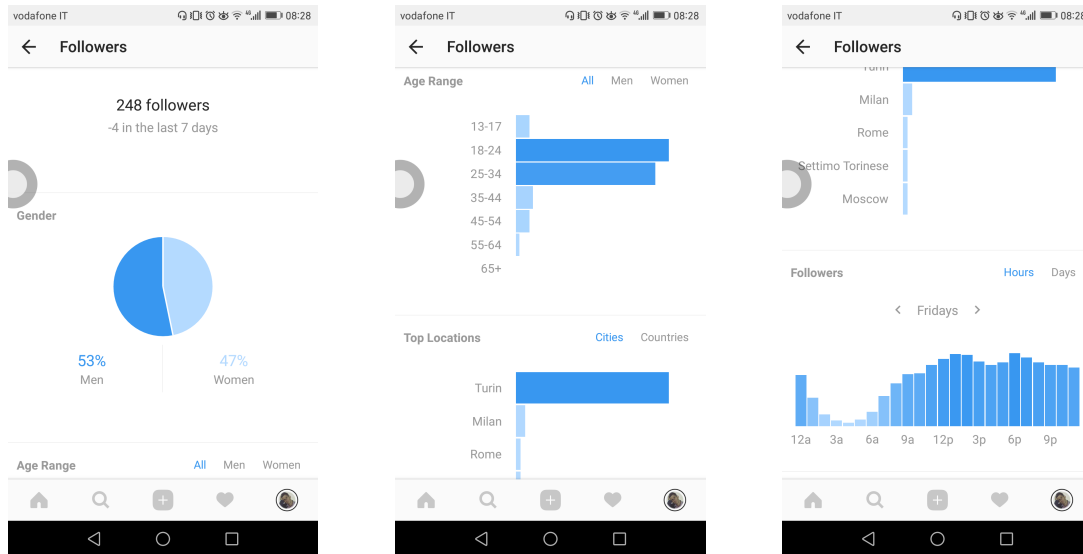


Figure 32: Demographic metrics of your followers

in learning more about the followers. If the business sees their most of audiences aged between 25 and 34, they may try to create content that is more appropriate for these audiences. Besides, it is possible that they will test different ideas to see if they can increase the number of followers between 35 and 44 years old. In other words, the division of the audiences mean that the brand needs a deeper understanding of who is the right audience, how to attract them and drive the growth.

4.1.3 Instagram posts

When it comes to figuring out how to publish content to their profile to maximize the reach and engagements. The new insights will show you the most popular post on Instagram recently. This area is particularly interesting because it is not a simple chart, but as an image thumbnail of the grid with the number of impressions that post had. This will not only help you keep track of which posts are doing well, but you can view them as images. So you can better visualize the most effective content for your audience. This can also help you track the performance of your articles over time, in other words, whether your followers and others return to previous posts or just click on the new content?

In Figure 33, you will get a comprehensive overview of how well your account is performing, along with detailed information about your follower growth. In the center of the picture, you'll see the top posts section. It shows you the top posts sorted by impressions. This information is valuable because it allows you to see exactly how many people have

seen your post rather than the number of people who liked it, which will give you a more accurate engagement rate. At the same time, you can filter the insights about the post by the category of your post, the response format of your post and when you post the content. It is helpful for you to distinguish which kind of post is more popular among the audiences. Choosing the right filter criteria can actually lead to more views and engagement.

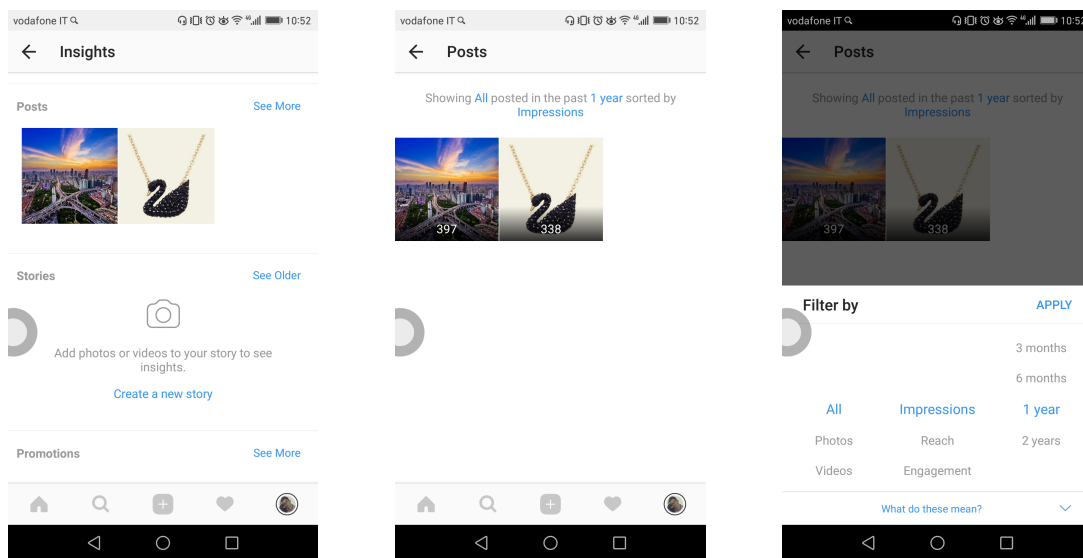


Figure 33: Status of your posts

After you tap the specific post, you can explore your post further. In Figure 34, you can see how many Instagram user commented, saved, reached and engagement with your post, especially liked in relation to how many followers you have in total. It's worth mentioning that you find someone liked your post but you are not the follower of him or she, you can follow him or she immediately in order to get more audiences. Another important thing is you can know whether the person liked your post is your follower or not by click the person link below the post. When you access his or her page, you are able to view the following status in order to acquire the basic information you want to know. Besides, when your followers like you post, the like button will give you the notification. Otherwise, the person is not your follower, the like button will not give you the notification. According to that, you also can recognise your followers from all the instagram users.

