



UNIVERSITÀ
degli STUDI
di CATANIA

DIPARTIMENTO DI
MATEMATICA E INFORMATICA

Social Media Data Analysis 2023/2024

The Rise of Social Media

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Social Media vs. Social Network



Social Network/Definition

From Wikipedia

- A *social network* is a social structure made up of a set of social actors (such as individuals or organizations), sets of dyadic ties, and other social interactions between actors.
- It is also the use of Internet-based social media sites to connect with family, friends, colleagues, audiences, or customers.

Social Media/Definition

From Wikipedia

Social media are interactive, computer-mediated technologies that facilitate the creation and sharing of information, ideas, career interests and other forms of expression via virtual communities and networks.

- Social media are interactive Web 2.0 Internet-based applications;
- User-generated content, such as text posts or comments, digital photos or videos, and data generated through all online interactions, is the lifeblood of social media;
- Users create service-specific profiles and identities for the website or app that are designed and maintained by the social media organization;
- Social media facilitate the development of online social networks by connecting a user's profile with those of other individuals or groups.

Social Media/Definition

The difference between **social network** and **social media** is that social network refers to the people and relationships that are formed online, while social media refers to the tools and platforms that enable the creation and exchange of user-generated content. Social media is the means, while social network is the end.

For example, Facebook is a social media site that allows users to share photos, videos, messages, and other information. The social network is the group of people who are connected by these shared activities and interests.

Social Media/Social + Media

Social

Meant for:

- Sharing information (files, tastes, opinions) with other individuals;
- Social interactions:
 - Individuals gathering into groups, acquiring notoriety and influence;
 - Collecting social reactions and solicit discussion;

Media

- Digital places for publication;
- Creation and sharing of user-created content;
- A medium for transmitting information and auditing interest;
- Digital words, sounds, pictures, videos which are created, shared in virtual communities and online networks.

SOCIAL MEDIA VERSUS TRADITIONAL MEDIA

SOCIAL MEDIA

Social media refer to websites and applications that enable users to create and share content or to participate in social networking

Facebook, YouTube, Instagram, LinkedIn, Wikipedia, Pinterest, etc. are some examples

Offers two-way communication

Dependent on the internet

Easy to make changes once a message is broadcasted/published

You have more control over the message you want to share

TRADITIONAL MEDIA

Traditional media refers to any form of mass communication available before the introduction of digital media

Some examples include television, radio, newspapers and magazines

Offers one-way communication

Not dependent on the internet

Difficult to make changes once a message is broadcasted/published

You have less control over the message you want to share



Social Media/Uses

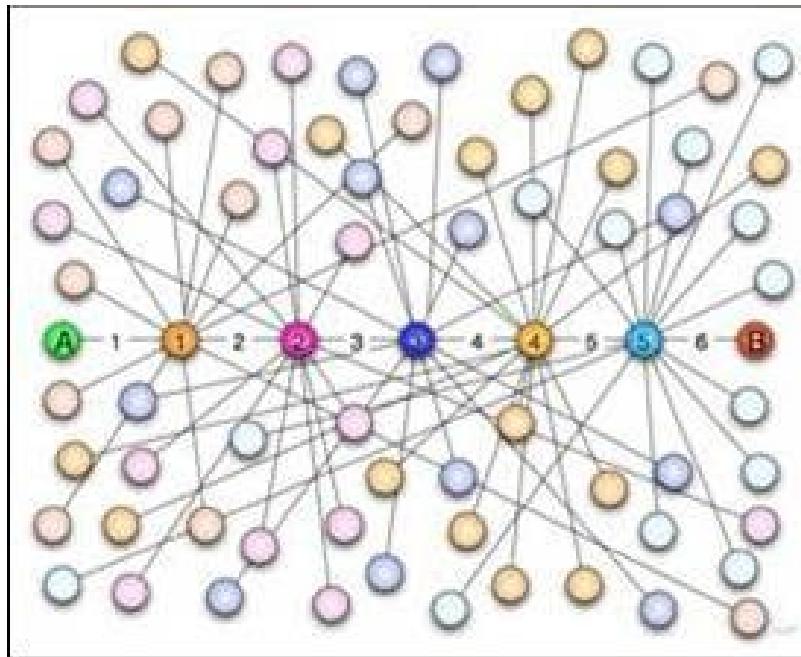
Social Media can be seen as a set of tools which can connect people around the world at the speed of light. As such, they allow some powerful uses:

- By Individuals: to gain control on how people perceive you, by sharing your interests and vision (self presentation);
- By companies: to advertise a product or brand, and get feedback on what people like/dislike about the product in order to improve it (social media marketing);
- By communities: to analyze/monitor public opinion and activities to decide how to take action, e.g., how to direct political action or where to drive a community (auditing);



History/SixDegrees (1997 - 2001)

SixDegrees was the first site that used the modern paradigm of creating profiles, connect users and allowing sharing different kinds of information. It already featured friend lists and instant messaging.



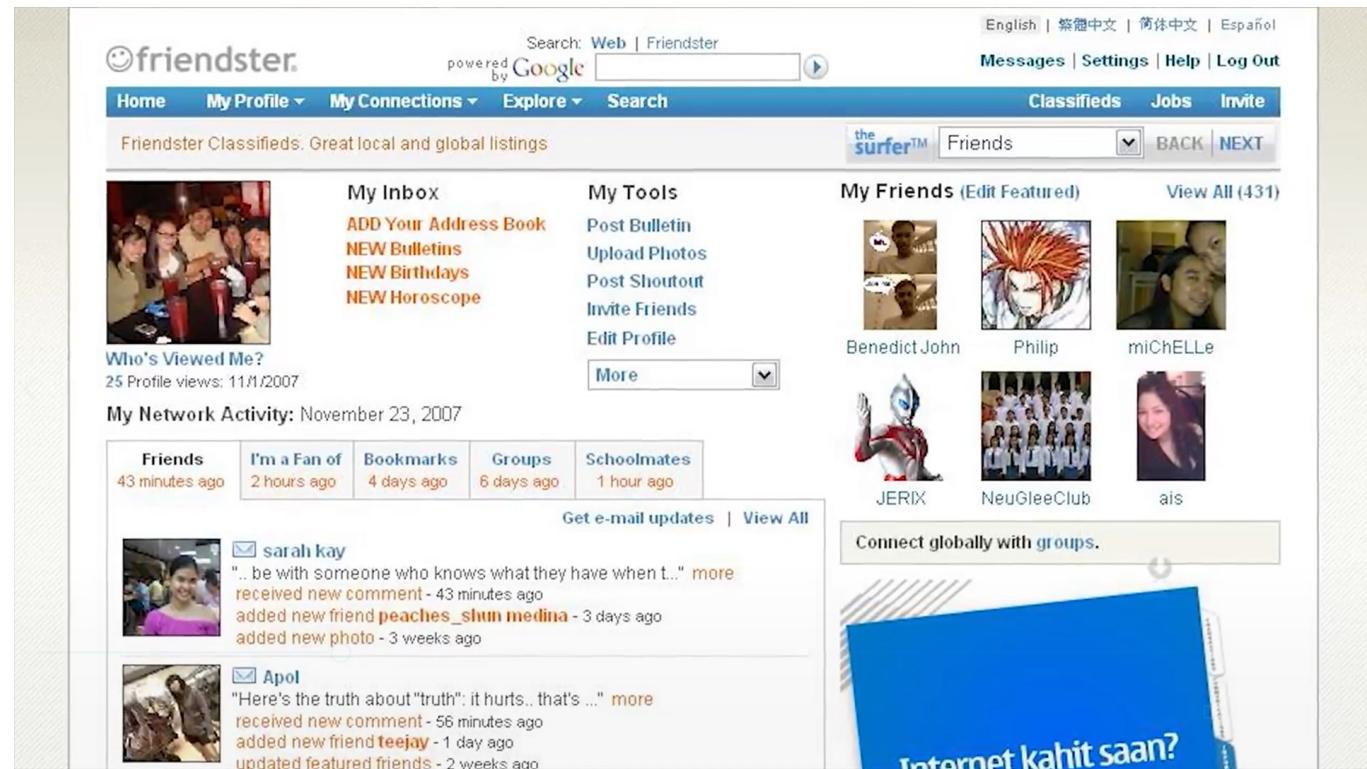
The screenshot shows the SixDegrees homepage. At the top left is the logo with the slogan "you'd be surprised who you know". To the right is a "member login" form with fields for e-mail address and password, and a "submit" button. Below the login is a message for non-members: "If you're not a member yet (it's free), [click here](#)". There's also a link for password recovery: "If you can't remember your password, [click here](#)". A "recommendations" button is visible. On the left, there's a "sixdegrees news" section with several items: "4/13 Check out this month's column on 'MegaNetworking.'", "3/18 Do you have multiple sixdegrees accounts? Merge 'em.", "3/1 Recommendations gets off to a flying start...", and "2/25 The brand new FAQ page - what you need to know about sixdegrees...". On the right, there's a "publicareas" section with links: "joinnow", "welcome", "about sixdegrees", and "whitepages".

