GOOGLE MAPS

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2018

ACKNOWLEDGEMENT:

The research on "**Google Maps**" has been given to us as a part of the curriculum in 2-Year BTech.
We have tried our best to present this information as clearly as possible using basic terms that we hope will be comprehended by the widest spectrum of researches, analysts and students.
We have complete this study under the able guidance and supervision of **Prof. Saurabh Anand**; we will be failed in our duty if we do not acknowledge the scholarly guidance, assistance and knowledge. We have received from them towards fruitful and timely completion of this work.
Last but not the least we would also like to mention that this project is a great success with the coordination among all.

INTRODUCTION:

Google maps navigation is the web mapping system developed by the google for the navigation. They are working for navigation purposes. It takes the information from offline and published it on online platform like: streets names, road signs, building names, etc.
Google Maps is launched to realise the tagline "**Discover more with every click**".
It provides the real time traffic conditions, street maps, 360° panoramic views of streets, and route planning for the one travelling by foot, or by any means of convenience.
It also uses the voice navigation for traffic alerts. It calculates the distances and even predicts the time by which one can reach to its destination.
Google maps even sends the notification to the users for updating with the real-time traffic conditions and navigating its users.
Google maps is using JavaScript, XML and Ajax as the languages on the front end.
Greasemonkey, script-insertion tool is used to provide a large number of client-side scripts to customize Google Maps data. JSON and XML is used for data transfer and for performance reasons respectively.
Google maps are updated latest on August 2018 to view the 3D globe.

WORKING OF GOOGLE MAPS:

Google's founder vision was to "organize the world's information and make it universally accessible and useful" and Google Maps is part of that endeavour.
Google being a private organisation is not able to collect all the data on its own so for the geospatial data it relies on the Base Map Partner Program which includes the USDA Forest Service, the US National Park Service, the US Geological Survey, various city and county councils, which submits the vector detailed data to google. Data provided demarcate the changing boundaries and waterways which helps to keep the "base-map" up-to-date.
Google maps collects the data from the GOOGLE STREET VIEW which is the never-ending road trip. The dispersed vehicles all over the planet constant moves from one place to another taking all the while taking 360-degree photos everywhere they go. Based on the GPS coordinates of vehicles, Google maps overlays its Street View images on top of its base map. Street view uses the OCR (optical character recognition) which reads the roads signs, building names, etc. It further helps to update the name of the roads.

The satellites also help the Google maps to collect the data. The satellite view in collaboration with Google Earth stitched together taking the high-resolution images of the planet. These images are combined with other layers of data such as Street view and data provided by other agencies to determine the altered buildings and other changes.

Google maps accesses the location data collected by the smartphones. These location data help in determining the real-time traffic example if it detects the number of active smartphone users is less on any busy road then it may detect the diversion and notify the user.

Even Google Map Maker also helps users in providing the local knowledge to Google Maps That there are large number of public editors to constantly updates the data on Google Maps 24*7. This local knowledge helps the Google Maps to detect the nearby cafes, restaurant, hotels.
The data collected by the Google Maps is fascinating but the thing that matters is making sense of that data. When these layers of data are processed, it gives us the access to various information found on Google Maps. These data is processed using different kind of algorithms. These complex and secretive algorithms work to clean the data, spot inconsistencies, and link it all together to make it more useful.

EVOLUTION OF GOOGLE MAPS:

Google maps was first developed in 2004 by Australian software engineer Neol Gordon, who was one of the four men who founded the Sydney-based digital mapping start-up Where 2 Technologies.
It was first designed in a C++ program by two Danish brothers.
October 2004 -company was taken over by Google Inc. and transformed into the web application "Google Maps".
September 2004-Google come up with ZipDash which provides real-time traffic analysis.

2005
February 8,2005
-application was first announced on the Google Blog and was located at Google.
-Firstly, supports only the users of Internet Explorer and Mozilla web browsers.
February 25, 2005
- Opera and Safari also started supporting Google Maps.
2006
January 2006
-Google Maps also started promoting road maps for other countries such as the United States, Canada, the UK, Japan, etc.
Google Mars (March 12, 2006)
- a draggable map and satellite imagery of the planet Mars was introduced.
December 2006.-feature added that lets anyone to add multiple destinations into their driving directions.

2007
February 2007- buildings and subway stops are displayed in "map view" of Google Maps for parts of New York City, London and some other cities.
Real-time traffic flow (February 28, 2007)
- officially launched to automatically include this feature in the maps of 30 major cities of the United States.
Street View (May 25, 2007)

- new feature which provides ground-level 360-degree view of streets in 5 major cities in United States.
-After its release, this feature gathered much controversy because of the privacy concerns about the uncensored nature of the panoramic (extensive or bird's eye view) photographs, although the views are taken on public streets only. Since then, Google started blurring faces and license plates.
September 13, 2007-54 new countries were attached to Google Maps in Asia and Latin America.
October 3,2007-Google Transit was combined to make public transportation routing possible on Google Maps.
Terrain (November 27,2007)
- view which shows users the 3D elevation of natural geographic features such as mountains,canyons.