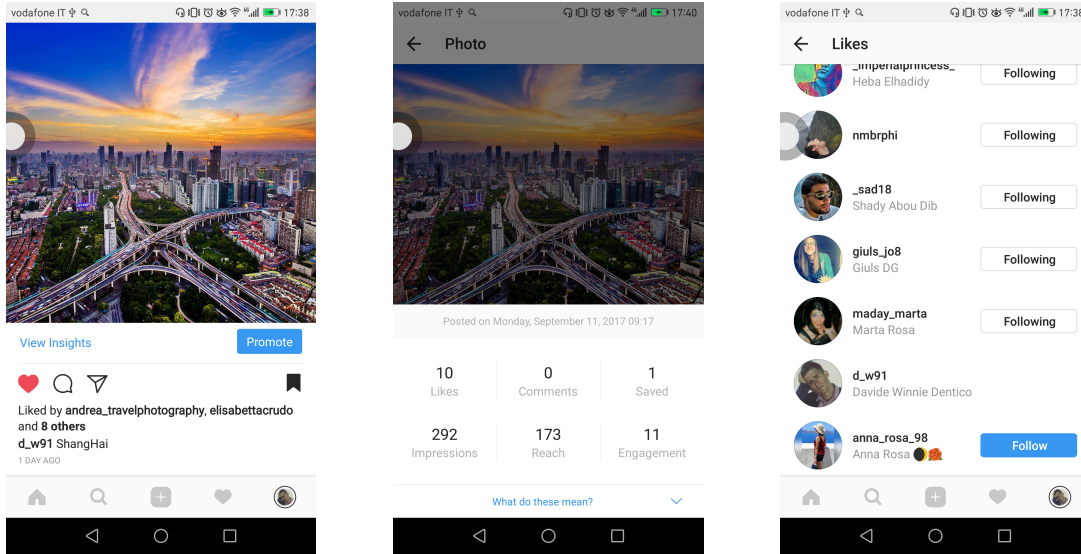


Figure 34: Who likes your post

Impressions: The total number of times a post has been seen.

Reach: The number of unique accounts that have seen your post.

Saved: The number of unique accounts that saved your post.

Engagement: The number of likes and comments on your post.

Similarly, you also need to optimise your posts for your business. For example, when you post one beautiful photo, it is better to add the location where they are taken. Since you can segment the followers by the location of the picture they like most. In addition, it is likely to attract more followers when you use more relatable and inclusive content. While it is a trick to use the filters, tags, links and hashtags to your photos so as to customize your posts. I also believe that you will use high quality photos. Even more interesting is that users with the most fans have an average of 2 to 3 photos posted per day. These data may make us say that more successful accounts tend to have higher frequencies in Table 1. Consequently, those businesses that often post on Instagram tend to see the best results.

4.1.4 Instagram stories

Instagram story allows you to share all the moments of your day, not just those moments you want to keep in your profile. When you share multiple photos and videos, they show up in the form of slides. It is not necessary to worry about over-posting on

Table 1: Number of Posts Per Page in January 2015 [22]

Page Bucket	Facebook	Optical Instagram
1-1k Fans	7	8
1k-10k Fans	21	20
10k-100k Fans	47	41
100k-1m Fans	106	57
1m-10m Fans	166	90
10m Fans+	107	95

Instagram. On the contrary, you can share what you want as much as possible in a day. You can use the new way to put your story with words and drawing tools into your life. These photos and videos will disappear after 24 hours and will not be available in your profile or feed.

As Figure 35 described, you'll see the stories section where you can get the general view for your Instagram stories. If you have created a story in the last 24 hours, it will appear here. Otherwise, you can click the see more link to access the insights of your older stories, which are posted in previous seven days. In order to see someone's story, you only need to click on their profile photo. Viewing your story at your own pace also can jump to another person's story by moving forward or backward. If you want to comment on what you see, you can click on Instagram directly and send a private message to that person. Your story follows your account's privacy settings. If you set your account as private, your story will only show to your followers, but you can also hide your story to anyone you do not want to see, even if they follow you.

Exits: The number of times someone exited your story. *Replies*: The number of replies to a particular photo or video in your story.

Swipes Away: The number of swipes away from this photo or video to skip to the next account's story.

Taps Forward: The number of taps to see the next photo or video.

Taps Back: The number of taps to see the previous photo or video.

Recently, some new features are added into the Instagram stories in order to make the story creative. For example, no matter what your business is or what you're going to do, you can add some context to the story with a sticker. The audience sees your story

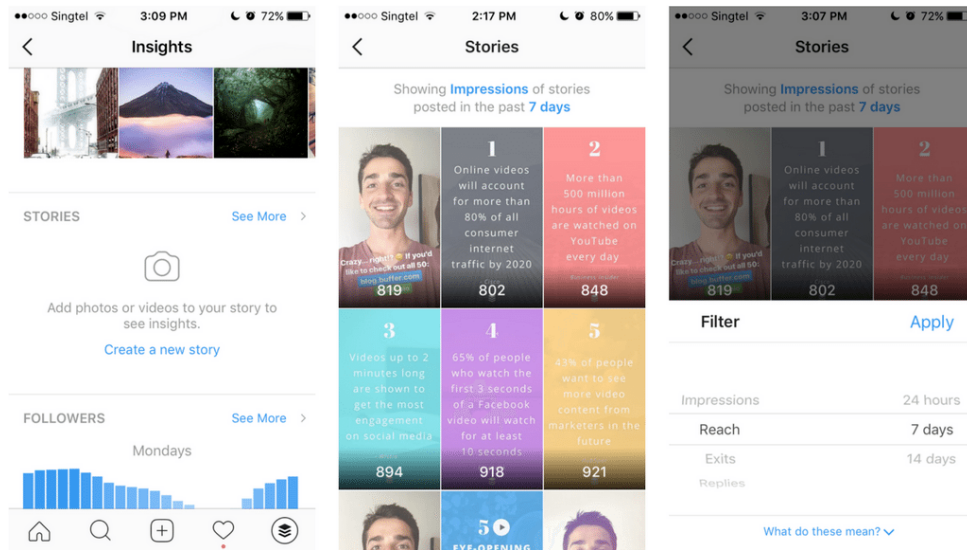


Figure 35: Insights from your stories [23]

will be able to learn more about your business by clicking the sticker. With such friendly features, more and more people will use this tool to target the audience and boost their business.

4.1.5 Instagram promotions

As we all know, Instagram has published mobile ads. Users will be able to promote good posts and quickly translate them into advertisements, as well as offer suggestions based on viewers and budgets. For example, Facebook's desktop advertising creation tool gives the access to businesses services such as uploading a targeted email address list, creating a login page pixel, or requiring more complicated reporting features. Otherwise, the advertising tool on Instagram pay more attention to the simplicity and speed. That is, because of the relationship between Instagram and Facebook, the owners of the business can use mobile tools based on Facebook and Instagram users personal information (such as gender, age, location and personal interests) to define, save and target custom audiences.

The promotion ability allows you to apply well performing posts into advertising on Instagram built in application in order to help you connect more customers. In the business mode, if you would like to promote something, you need to select the posts you have on Instagram to share and choose the audiences for your promotion. Beside, you can determine the target audiences or allow Instagram popping up the recommendations for you. We recommend creating the targeted audience based on the type of customer

you want to reach. You set the person within the audience will be qualified to see your promotion. If someone see you promotions and marks another person in the comments, the tagged people will also be able to see your promotion. After clicking on the promotion, your promotion will be reviewed in accordance with advertising policies. In general, it will takes about 60 minutes for promotion reviewing, but in some cases, the approval process may take longer. Will begin to after the promotion activities. Once approved by the review, your promotion will be run anytime you choose to advertising.