SixDegrees failed because it was too ahead of its time and there were not enough users on the Internet to support the site (less than 2% of the world population used the internet).

History/Friendster (2002 - 2015)

Friendster was the first social networking service to hit 1 million users.

- Friendster had functionalities similar to SixDegrees, but benefited from the larger amount of people on the Internet at the time.
- The site quickly reached 3 million users.



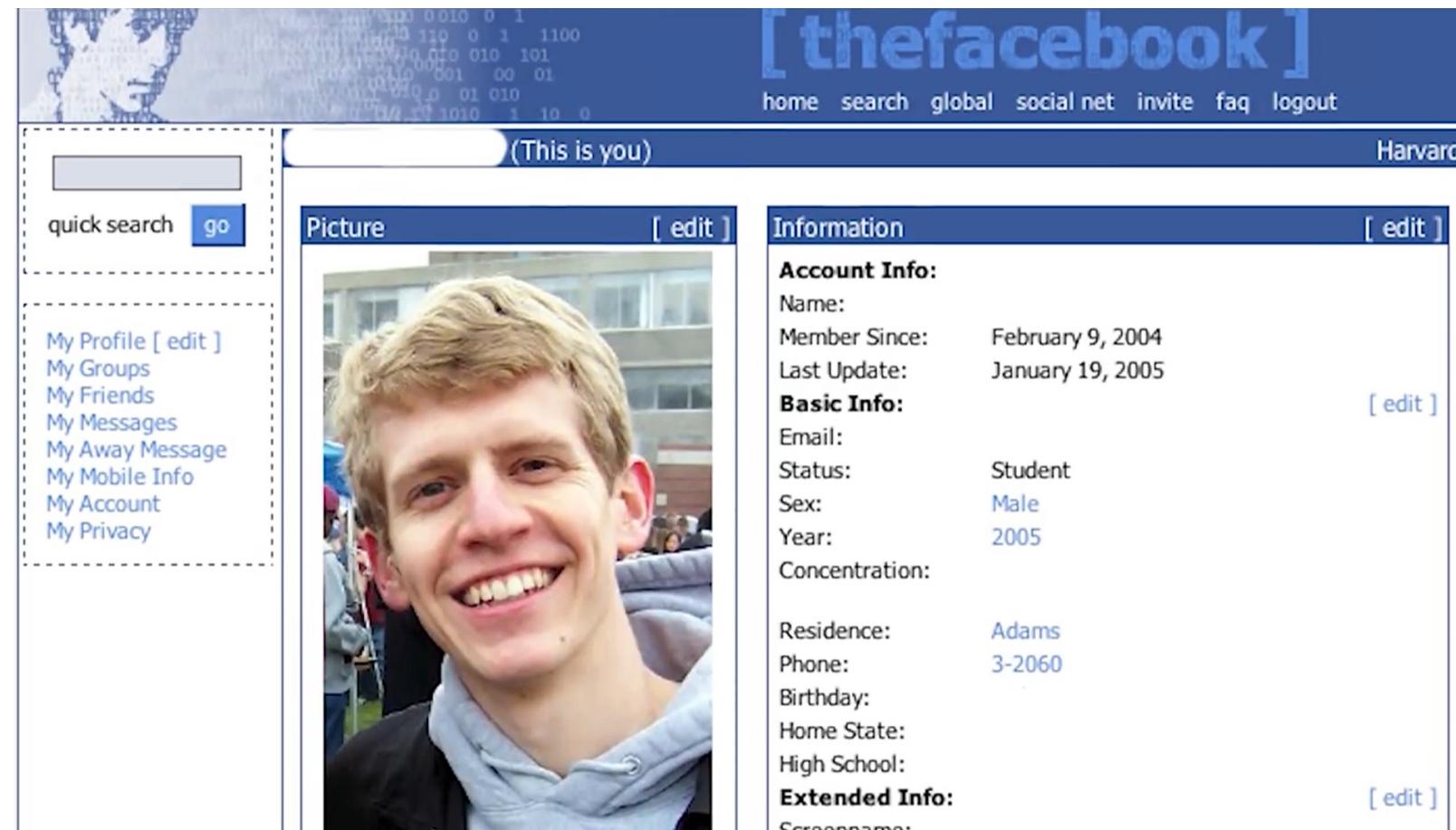
History/MySpace (2003 - present)

- The creators of MySpace owned eUniverse, a company running multiple websites;
- MySpace rapidly became more popular than Friendster thanks to a massive advertising campaign;
- MySpace could also implement new features (such as customized profile pages) more quickly than Friendster.

The screenshot shows a MySpace profile page for a user named 'Tom'. At the top, there's a navigation bar with links like Home, Browse, Search, Invite, Film, Mail, Blogs, Favorites, Forum, Groups, Events, MySpace TV, Music, Comedy, and Class. Below the nav bar is the user's profile picture, name ('Tom'), status ('":)'), gender ('Male'), age ('32 years old'), location ('Santa Monica, CALIFORNIA United States'), and last login ('12/11/2007'). A mood indicator says 'busy' with a smiley face. There are links to 'View My: Pics | Videos'. Below this is a 'Contacting Tom' section with options to Send Message, Forward to Friend, Add to Friends, Add to Favorites, Instant Message, Block User, and Add to Group. A 'MySpace URL' input field contains the URL <http://www.myspace.com/tom>. Underneath is a music player showing 'Electric Surfin Go Go 01:10' by Zune. The 'Tom's Interests' section lists General interests (Internet, Movies, Reading, Karaoke, Language, Culture, History of Communism, Philosophy, Singing/Writing Music, Running, Finding New Food, Hiking, Travel, Building alternate communities) and specific Music interests (Bands: Beatles, Superdrag, Jackson 5, Weezer, Sex). On the right side, there's a box titled 'Tom testing out the new status' containing recent blog entries: 'myspace updates!', 'new homepage look', 'what's going on with friend counts?', 'extended network', 'am i online?', and a link to 'View All Blog Entries'. Below that is a 'Tom's Blurb' section where Tom introduces himself and encourages users to ask questions. At the bottom are buttons for COMMENT, ADD TO PROFILE, and MORE FROM USER.

History/Facebook (2004 - present)