2008

April 2008-a button was added to view the recent Saved Locations to the right of the search field.
July 22, 2008-walking directions were added in Google Maps.
August 2008 -Street View was launched in Japan and Australia.
-Map Maker tool was introduced which allows user to update the map data seen by all.
Android App(September 2008)
-Android app for "Google Maps" was first released with GPS localization feature which also includes features of turn by turn navigation, Street view, etc.

2009

-Street View was launched in the United Kingdom and the Netherlands.
Google Map Logo (May 2009)
- new "Google Maps logo" was introduced.
October 2009-maps are updated according to the railroads that were redone and transformed to have a slightly new look and removing older lines.

2010

Google Maps Labs (February 11, 2010)-popular map service that provides several ways to explore nearby places and even far places.

Google Street View (March 11, 2010)- a technology that provides wide angle views from positions along many streets all around the world, featured in Google Maps and Google Earth.

- was launched this year for Hong Kong and Macau only.

Google transit or public transportation routing (May 25, 2010)

- Transit on Google Maps is a public transportation planning feature which combines the transport agencies data with Google Maps. It takes care of transit stop, route, schedule, and fare which makes planning of trip faster and easier.

-Firstly, launched for Denmark.

December 2010-Internet Explorer, Firefox. Safari, and Google Chrome started supporting google maps.

2011

April 8, 2011 -Google announced that it will charge for API usage, if the usage exceeded over a limit (for commercial site).

Map Maker (April 19, 2011)-introduced to US Google Maps,

- allowed any viewer to edit and add changes to Google Maps which would provide Google with local map updates.

2012

January 31, 2012 -Google made its map services free in France causing huge loss to a French based mapping company therefore was declared guilty and was ordered by French court to pay the damage to the French mapping company.

Google+ Local (May 30, 2012)-replaced google places for business.

- allows users to post photos and reviews of locations directly to its service page (Zagat).

Google Places -It works for businesses that have registered with Google by displaying their location. Registration for it is free. Also includes opening/closing time and photos of their business. Google Places is especially important for businesses that have local customer base or for the customers that are searching for something in a certain location (e.g. hotels, amusement parks, restaurants etc.).

June 2012-Google started to map the rivers and canals of Britain.

October 11 -announcement came that Google updated the 250,000 miles of roads in the US.

December 2012- the Google Maps was made available in App Store, after Apple removed it from its default installation of the mobile operating system on its version iOS 6.

2013

January 29, 2013 -Google Maps included map of North Korea.

Google My Maps- Google My Maps, service launched by Google in April 2007 which enabled users to create custom maps for personal use.

April 23, 2013 -Street View was launched to Hungary and Lesotho, expanding the coverage of Google Maps (360-degree mapping imagery) to over fifty countries.

May 15, 2013 -Google announced for a new upgraded version of Google Maps which was able to create a customized map that was specific to the behaviour of each user. For example -it revealed highlights that are based on the information that is entered, and provided useful local information such as restaurants. A new feature also came that displays Earth view that directly integrates the 3D experience from Google Earth into the new maps.

2014

March 21, 2014 -a new Google Maps interface came into scene, although was not the default interface.

April 5, 2014 -Street View was launched for Cook Islands, which expanded the coverage of Google Maps (360-degree mapping imagery) to 58 countries.

April 12, 2014 -Google Maps was updated because of Crimean crisis (Russian border issue).

2015

April 2015-A case happened on the map of one of the cities in Pakistan where imagery of the Android and Apple logo went through some vandalism. The vandalism (deliberate destruction to public property) was removed and *google disabled user moderation on Map Maker.*

-Google disabled usage of classical google maps.

2016

June 27, 2016 -Google launched Landsat 8 that provided new satellite imagery worldwide, which comprised over 700 trillion pixels of new data. It acquired mapping analytics (how your product or service will perform in a specific geographical area).

2017

October 16, 2017-Google Maps went through update that provided accessible imagery of space bodies such as Titan, Mercury, and Venus, as well as direct availability to imagery of the Moon and Mars.

2018

May 2018 -Google made changes in the API structure, which merged the basic and premium plan into one which resulted in price raise for users of the basic plan.

August 2018 -Google maps changed overall view into a 3D globe and dropped the Mercator projection, which was to display project of the planet on a flat surface.

GOOGLE TRAFFIC:

The most hit feature of Google maps is **GOOGLE TRAFFIC**
It is a feature that displays the real time traffic on major roads and highways.
The technology used behind the Google traffic is analyzing the GPS determined locations of a large number of mobile phone users, and then calculating their speed along with the length of the road. Google processes the incoming raw data of mobile phone locations and analyze the frequent stops. Then the no of users in a particular area is noted and according to the analysis the colour is changed.
Green represents a normal speed of traffic, orange represents slower traffic conditions, red indicates congestion while dark red (previously red and black) indicates nearly stopped or stop-and-go traffic.