As Figure 36 depicted, you'll be able to see your active promotions. In each promotion,you can gain how many people reach your promotion website, the number of impressions your promotion received, how long the promotion last as well as how much of your budget has been spent. According to that, you can adjust your strategy of the promotion for targeting even more audiences and boosting your business. Additionally, the original version of your post promoted still exist in your business profile. The original post still can be seen in your followers sets in the feed, so you do not worry someone can not see it.

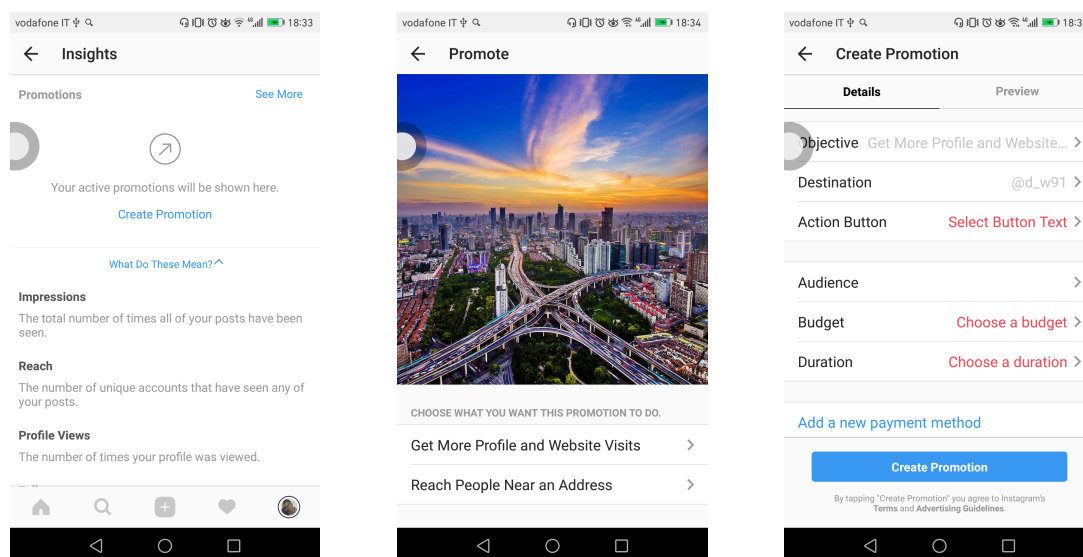


Figure 36: Status of your promotion

These metrics and insights can be accessed from Instagrams native analytics (Instagram Business Profile) instead of other analytic tools. It is extremely convenient for analyse the insights of your account or your business. If you can leverage the Instagram Business Tool well, Your business will go far on Istagram. Importantly, the posts or sto-

ries of your business should not be lost or overbearing.

4.2 Instagram API

Instagram has become one of the most popular photo and video sharing platforms on the web. In order to help users to further integrate the social networks into their daily lives, it has already issued a public application programming interface (API).

The Instagram API is a standard REST API that provides basic create, update, delete and read(CRUD) operations. The Instagram API permits developers to programmatically access the Instagram business account so that they can retrieve the basic insights, view comments and metadata, and manage media objects as easy as possible through custom build applications. It can by checking the user's access token to get any Facebook page role. If the user has a role on the page and the page is linked to the Instagram business account, the user can be granted to your business account application permissions to access the data of the connected business account. For some cases, you can propose a request to pull all Instagram pictures taken in any geographic area. So that you can see who uploads your favorite local bar or bar photos to the rest of the world. Or you can request that all Instagram photos marked the cats be created every second to the real-time information of thousands of cats uploaded to Instagram. The Instagram API is based on the Graph API, so its endpoints consist of nodes, edges and fields. In addition, all endpoints can be accessed through a valid user access token with specific privileges.

4.2.1 Preparation for using Instagram API

Before we start using the Instagram API to develop our application, we need to understand how it works. Like many other web APIs, the Instagram API works through HTTP and expects to send HTTP requests to the specified endpoint. Upon receiving this request, the API server will use JSON subscription containing the requested data to answer queries. We can then use the server-side programming language (such as PHP) or the client toolkit (for example jQuery) to parse the data and extract the content from it so as to integrate into the web.

Similar to most API providers, we must register an Instagram account and sign up for the developer in order to start using the Instagram API. It is obviously that we need fill

in the details and accept the terms and conditions to be as a developer in Figure 37 and 38.