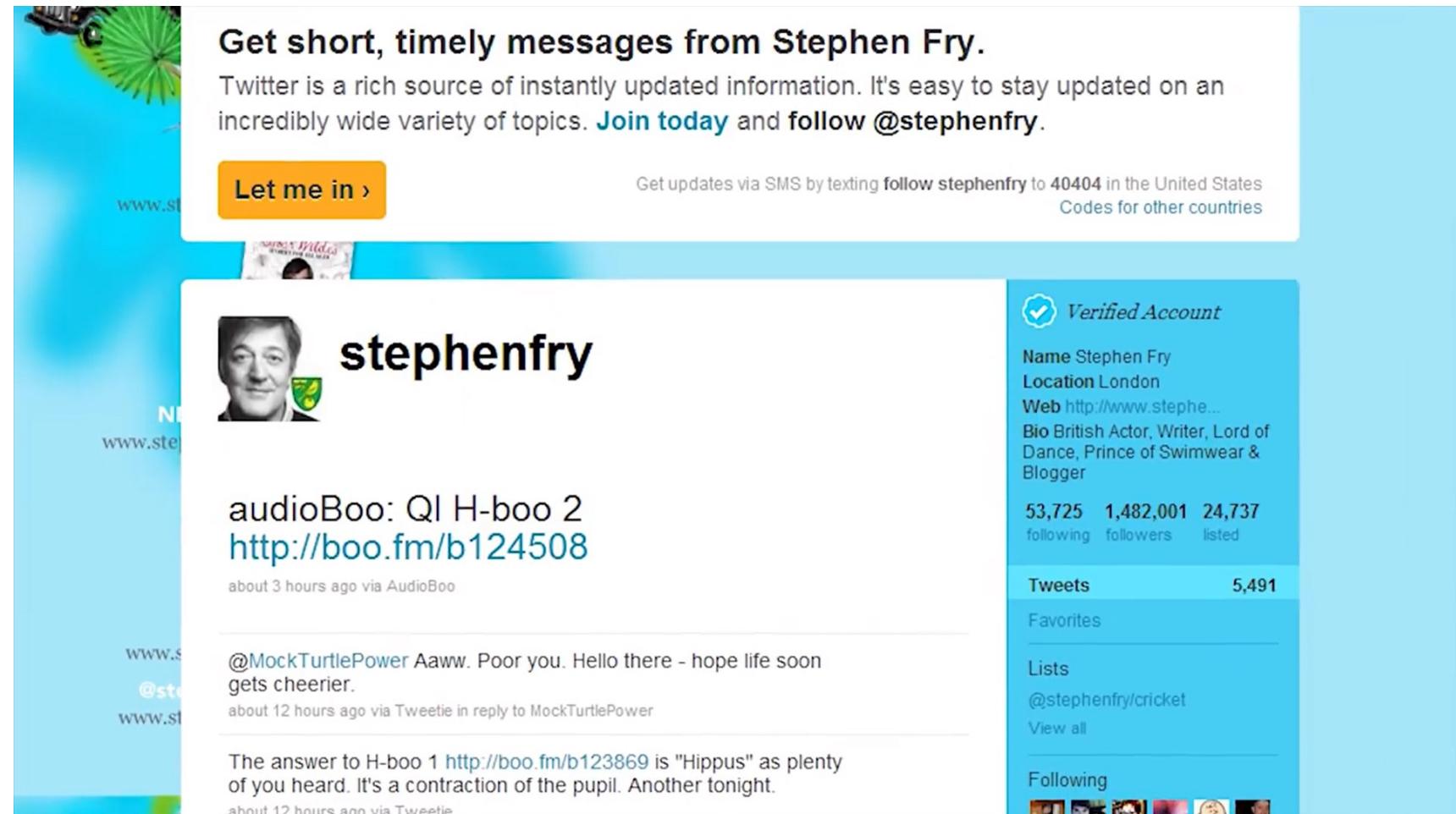
- Facebook was originally intended to be a campus-wide student directory;
- It was soon extended to other schools (still requiring a college email address);
- People could interact with each other by posting on somebody's else "wall";
- Facebook opened to the masses in 2006;
- Facebook surpassed MySpace as it was more directed towards user-generated content, pages, groups.



see "The Social Network" movie

History/Twitter (2006 - present)

- Instead of focusing on user profiles as the competitors did, Twitter proposed the simpler idea of micro-blogging;
- People could post ‘tweets’ of 140 characters, non-editable;
- Twitter also introduced hashtags in 2007, which will be later used to determine which topic was trending in 2010;

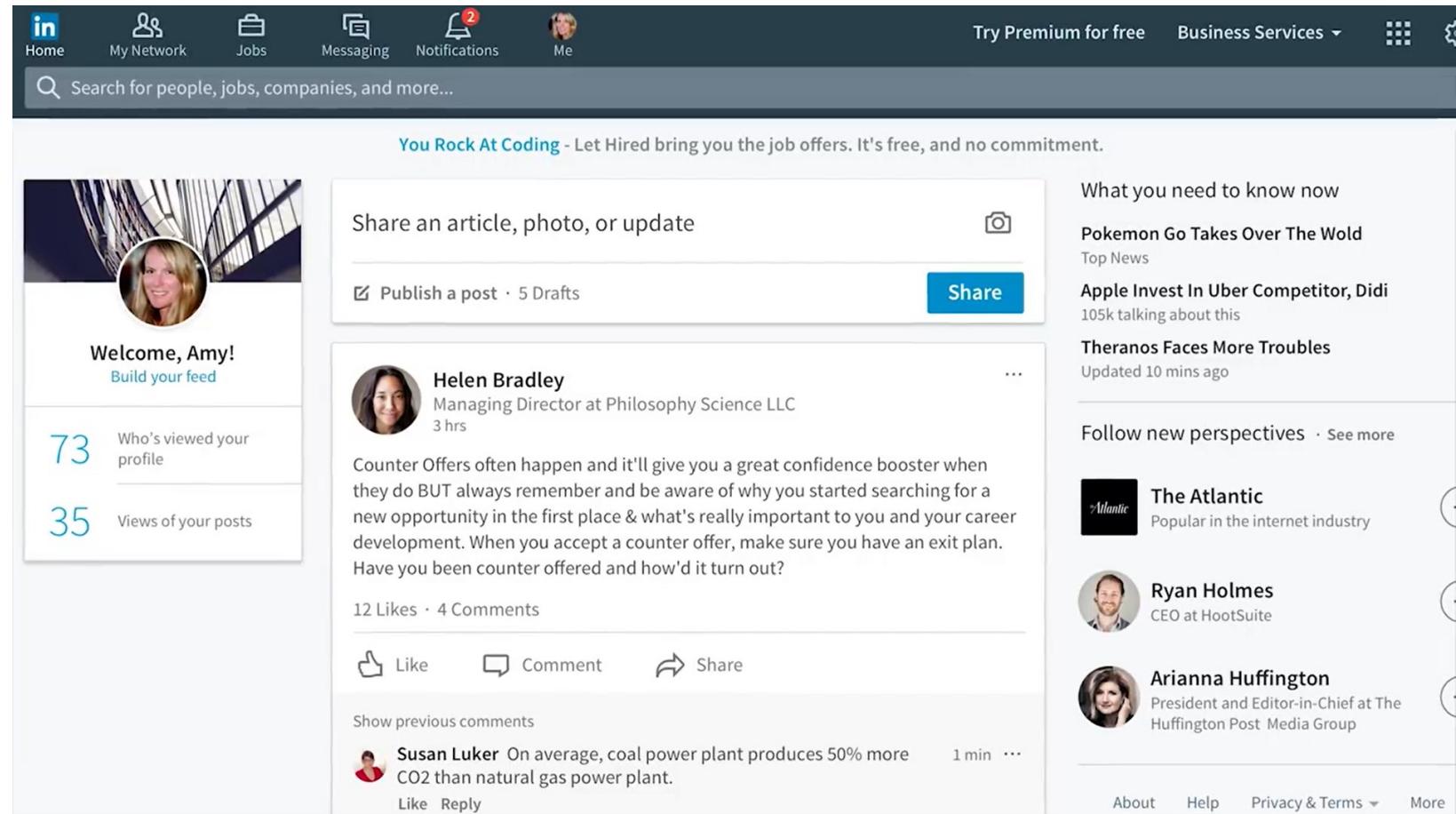


The screenshot shows Stephen Fry's Twitter profile. At the top, there's a promotional message for following him: "Get short, timely messages from Stephen Fry. Twitter is a rich source of instantly updated information. It's easy to stay updated on an incredibly wide variety of topics. [Join today](#) and follow @stephenfry." Below this is a large orange "Let me in >" button. To the right, instructions for SMS updates are provided: "Get updates via SMS by texting [follow stephenfry](#) to 40404 in the United States" and "Codes for other countries". The main profile area features a photo of Stephen Fry, his handle "@stephenfry", and his bio: "British Actor, Writer, Lord of Dance, Prince of Swimwear & Blogger". His stats are listed as 53,725 following, 1,482,001 followers, and 24,737 listed. Below the bio, a recent tweet from "audioBoo: QI H-boo 2" is shown, along with a reply from "@MockTurtlePower". A summary of his activity is provided: "The answer to H-boo 1 [http://boo.fm/b123869](#) is "Hippus" as plenty of you heard. It's a contraction of the pupil. Another tonight." On the far right, there are links for "Verified Account", "Name Stephen Fry", "Location London", "Web [http://www.stephe...](#)", "Bio British Actor, Writer, Lord of Dance, Prince of Swimwear & Blogger", "Tweets 5,491", "Favorites", "Lists", "View all", and a row of small profile pictures.