Google is also providing the shorter path according to the analysis of the road traffic so as to reach the destination in less time.

Metropolitan cities (DELHI, MUMBAI, BANGALORE) where usually
Traffic jam is a common issue this feature helps a lot.

EXPLORER TAB:

Another feature of Google map is the EXPLORER TAB that comes with a refresh immersive experience.
It is a quicker way of finding the nearby restaurants, takeaways, cafes and bars to hang out. Not only this but it also helps to find shopping, recreation, household activities, and the top events and activities happening in our area.
It's all about personalizing our experience using Google Maps with AI and machine learning to give us a better-predictions about the places and restaurants we deserve to know about, and it can be shareable between our friends and families so that they can shortlist a plan for outing.

Use of GPS in Google Maps:

GPS stands for the GLOBAL POSITIONING SYSTEM is the satellite-based navigation system which consists of at least 24 satellites. This system is used to determine the ground position of the object.
These satellites are owned by the US department of defence but they can be use by anyone having the GPS receivers. They do not have any subscription fees or any installation charges. They were launched for the military uses but in 1980s the government make them accessible for the civilian uses.
GPS uses the process trilateration for effectively determining the relative and absolute locations. This technology is developed for navy purposes but today it is being used for the various purposes.
GPS is combined with mobile communications and Google maps helping in determining the nearby hotels, parking, petrol stations, and many more things.

Google maps use the GPS coordinates to determine the locations. GPS coordinates is the combination of longitudes and latitudes which helps to determine the exact location on the earth. It is the unique identifier on the earth.
The satellites used over there are not old more than three years, they are updated on the regular basis.

IMPLEMENTATION OF VIRTUAL POSITIONING SYSTEM:

Till now Google using the idea of GPS, but now learning from Machine Learning and AI and with the help of AR and camera.
Google brings VPS which brings the new age of navigation and maps to view.
To use the newly Visual Positioning System (VPS) we just need to
Fire up the camera in google maps and look around.
Google will collect data from street view, from present location
And the phone's compass to give a visual indicator with the help of AR to where to go. We will see a virtual arrow pointing to the right path. Further from new updates, there will be animate guides like a fox, dog, or anything we can imagine.
VPS also provide additional information of the buildings and landmarks around us.
This system uses google lens and street view parallely to deliver an unmatched navigation experience.
This is the future of Google maps. Google is continuously pushing updates to enhance the Maps experience.

STATS ON GOOGLE MAPS:

1. Combining satellite, aerial and street level imagery, Google Maps has over 20 petabytes of data, which is equal to approximately 21 million gigabytes, or around 20,500 terabytes.
2. Depending on data availability, aerial and satellite images are updated every two weeks.
3. The satellite imagery for both Google Maps and Google Earth comes from a broad range of sources and third-party providers. The same information is available to anyone who has a license or has purchases it from public, government, commercial and private sector sources.
4. Over 1,000,000 websites use the Google Maps API, making it the most heavily used web application development API. Over 15% usage share of google maps API.
5. On average, Google Maps uses about 0.67MB of data every 10 miles.
6. Maps generate nearly $73 billion in annual revenue.
7. The altitudes of 800-1500 feet from which the imagery of cities for Google maps are taken even though the it has satellites.

8. Increase of interest of Google maps since its introduction.
9. North Korea is the only country which has no data available on Google, only the satellite images is shown when you try to look.

PLACES WHERE IMAGES ARE BLURRED ON GOOGLE MAPS:

a. Baker Lake Inuit territory in northern Canada
b. Air base Ramstein, Germany (starting point for forces of “operation iraqi freedom”)
c. Pacific Northwest, USA (near border of Washington and Oregon
d. Oil Refinery, Szazhalombatta, Hungary
e. Palace Huis Ten, The Netherland
f. Unknown area, Russia
g. Mobil Oil Corporation, Buffalo, New York, USA
h. Babylon, Iraq
i. Airbase at Reims, France
j. Indian Point Power Plant, New York, USA
k. Volkel Air Base, Netherlands
l. HAARP, Hakon, Alaska, USA (controversial places believed to cause hurricane, flood and earthquakes
m. Mazda Raceway Laguna Seca, Salinas, California, USA (racetrack)
n. Tantauco National Park, Chile
o. Elmira Correctional Facility, USA
p. Alexei Miller House, Russia (private place Gazprom CEO)
q. Colonel Sanders
r. Faroe Islands, Denmark
s. NATO headquarters, Portugal
t. Seabrook Nuclear Station, New Hampshire
u. Missile silos, Spain

CONCLUSION:

Google is trying to make the world closer by bringing the massive amounts of geospatial data and making it accessible to the world on the massive library called The Internet. It is a mix of innovation and good marketing. Google maps is innovating and becoming better bit by bit. Every day new technologies and ideas are including for the convenience of the users.

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