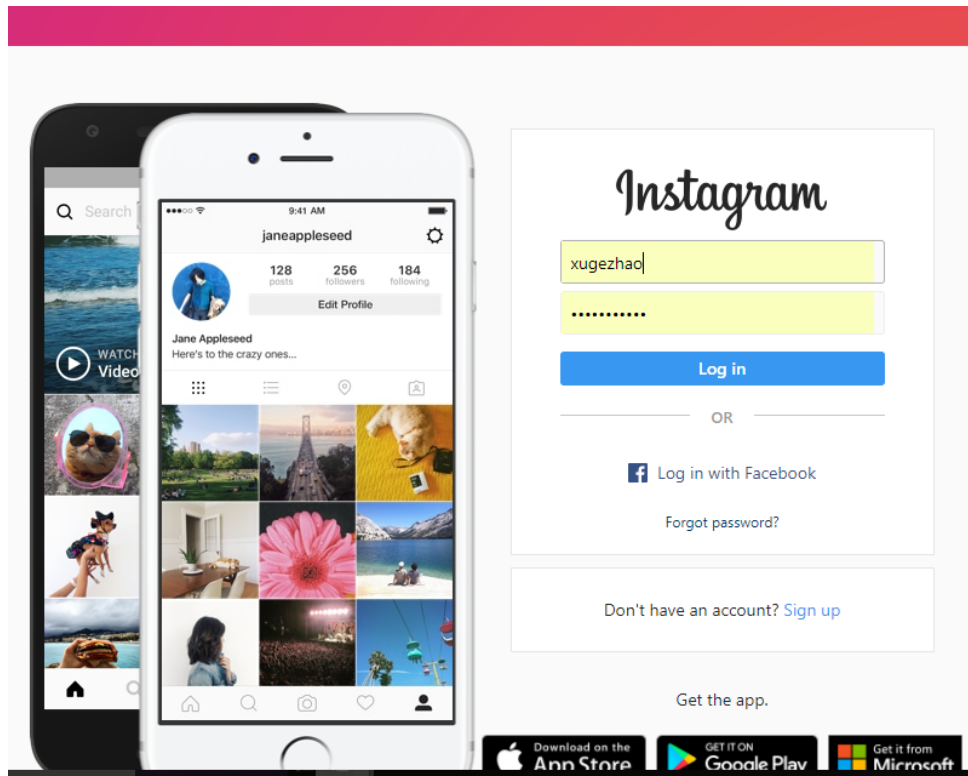


Figure 37: Log in the Instagram

<ul style="list-style-type: none">OverviewAuthenticationLogin PermissionsPermissions ReviewSandbox ModeSecure RequestsEndpointsRate LimitsSubscriptionsEmbeddingMobile SharingLibrariesSupportChangelogPlatform Policy	<p>Starting 10/1/2017, all permissions other than the basic permission will be unavailable to submit for or obtain.</p> <h2>Developer Signup</h2> <p>Thanks for your interest. To get started, just a few things we need to know:</p> <p>Your website: <input type="text" value="https://www.facebook.com/Davide-Account-Thesis-273"/></p> <p>Phone number: <input type="text" value="+393510307880"/></p> <p>What do you want to build with the API?</p> <p>I want to study the Instagram API for retriving the basic information about my profile, including the media, followers. Then I can do the segmentation by the location and age of my followers in order to manage my audiences and know well the Instagram API.</p> <p><input checked="" type="checkbox"/> I accept the API Terms of Use and Brand Guidelines</p> <p>Sign up</p>
--	--

Figure 38: Register as a developer

Now, you can register your application using the manage client link as a developer. After you finish filling the details in Figure 39, it will provide you the client ID and client secret to permit you to integrate your application by implementing the OAuth dance. After we register the client application successfully, we can manage the client according to the security, permission and migration in Figure 40.

The screenshot shows the 'Register new Client ID' page. On the left is a sidebar with a search bar and a list of navigation items: Overview, Authentication, Login Permissions, Permissions Review, Sandbox Mode, Secure Requests, Endpoints, Rate Limits, Subscriptions, Embedding, Mobile Sharing, Libraries, Support, and Changelog. The main content area has a header with 'Instagram', 'Sandbox Invites', 'Manage Clients', and the user 'xugezhao'. Below the header, there's a tabbed interface with 'Details' and 'Security'. The 'Details' tab is active, showing form fields for 'Application Name', 'Description', 'Company Name', 'Website URL', 'Valid redirect URIs', and 'Privacy Policy URL'. A note below the 'Application Name' field states: 'Do not use **Instagram**, **IG**, **insta** or **gram** in your app name. Make sure to adhere to the API Terms of Use and Brand Guidelines'. The 'Valid redirect URIs' field has a placeholder text 'Press Enter to confirm.' and a note below it: 'The redirect_uri specifies where we redirect users after they have chosen whether or not to authenticate your application.'

Figure 39: Register a new client

The screenshot shows the 'Manage Clients' page. On the left is the same sidebar as in Figure 39. The main content area has a header with 'Manage Clients', 'Report Issue', and a green button 'Register a New Client'. Below the header, there are two client cards. The first card is for a client named 'green' and has buttons for 'DELETE' and 'MANAGE'. It shows 'CLIENT INFO' with fields for 'CLIENT ID' (51c29df2672540c6ba810f610e7afa93), 'SUPPORT EMAIL' (920416015@qq.com), and 'CLIENT STATUS' (Sandbox Mode). Below this is a text field containing 'simple test'. The second card is for a client named 'Ayan' and also has 'DELETE' and 'MANAGE' buttons. It shows 'CLIENT INFO' with fields for 'CLIENT ID' (5c2035493a1844cbb12fdb385b5eb351), 'SUPPORT EMAIL' (zizimumu00@gmail.com), and 'CLIENT STATUS' (Sandbox Mode). Below this is a text field containing 'A simple test'.

Figure 40: Manage the client

Additionally, Instagram API requires the authentication. All requests for the API must be made through SSL (Secure Sockets Layer), especially on behalf of the user's request. Therefore, in order to verify the request, we need to use the client ID and secret to obtain the access token. In order to receive an access token, we can choose the server-side flow or implicit flow. But I choose the implicit flow here, which includes the access token as one part of the url rather than handling a code. It allows the application receive the access token simply without the server joining in, even if it is less secure. Firstly, we should direct ourself to our authorization url. For example, I use the url https://api.instagram.com/oauth/authorize/?client_id=CLIENT-ID&redirect_uri=REDIRECT-URI&response_type=token to get my client access token. We should substitute the CLIENT-ID and REDIRECT-URI with our client id and valid redirect url we got above. After that, we will be asked to authorize in Figure 41. Once authenticating and authorizing of your application, you will be redirected to your redirect uri with the access token in the url fragment by the Instagram. It will be look like the Figure 42. Finally, you just need to grab the access token from the returned url fragment. More interesting, you can get the user id from the access token. In other words, the user id is the first string of numbers before the first dot. If you chooses not to authorize the application, you will receive the error response including the error reason and error description.

4.2.2 Prerequisites you need to know

Each new application created on the Instagram platform is launched in sandbox mode. This is a full featured environment that authorizes you to test the API before submitting an application for review. Sandbox mode is ideal for developers who want to explore the API platform, even if they are new on the Instagram platform. In order to help you develop and test your application, they are real Instagram data for the users and media in the sandbox mode. However, there are also some limitations for the application in the sandbox mode.

Because the model is suitable for development, the application in sandboxed mode is invisible to the general public and can only be displayed by no more than 10 authorized sandbox users. The application Only can be tested and validated by these users. If