The use of trending topics started changing the way people got news from the internet, replacing traditional media with social media;

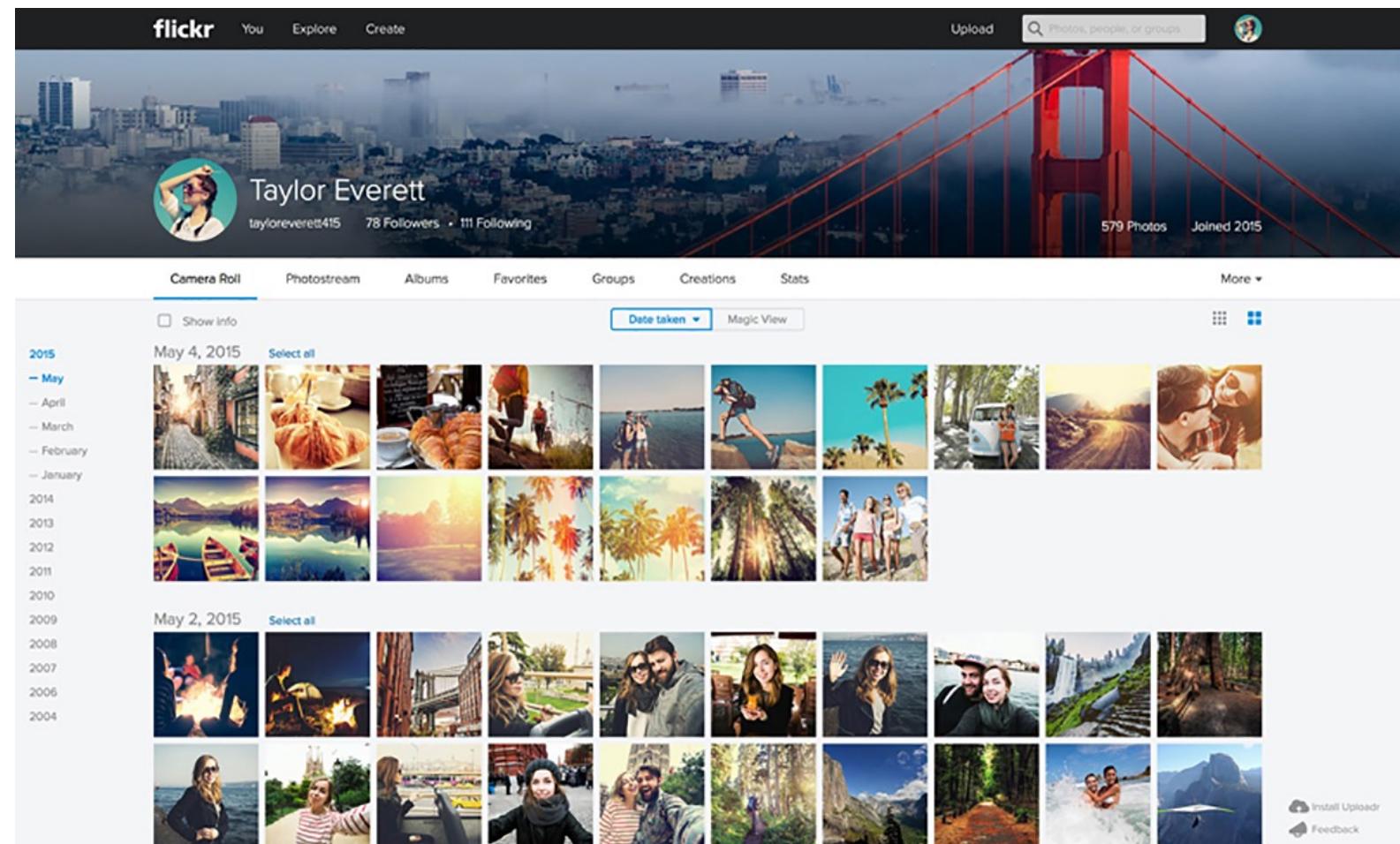
History/LinkedIn (2003 - present)

- The success of social networking sites brought to the implementation of social functionalities to other sites which had been around since a long time ago;
- For instance, LinkedIn implemented many social features such as the ability of posting, liking, commenting and sharing, as well as the social feed, and now looks very Facebook-like.



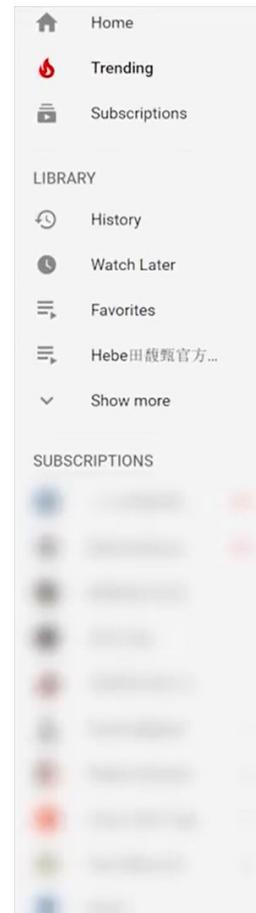
History/Flickr (2004 – present)

- Allows to publish photos and acts as a photo hosting site;
- Signed-in Flickr users can follow the photostreams of other users;
- Ability to create galleries and groups.



History/Youtube (2005 - present)

- Originally proposed as a directory to load/search videos;
- Similarly, trending and community function started appearing on Youtube;
- Users can like/dislike videos, comment them, have ‘channels’ (personal profiles) and share video content;



The image shows a screenshot of the original YouTube interface from around 2005. The navigation bar at the top includes 'Home', 'Trending', and 'Subscriptions'. Below this is a 'LIBRARY' section with 'History', 'Watch Later', 'Favorites', and 'Show more'. A 'SUBSCRIPTIONS' section follows, displaying several blurred channel thumbnails.

French Figure Skater Finishes Despite Wardrobe Malfunction
Wochit Entertainment • 755K views • 1 day ago
Gabriella Papadakis suffered a figure skating nightmare on Monday. During her short dance routine with French partner Guillaume Cizeron, Papadakis felt her glittery dress slip. They could go on to ...

Fergie Performs The U.S. National Anthem / 2018 NBA All-Star Game
MLG Highlights • 11M views • 1 day ago
Fergie Performs The U.S. National Anthem / 2018 NBA All-Star Game Follow Us on Twitter: <https://twitter.com/stayhls> Like Us on Facebook: <https://www.facebook.com/stayhls> Subscribe To

Drake - God's Plan
DrakeVEVO • 25M views • 3 days ago
God's Plan (Official Video) Song Available Here: <https://Drake.Ink.to/ScaryHoursYD> Directed by Karena Evans Executive Producers Director X & Taj Critchlow Produced by Fuliane Petikyan For P...

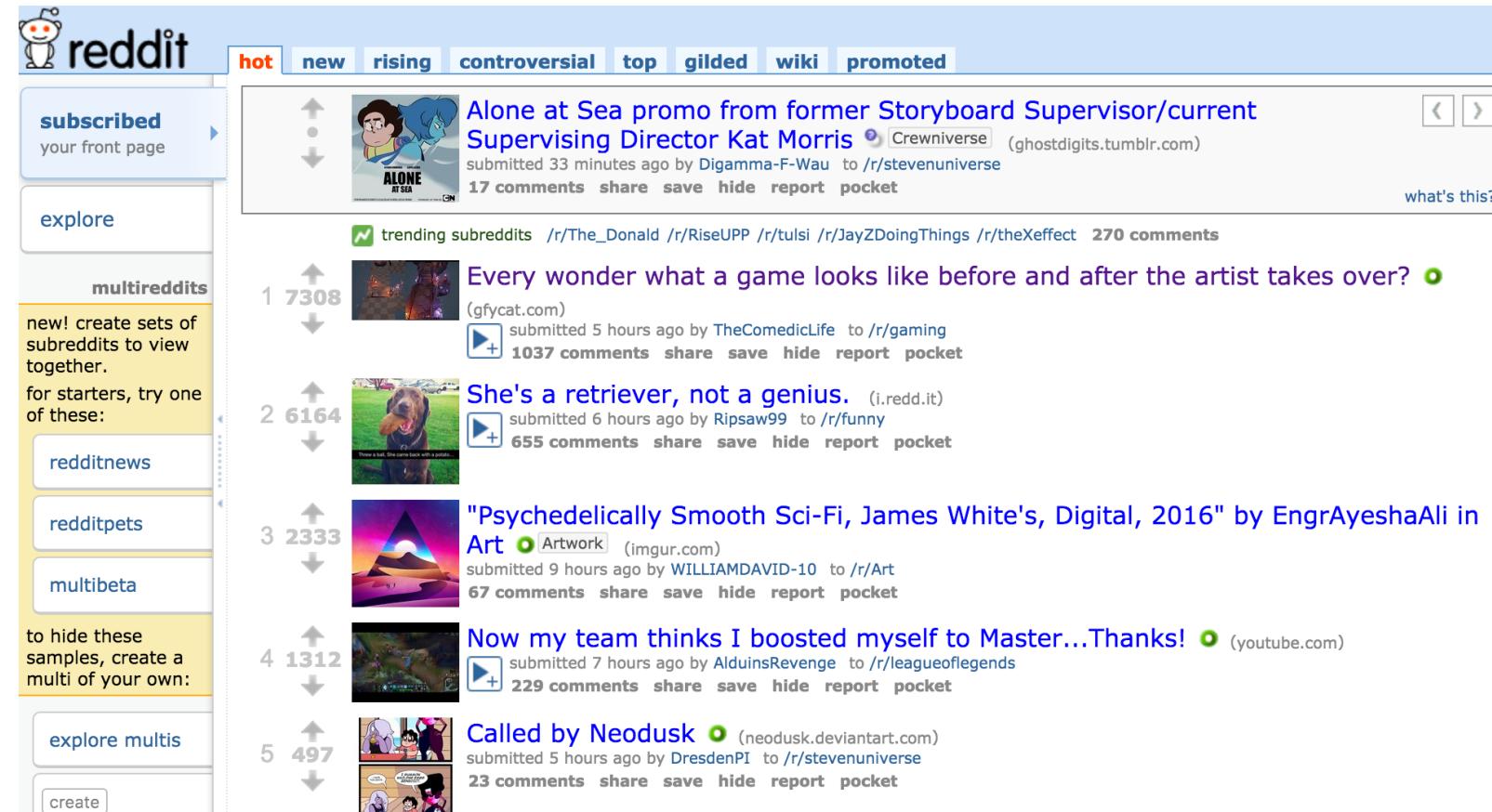
How I Made My Millions! (and so can you) 💰💰💰
PewDiePie • 3.3M views • 1 day ago
Headphones: <http://r2r.to/edgar> Chair: USA & Asia: <https://usa.clutchchairz.com/product/pewdiepie-edition-throttle-series/> Europe: <https://europe.clutchchairz.com/en/product/throttle-series-pewd...>

FLORIDA NRA 02/19/18 Last Week Tonight with John Oliver
PodcastRealTimeWithBillMaher • 412K views • 1 day ago
Thank you for watching!!! Link video: <https://youtu.be/ffmgY22YNUk>

Gabriella Papadakis/ Guillaume Cizeron European Championships

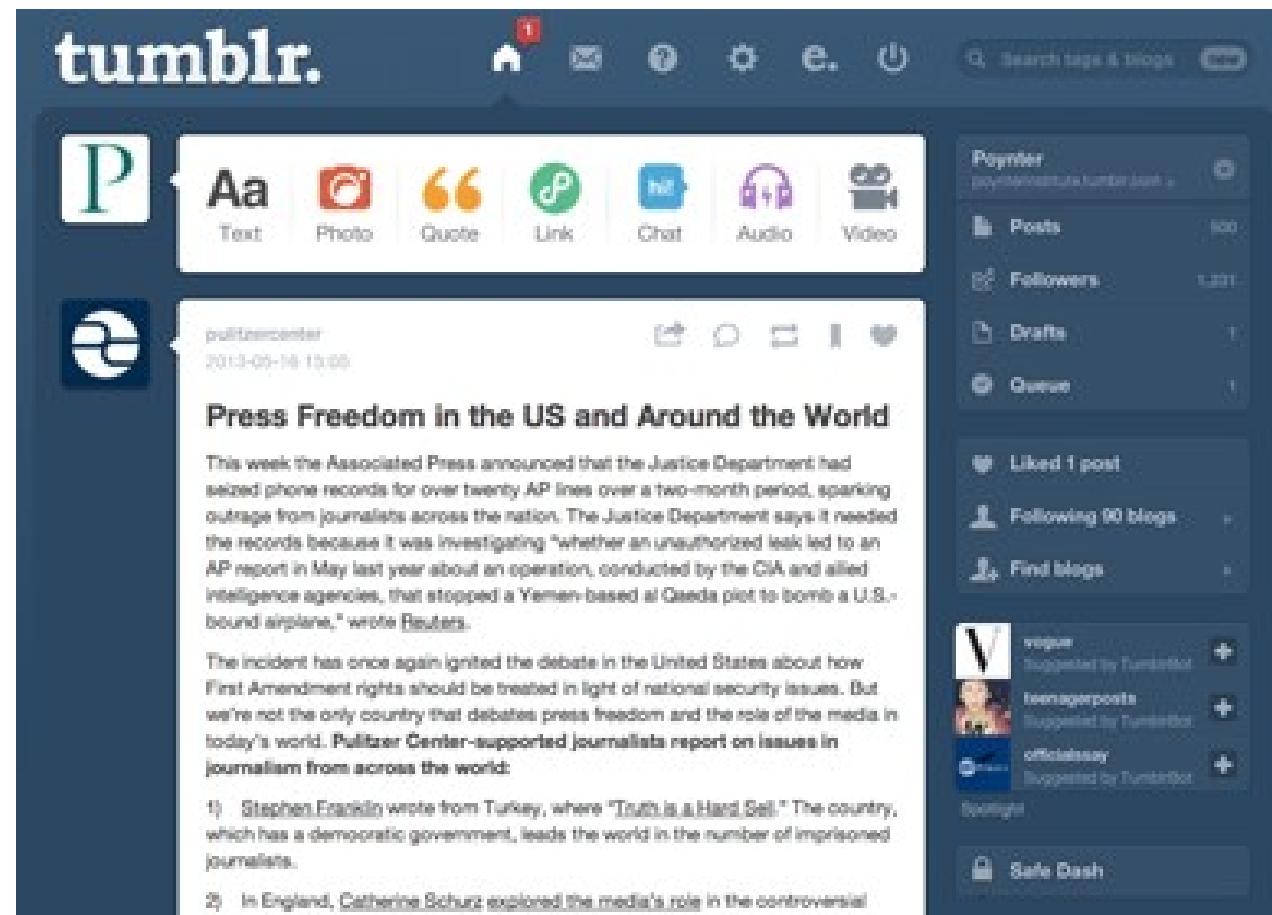
History/Reddit (2005 - present)

- Reddit is a social news aggregation, web content rating and discussion website;
- Users can post content and up/down vote them;
- Posts are sorted by votes;
- Posts are grouped into interest-based groups (subreddits).