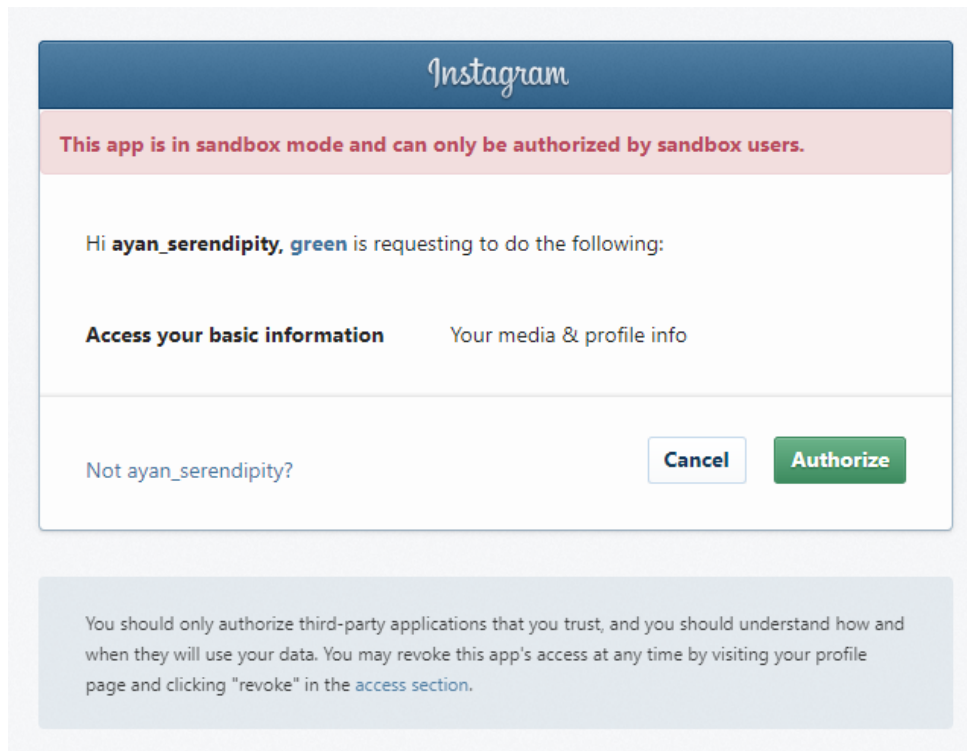


Figure 41: Authorize the client

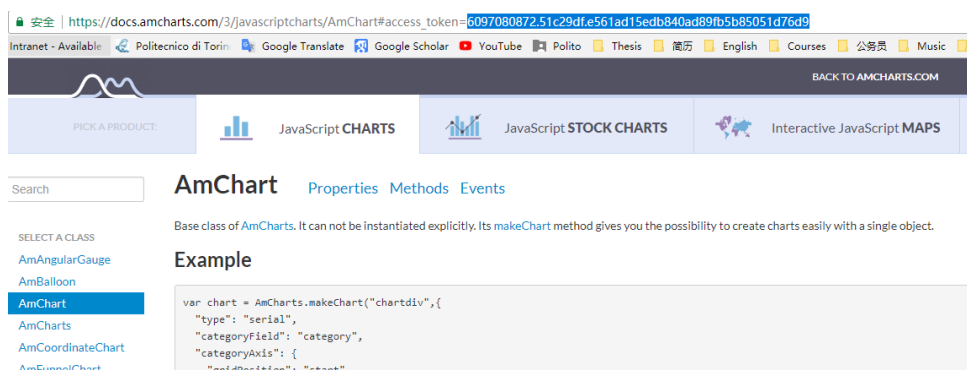


Figure 42: Retrieve your access token

you want to manage the list of sandbox users for a given application, you can go to the sandbox button in Figure 43. At that point, you can add or remove sandbox users for your application, which can accommodate up to 10 users. Please note that the application's administrator is always a sandbox user, so you can add at most nine sandbox users effectively. When users are added to the list and accept the invitation, they will be exactly becoming a sandbox user. It is really convenient to go to the developer's website and click the sandbox invitation button to accept the invitation. Besides, the user can accept or reject invitations, or can stop sandbox users of a given application on the

sandbox invitation page. At the same time, the users can be at most five application sandbox users. It is impossible to invite one user that is already 5 test users.

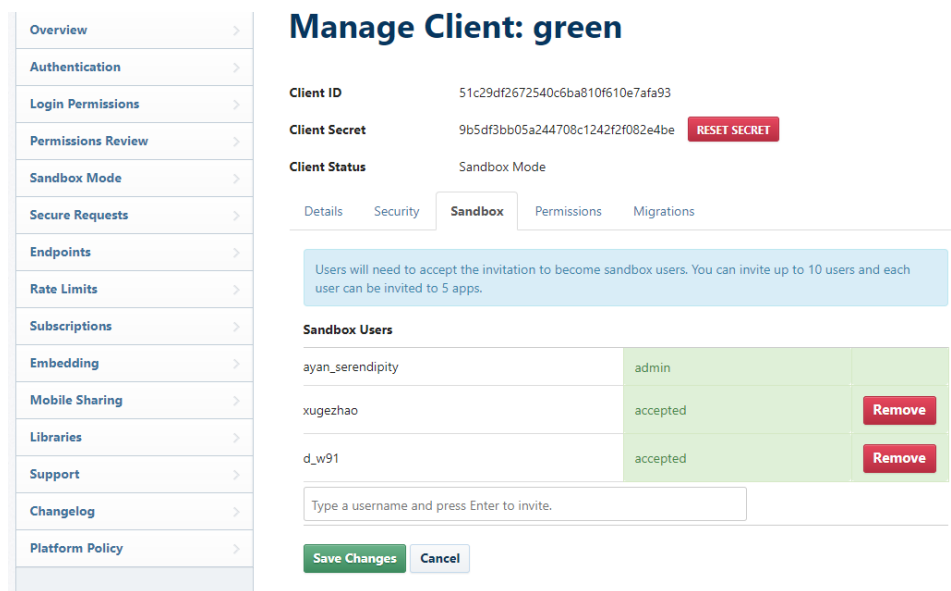


Figure 43: Manage the sandbox users

Sandbox users who are other Instagram users are invited to the client by us. Why do we need to do that? The main reason is that the application can access their media data in addition to our own. Let me give you one example, if you have the request `/users/user-id/` to the user endpoint and user id is a sandbox user, you will get a normal API response about the user information. However, if the user id is not a sandbox user, the Instagram platform will show `APINotFound` error. In addition, another restriction is that no more than 20 recent media can be seen from each sandbox user. For example, when we query the endpoint `/tags/tag-name/media/recent`, it will response the media with the given label. But it will only return the media that belongs to your sandbox user, limiting to the last 20 of each user, rather than returning any media from the sandbox users.

All rate limits in a sliding 1 hour window are individually controlled for each access token on the Instagram platform. The rate limits of live application are higher than those in sandboxed mode, which is the another restriction for the application in sandbox mode. However, it is enough for you to test the Instagram API.

To exit the sandbox mode, you need to submit your application for review. If your application belongs to an approved use case and is approved, it will start automatically.

At this stage, any Instagram user can authorize the application, but you can only access the permissions granted by you during the audit. If you need to have more access, you can submit the review again and you already have the previous granted permissions.

The OAuth 2.0 protocol is used by the Instagram API for simple valid authentication and authorization. The OAuth 2.0 specification permits you to specify the scope parameter of access that you want to request from the user. By default, there are basic access rights for all approved applications. However, if you are going to require the extended access, such as reading public content, likes, comments, or managing friendships, it is necessary for you to specify these scopes in the authorization request. It is compulsory to submit the application for review for people that want to use these extended permissions. You should only request scope you needed when you authorize. If you try to execute a request using an unauthorized access token for that scope, you will receive an `OAuthPermissionsException` API error response. If you need additional scope in the future, you can instruct the user to grant an authorized URL with an additional scope.

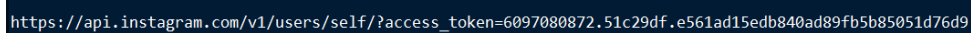
4.2.3 Instagram Endpoints for users and likes

It is known that the API is an entity that represents an external resource that can accept and respond to a protected resource request generated by the client. After getting the access token, you can now start making requests to the API endpoints. There are many different endpoints provided by the Instagram API, for example, the users, relationships, media, likes, tags, comments and locations. Some endpoints can only be accessed by providing the access token as a request parameter, however, other endpoints need to use the scope to acquire the extended data. All endpoints located at `api.instagram.com` can only be accessed through the https with the access token. You can use the same access token to retrieve the API's resources without having to verify it again until it expires. Additionally, each API has a number of defined permissions. It is allowed that a portion of defined permissions are requested by the client, when executing the authorization process and including it as part of the scope request parameter in the access token.

The users endpoint provides us many methods to access the information about the user. For example, we can get the information about a certain user, before we do that, we can search that user id by the user name in the browser. In addition, we can easily look up the most recent media of the user and know which one is liked by the user. Sometimes,

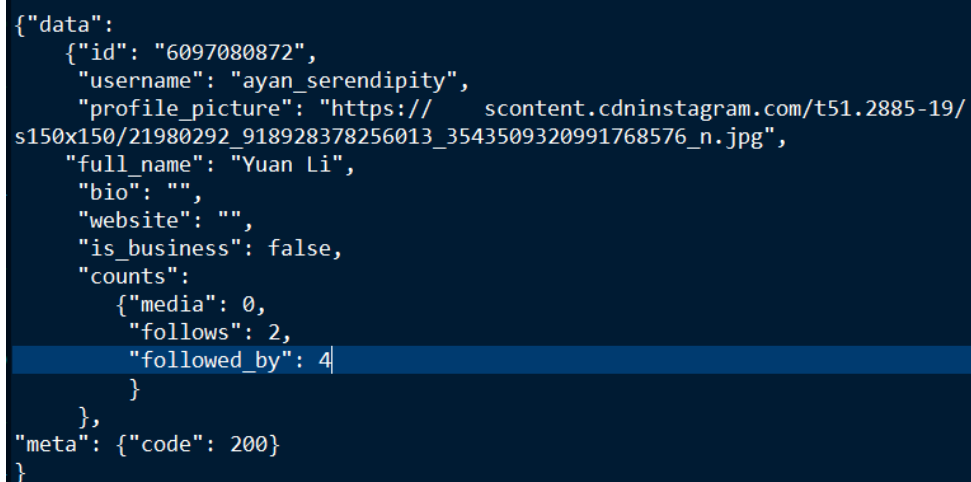
when we query these resources, we need to provide the access token as well as other related parameters.

As an example, we are going to retrieve the information of the user that owns one access token. Figure 44 displays the request url and the response will be depicted in Figure 45. The response contains the data, meta and pagination three main parts. The part of the data will list the content you requested. Here, it will show the basic information about the user, including user id, bio, profile picture and so on. The meta portion is used to convey additional information about the response. If everything goes well, it will show you a code value 200. While it will return you one error message with code value 400 when your request has some problems. Sometimes, if you would like to access more data, you can invoke the next url in the pagination part.



```
https://api.instagram.com/v1/users/self/?access_token=6097080872.51c29df.e561ad15edb840ad89fb5b85051d76d9
```

Figure 44: Request url for the endpoint /users/self



```
{
  "data": {
    "id": "6097080872",
    "username": "ayan_serendipity",
    "profile_picture": "https://scontent.cdninstagram.com/t51.2885-19/s150x150/21980292_918928378256013_3543509320991768576_n.jpg",
    "full_name": "Yuan Li",
    "bio": "",
    "website": "",
    "is_business": false,
    "counts": {
      "media": 0,
      "follows": 2,
      "followed_by": 4
    }
  },
  "meta": {
    "code": 200
  }
}
```

Figure 45: Response for the endpoint /users/self

Another case is that we can get the user id matched with the user name we want to know. It is extremely helpful for us to acquire the basic information of the specific user we need to know. You can request the data of the user name jack through the url in Figure 46. However, you receive the error message in Figure 47 instead of the list of users matched the query in Figure 48. Since your application is not authorized with the public

content scope, when you get the access token. In order to have the public content scope, you need to submit your application for review by Instagram and specify the scope in the authorization request.

```
https://api.instagram.com/v1/users/search?q=jack&access_token=6097080872.51c29df.e561ad15edb840ad89fb5b85051d76d9
```

Figure 46: Request url for the endpoint /users/search

```
{
  "meta": {
    "code": 400,
    "error_type": "OAuthPermissionsException",
    "error_message": "This request requires scope=public_content, but this access token is not authorized with this scope. The user must re-authorize your application with scope=public_content to be granted this permissions."
  }
}
```

Figure 47: Error response for the endpoint /users/search

```
{
  "data": [
    {
      "username": "jack",
      "first_name": "Jack",
      "profile_picture": "http://distillery.s3.amazonaws.com/profiles/profile_66_75sq.jpg",
      "id": "66",
      "last_name": "Dorsey"
    },
    {
      "username": "sammyjack",
      "first_name": "Sammy",
      "profile_picture": "http://distillery.s3.amazonaws.com/profiles/profile_29648_75sq_1294520029.jpg",
      "id": "29648",
      "last_name": "Jack"
    },
    {
      "username": "jacktidy",
      "first_name": "Jack",
      "profile_picture": "http://distillery.s3.amazonaws.com/profiles/profile_13096_75sq_1286441317.jpg",
      "id": "13096",
      "last_name": "Tiddy"
    }
  ]
}
```

Figure 48: Correct response for the endpoint /users/search

At the same time, you can retrieve the list of recent media liked by the owner of the

access token. It is convenient to use the url in Figure 49. Besides, you can specify the max like id parameter to return the liked media before this id and the count parameter to return how many media you want. You can see the all kind of data about your liked media, including the videos and images in Figure 50.

```
https://api.instagram.com/v1/users/self/media/liked?access_token=6097080872.51c29df.e561ad15edb840ad89fb5b85051d76d9
```