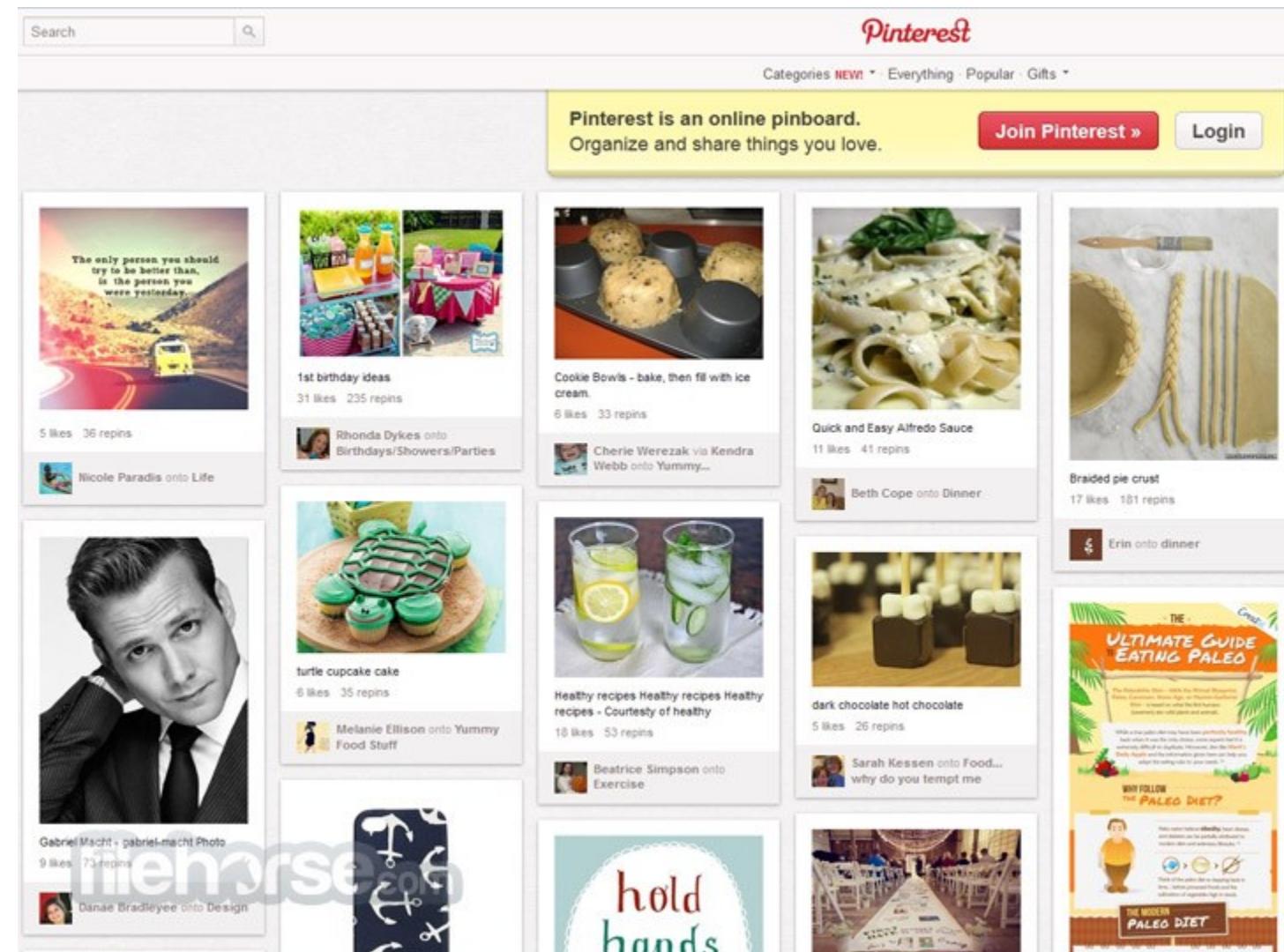
History/Tumblr (2007 – present)

- Microblogging and social networking website;
- The service allows to post multimedia and other content to a short-form blog;
- Users can follow other users' blogs, which can also be made private;
- The 'dashboard' is the primary tool for the users. It provides access to a live feed of recent posts from blogs followed by the user;
- Users can comment, reblog and like posts from other blogs;



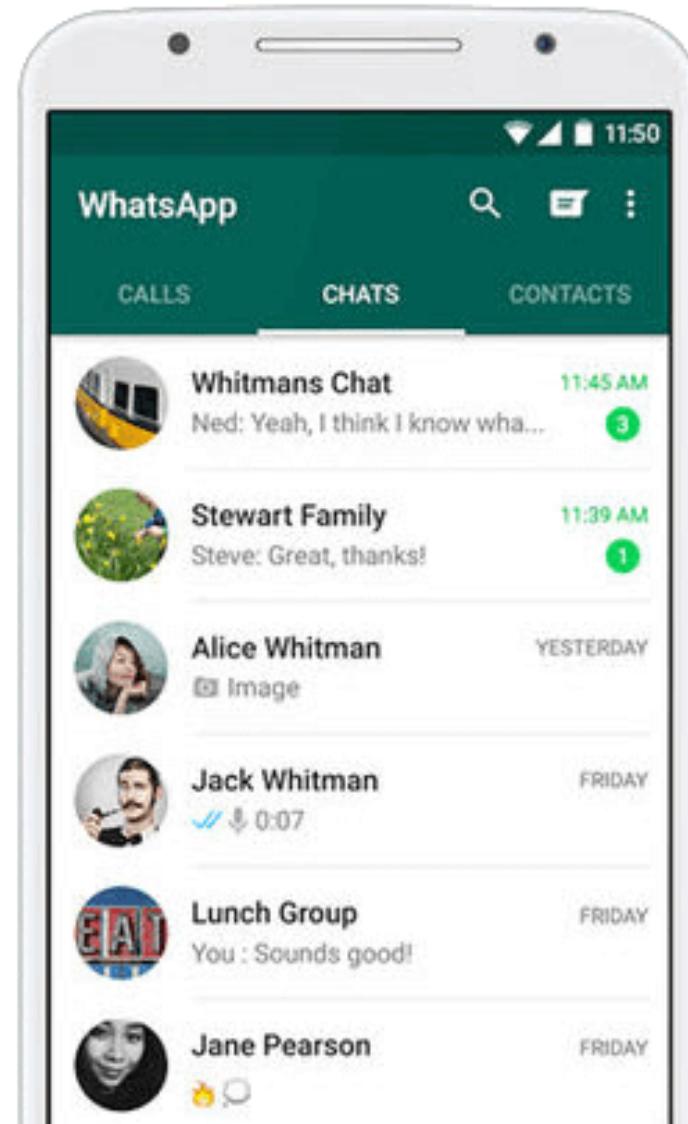
History/Pinterest (2009 – present)

- Designed to enable saving and discovery of information on the World Wide Web using images, GIFs and videos;
- Users can upload, save, sort and manage images or other media content such as videos. Such saved resources are referred to as ‘pins’;
- Content can also be found outside Pinterest and uploaded to the board via the ‘Pin It’ button;



History/Whatsapp (2009 - present)

- Founded by former employees of Yahoo!;
- Designed as a messaging app for iPhone that would show user statuses next to individual names of the people;
- Used primarily on smartphones. A web client exists, but it depends on the smartphone app;
- Initially a free service, was turned to paid to cover the cost of sending verification codes;
- Acquired by Facebook in 2014;
- Introduced new “status” functionalities similar to stories in 2017;



History/Instagram (2010 - present)

- Instagram is a photo and video-sharing social networking site;
- It was first introduced in 2010 for iOS only;
- It has been designed as a mobile-based app, with limited functions allowed via the website (e.g., no posting);
- Bought by Facebook in 2012;
- Its APIs have been restricted in 2019.



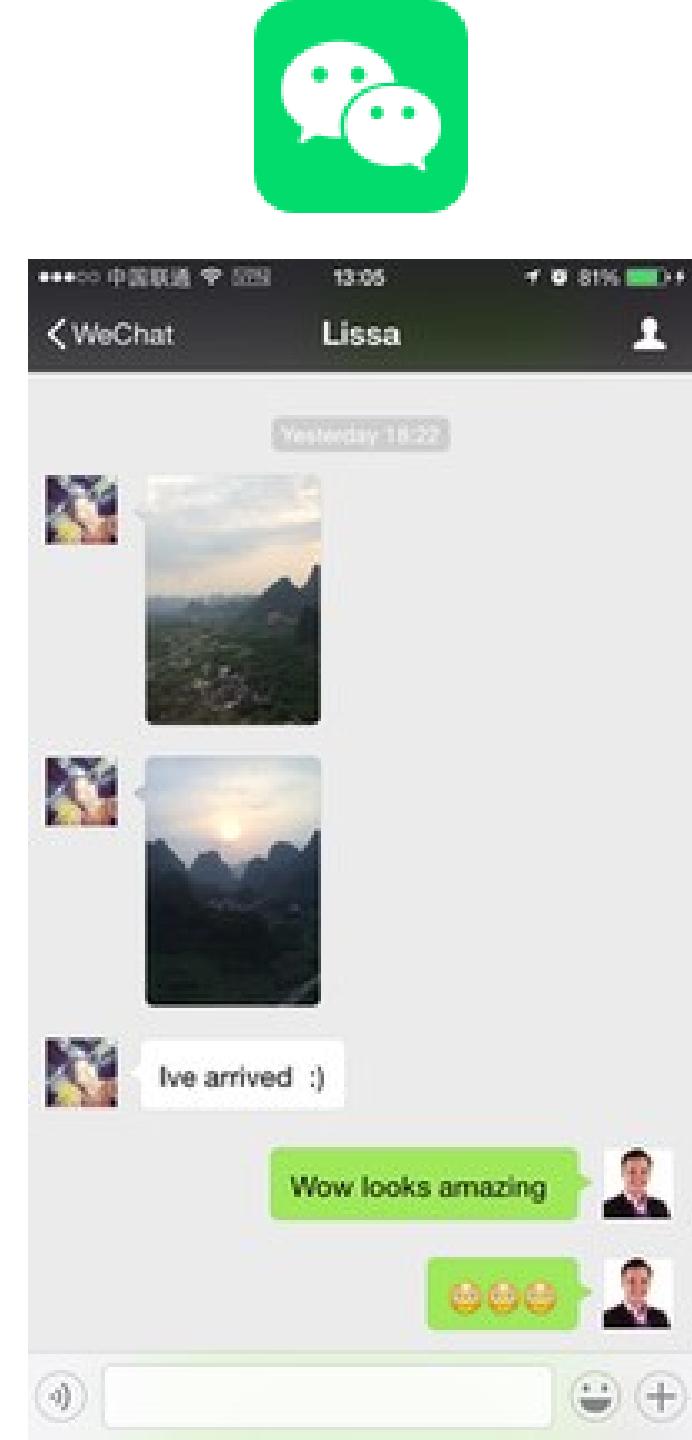
History/Snapchat (2011 – present)