Figure 49: Request url for the endpoint /users/self/media/liked

```
{
  "data": [{
    "location": {
      "id": "833",
      "latitude": 37.77956816727314,
      "longitude": -122.41387367248539,
      "name": "Civic Center BART"
    },
    "comments": {
      "count": 16
    },
    "caption": null,
    "link": "http://instagr.am/p/BXsFz/",
    "likes": {
      "count": 190
    },
    "created_time": "1296748524",
    "images": {
      "low_resolution": {
        "url": "http://distillery.s3.amazonaws.com/
media/2011/02/03/efc502667a554329b52d9a6bab35b24a_6.jpg",
        "width": 306,
        "height": 306
      },
      "thumbnail": {
```

4.2.4 Instagram Endpoints for relationships

It is widely known if we would like to access the information about our relationships, we need to request the relationship endpoint like Figure 51. But it is necessary to add the extend permissions, containing the follower list scope to read the list of followers and followed-by users and the relationships scope to follow and unfollow accounts on a users behalf. As Figure 52 depicted, we can get the list information of my followers, including the follower id. In addition to retrieve the basic information about the user's relationships, it is also possible for you to modify the relationships between the current authenticated user and the target user using the post method. Do not forget to specify

```

        "standard_resolution": {
          "url": "http://distillery.s3.amazonaws.com/
media/2011/02/03/efc502667a554329b52d9a6bab35b24a_7.jpg",
          "width": 612,
          "height": 612
        }
      },
      "type": "image",
      "users_in_photo": [],
      "filter": "Earlybird",
      "tags": [],
      "id": "22987123",
      "user": {
        "username": "kevin",
        "full_name": "Kevin S",
        "profile_picture": "http://distillery.s3.amazonaws.com/
profiles/profile_3_75sq_1295574122.jpg",
        "id": "3"
      }
    },
    {
      "videos": {
        "low_resolution": {
          "url": "http://
distilleryvesper9-13.ak.instagram.com/090d06dad9cd11e2aa0912313817975d_102
          "width": 480,

```

```

        {
          "videos": {
            "low_resolution": {
              "url": "http://
distilleryvesper9-13.ak.instagram.com/090d06dad9cd11e2aa0912313817975d_102
              "width": 480,
              "height": 480
            },
            "standard_resolution": {
              "url": "http://
distilleryvesper9-13.ak.instagram.com/090d06dad9cd11e2aa0912313817975d_101
              "width": 640,
              "height": 640
            },
            "comments": {
              "count": 2
            },
            "caption": null,
            "likes": {
              "count": 1
            },
            "link": "http://instagr.am/p/D/",
            "created_time": "1279340983",
            "images": {
              "low_resolution": {
                "url": "http://

```

Figure 50: Response for the endpoint /users/self/media/liked

the action parameter which contains the follow, unfollow, approve and ignore four types, when you perform the relationship on the endpoint. What is more, we need to know two terms in the relationship response, which are the outgoing status and incoming status.

The former means your relationship to the user, which can be the follows, requested and none. While the later means a user's relationship to you, which can be the followed by, requested by, blocked by you and none.

```
https://api.instagram.com/v1/users/self/followed-by?access_token=6097080872.51c29df.e561ad15edb840ad89fb5b85051d76d9
```

Figure 51: Request url for the endpoint /users/self/followed-by

```
{
  "data": [{
    "username": "kevin",
    "profile_picture": "http://images.ak.instagram.com/profiles/
profile_3_75sq_1325536697.jpg",
    "full_name": "Kevin Systrom",
    "id": "3"
  },
  {
    "username": "instagram",
    "profile_picture": "http://images.ak.instagram.com/profiles/
profile_25025320_75sq_1340929272.jpg",
    "full_name": "Instagram",
    "id": "25025320"
  }
]
```

Figure 52: Response for the endpoint /users/self/followed-by

4.2.5 Instagram Endpoints for media and comments

If you want to manage your media data and know the audiences preference, it is a good choice to leverage the media and comment endpoint on Instagram API. Using the media endpoint, you can access information about specific images and videos. In order words, it is also possible to search the media which come from specific time and place, just as we are using the social media API to locate the potential crime scene witnesses. In Figure 53, you can use that url to search the specific media id. Besides, you can know clearly about how many people like it, how many comments received, when it is created and related links from the response Figure 54. In addition, you can retrieve the comments from that media by the method Figure 55, which contains who commented the media, when commented the media and the content in Figure 56. According to the comments, we can improve our strategy to post the media at right time and right place. You need

remember before we retrieve the comment on the media, we need get the media id firstly, then injecting the media id into comment endpoint.

```
https://api.instagram.com/v1/media/search?
lat=48.858844&lng=2.294351&access_token=6097080872.51c29df.e561ad15edb840ad89fb5b85051d76d9
```

Figure 53: Request url for the endpoint /media/search

```
{
  "data": [{
    "distance": 41.741369194629698,
    "type": "image",
    "users_in_photo": [],
    "filter": "Earlybird",
    "tags": [],
    "comments": {
      "count": 2
    },
    "caption": null,
    "likes": {
      "count": 1
    },
    "link": "http://instagr.am/p/BQEEq/",
    "user": {
      "username": "mahaface",
      "profile_picture": "http://distillery.s3.amazonaws.com/
profiles/profile_1329896_75sq_1294131373.jpg",
      "id": "1329896"
    },
    "created_time": "1296251679",
    "images": {
      "low_resolution": {
        "url": "http://distillery.s3.amazonaws.com/
```

4.2.6 Instagram Endpoints for locations and tags

Similar to Twitter, Instagram also has its own place database. We can access the place database through the location endpoint on Instagram API. It is possible to search the location id by providing the geographic coordinate in the request parameter. If you have the request Figure 57 to the location endpoint, you will get many related data about that geographic coordinate in Figure 58. The parameters lat and lng are the latitude and longitude of the searched coordinate respectively. At the same time, we can get as many as we want the list of recent media by the location id we get above. It is extremely convenient for us to segment the media by the location. Like the location endpoint, we are also provided the tag endpoint by the Instagram API. If we know the tag name, we

```

    "created_time": "1296251679",
    "images": {
      "low_resolution": {
        "url": "http://distillery.s3.amazonaws.com/
media/2011/01/28/0cc4f24f25654b1c8d655835c58b850a_6.jpg",
        "width": 306,
        "height": 306
      },
      "thumbnail": {
        "url": "http://distillery.s3.amazonaws.com/
media/2011/01/28/0cc4f24f25654b1c8d655835c58b850a_5.jpg",
        "width": 150,
        "height": 150
      },
      "standard_resolution": {
        "url": "http://distillery.s3.amazonaws.com/
media/2011/01/28/0cc4f24f25654b1c8d655835c58b850a_7.jpg",
        "width": 612,
        "height": 612
      }
    },
    "id": "20988202",
    "location": null
  },
  {
    "distance": 41.741369194629698,

```

```

    "location": null
  },
  {
    "distance": 41.741369194629698,
    "type": "video",
    "videos": {
      "low_resolution": {
        "url": "http://
distilleryvesper9-13.ak.instagram.com/090d06dad9cd11e2aa0912313817975d_102
        "width": 480,
        "height": 480
      },
      "standard_resolution": {
        "url": "http://
distilleryvesper9-13.ak.instagram.com/090d06dad9cd11e2aa0912313817975d_101
        "width": 640,
        "height": 640
      },
      "users_in_photo": null,
      "filter": "Vesper",
      "tags": [],
      "comments": {
        "count": 2
      },
      "caption": null,
      "likes": {

```

can get the number of the media which have the tag name. You can see the request and the response in Figure 59 and 60 respectively.