- It is a multimedia messaging app;
- The main feature of Snapchat is that pictures and messages are usually available only for a short time before they become inaccessible to their recipients;
- Pictures can be edited with filters;
- Can be used only on mobile phones;
- Introduced ‘stories’ in 2013;
- Introduced ‘Spectacles’ in 2016.



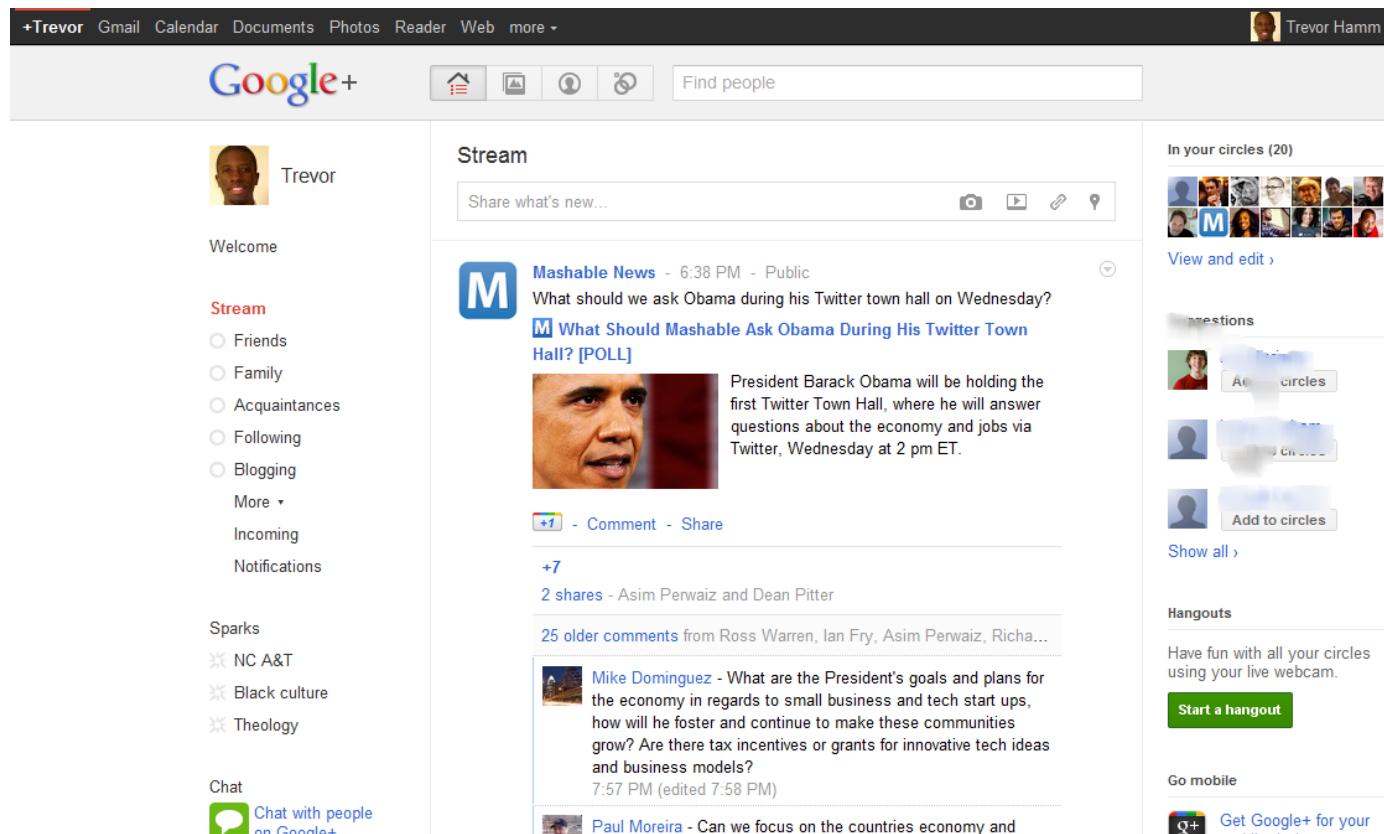
History/WeChat (2011 – present)

- Is a Chinese multi-purpose messaging, social media and mobile payment app;
- Messaging features including text, hold-to-talk voice messages, video calls and conferencing, video games, photograph and video sharing, location sharing;
- Support for ‘moments’;
- WeChat Pay;
- WeChat Enterprise – to help workers separate private life from work;
- Mini Program – small apps written in Javascript;



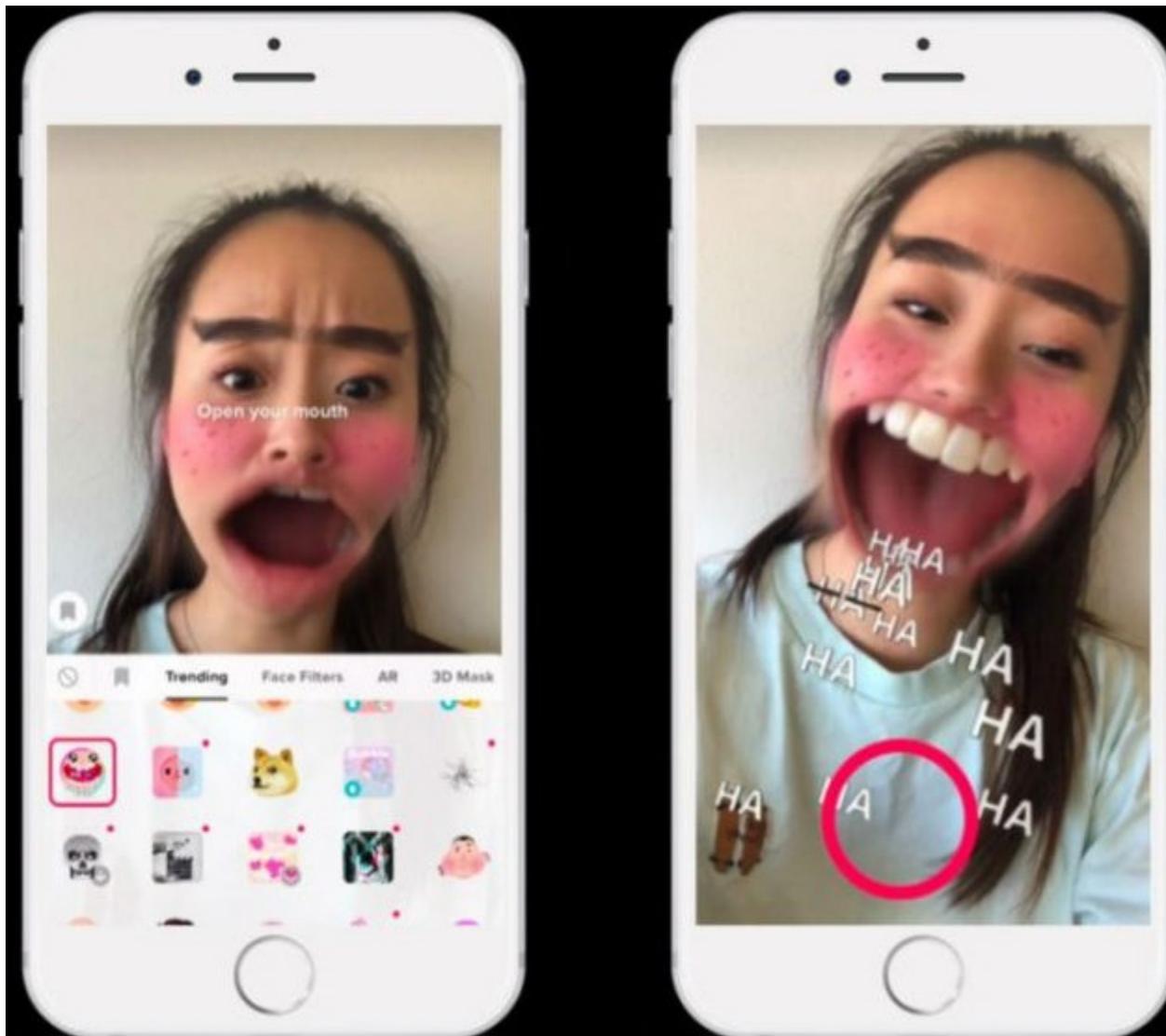
History/Google+ (2011 – 2019)