As these examples display, the Instagram API gives us a set of fully functional end-

```

    "users_in_photo": null,
    "filter": "Vesper",
    "tags": [],
    "comments": {
      "count": 2
    },
    "caption": null,
    "likes": {
      "count": 1
    },
    "link": "http://instagr.am/p/D/",
    "user": {
      "username": "kevin",
      "full_name": "Kevin S",
      "profile_picture": "...",
      "id": "3"
    },
    "created_time": "1279340983",
    "images": {
      "low_resolution": {
        "url": "http://
distilleryimage2.ak.instagram.com/11f75f1cd9cc11e2a0fd22000aa8039a_6.jpg",
        "width": 306,
        "height": 306
      },
      "thumbnail": {

```

Figure 54: Response for the endpoint /media/search

```

https://api.instagram.com/v1/media/{media-id}/comments?access_token=6097080872.51c29df.e561ad15edb840ad89fb5b85051d76d9

```

Figure 55: Request url for the endpoint /media/media-id/comments

```

{
  "data": [
    {
      "created_time": "1280780324",
      "text": "Really amazing photo!",
      "from": {
        "username": "snoopdogg",
        "profile_picture": "http://images.instagram.com/profiles/
profile_16_75sq_1305612434.jpg",
        "id": "1574083",
        "full_name": "Snoop Dogg"
      },
      "id": "420"
    },
    ...
  ]
}

```

Figure 56: Response for the endpoint /media/media-id/comments

points for retrieving and analysing the data including the media and relationships stored on Instagram platform. Whether you are the advertiser or the business company, it is quite easy to access your user profiles, relationships, locations, likes and media. After you

```
https://api.instagram.com/v1/locations/search?lat=48.858844&lng=2.294351&access_token=6097080872.51c29df.e561ad15edb840ad89fb5b85051d76d9
```

Figure 57: Request url for the endpoint /locations/search

```
{
  "data": [{
    "id": "788029",
    "latitude": 48.858844300000001,
    "longitude": 2.2943506,
    "name": "Eiffel Tower, Paris"
  },
  {
    "id": "545331",
    "latitude": 48.858334059662262,
    "longitude": 2.2943401336669909,
    "name": "Restaurant 58 Tour Eiffel"
  },
  {
    "id": "421930",
    "latitude": 48.858325999999998,
    "longitude": 2.294505,
    "name": "American Library in Paris"
  }
]
```

Figure 58: Response for the endpoint /locations/search

```
https://api.instagram.com/v1/tags/{tag-name}?access_token=6097080872.51c29df.e561ad15edb840ad89fb5b85051d76d9
```

Figure 59: Request url for the endpoint /tags/tag-name

```
{
  "data": {
    "media_count": 472,
    "name": "nofilter",
  }
}
```

Figure 60: Response for the endpoint /tags/tag-name

get the data you want from Instagram platform, you can combine these information to target more audience at right place and time in order to boost your business.

4.3 Instagram Ads

In late 2015, Instagram launched advertising. After one year, Instagram ads have promoted no less than one billion user behaviors. Through Instagram ads, the marketers and businesses can reach 600 million users of any particular instance of Instagram. Be-

sides, as more than 400 million people use Instagram every day, Instagram advertising has become a tempting way to increase the participation and engagement of the brand. All the results are because Instagram provides the incredible tools and opportunities for all kinds of advertisers and businesses to reach their target customers in order to boost their business. However, as more and more people and companies join Instagram, it is necessary for us to know the Instagram ads well in order to stand out in the competitive environment.

We can create a large number of high quality Instagram ads at any time in many format using the Instagram business tool, like the promotion. At the same time, the Instagram business tool and Instagram API allow us to analyse and manage the Instagram ads efficiently.

Before we create the Instagram ads, we need to identify the objective we want to achieve, which contains the brand awareness, getting more reach and engagement and creating lead generation Instagram ads. Next, we need to take consideration of the audience we want to target. For example, it is important to consider the age, location, gender, language, demographics, interests and connections in order to target a extreme specific set of the audience. As soon as you determine the target criteria for your audience, you can set how much money you want to spend on on your ads every day and the lifetime of your ads. When we decide all the prerequisites, we are ready to choose the format of our Instagram ads, which include the single image, single video and the slideshow. Finally, we can promote our Instagram ads.

After we create our Instagram ads, the advertisements will be qualified to run on the Instagram. The Instagram ads will show up in our Instagram feeds, as well as images and videos shared by our friends, family and other Instagram accounts we follow. Then we can use the Instagram API and Instagram business tool to measure the performance of our Instagram ads in order to modify our strategy. At the same time, it is helpful to segment the data and dig out the potential information.

Instagram advertising is a part of your overall strategy for your business. There is no doubt that it will bring long term effects for your business. However, The premise is that we can be very good to apply Instagram ad to our business.

5 Conclusion and Future Challenges

5.1 Conclusion

This thesis mainly studies the Facebook and Instagram social networks, including the built in analytic tools and the application programming interface (API) in order to retrieve the meaningful data on these platform, analyse the hidden information efficiently and refine the marketing strategies to boost the business. In other words, we can use the application programming interface (API) to programmatically access the wealth of data on these social network platforms, then employ the built in analytic tools to segment these retrieved data based on the interests, demographics and the locations of the users, finally refine the marketing strategies based on the marketing API to boost the business. With these test results and study cases, we will have a further comprehensive understanding about the digital marketing tools.

5.2 Future Challenges

Due to the time constraint during the development of this thesis, I did not write the program to fully interact with the application programming interface (API) on the social network platforms. Besides, how to write the application programming interface (API) for one service has not been exploited. If we would like to get more resources from one platform, I think it will be really useful to write one or more client applications and some other non provided services on the social network platforms and test the interactions between them, suppose we have the admin permission in advance.

As for the digital marketing tools, I think it is extremely important to combine the digital marketing tools with the artificial intelligence (AI) as well as the machine learning technologies in the future in order to better serve the market and improve the experience of the customers. Therefore, they also could be as a further interesting research and development topic .

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