- Introduced by Google, initially provided innovative features such as video hangouts;
- Required users to use their real names and suspended accounts when this requirement was not met;
- Suspended in 2019 due to low engagement and use;



History/TikTok (2016 – present)

- iOS and Android social media video app for creating and sharing short lip-sync, comedy, and talent videos;
- The application allows the users to create and share short clips of 3 to 15 seconds;
- Artificial Intelligence is used to analyse users' interests and preferences through their interactions with the content, and display a personalized content feed to each user;



Types of Social Media

- Social networking sites;
- Social reviews sites;
- Image-based sites;
- Video sharing/streaming platforms;
- Discussion forums;
- Blogs and community platforms;
- Sharing economy networks;

Social Networking Sites

- These are sites mainly used for connecting with friends and family. They focus more on person-to-person conversations.
- Through these sites, people can share thoughts, curate content, upload photos and videos, form groups based on interests, and participate in lively discussions;
- These platforms accommodate the different types of content formats from text to photos, videos, and other creative forms of content.



Social Reviews Sites

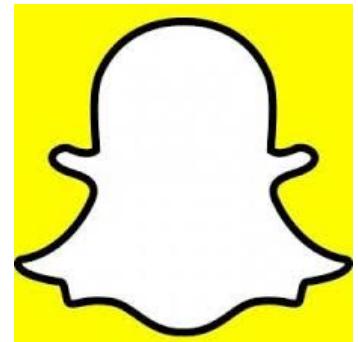
- Review sites like Yelp and TripAdvisor display reviews from community members for all sorts of locations and experiences.
- This allow customers to know in advance if a given product is good for them;
- At the same time, by studying the reviews, the owner of a service can understand how to improve a given product.



tripadvisor®

Image-based Sites

- Content like infographics, illustrations, and images capture the attention of users more;
- Since most of the content is based on images, in order to analyze the data contained on such media, it is necessary to be able to process images and extract information from them;



Video Sharing/Streaming Platforms

- Video content is one of the most captivating and engaging forms of content;
- They allow to share user-created video content which can be both non-professional (Instagram, YouTube) or professionally edited (YouTube, Vimeo);
- Also these media contain a lot of information in the ‘implicit’ form of videos, which need to be correctly processed in order to extract value.



Discussion Forums

- These platforms are designed to spark conversations based on shared interests or out of curiosity.
- However, differently from other social media, they have been explicitly designed to spark a conversation;
- Anyone is free to ask a question or make a statement, and this attracts people with shared interests and curiosities;



reddit



StackExchange



YAHOO!
ANSWERS



Quora

Blogs and Community Platforms

- These platforms allow users to create a community where people with similar interests can follow them and read all they have to say about certain topics.
- Such services also help connecting users to content, making it easier for the blogger to reach their audience;
- Even if the content is shared within the platform, such media allow a certain degree of customization;



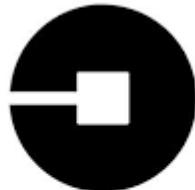
tumblr.



Medium

Sharing Economy Networks

- These are sites such as AirBnB, Rover (“AirBnB for Dogs”) and Uber, which allow users to provide their services (e.g., hosting, dogsitting, car rides, etc.) to other users;
- These communities do not only allow people to share services, but also bring together individuals who share given interests (e.g., for traveling);
- Also, they provide opportunities by pooling resources on a large scale, which is possible only via tech.



UBER



The Rise of Social Media

In 2023, an estimated 4.9 billion people use social media across the world.

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This number is expected to jump to approximately 5.85 billion users by 2027.

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The social media app market in 2022 was valued at \$49.09 billion.

The driving force?

The Rise of

In 2023, an estimated

This number is expected

The social media app

5G USERS BE LIKE

to surpass the world.

to reach 2 billion users by 2027.

million.

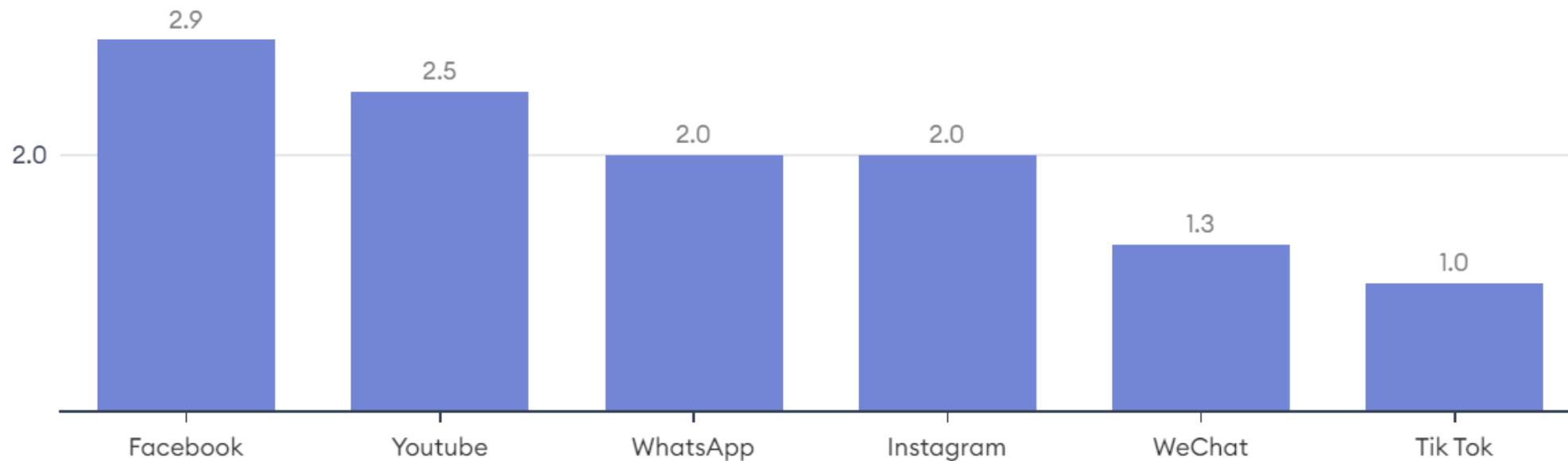


YEAH I'M STERILE NOW BUT
IT FAST DOE

The Rise of Social Media/Users

Monthly Active Users by Social Media Platform (in millions)

Source: Statista



OVERVIEW OF SOCIAL MEDIA USE

HEADLINES FOR SOCIAL MEDIA ADOPTION AND USE (NOTE: USER IDENTITIES MAY NOT REPRESENT UNIQUE INDIVIDUALS)



NUMBER OF SOCIAL
MEDIA USER IDENTITIES



4.80
BILLION

QUARTER-ON-QUARTER CHANGE
IN SOCIAL MEDIA USER IDENTITIES



+0.9%
+45 MILLION

YEAR-ON-YEAR CHANGE IN
SOCIAL MEDIA USER IDENTITIES



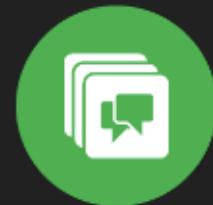
+3.2%
+150 MILLION

AVERAGE DAILY TIME SPENT
USING SOCIAL MEDIA



2H 24M

AVERAGE NUMBER OF SOCIAL
PLATFORMS USED EACH MONTH



GWI.

6.6

SOCIAL MEDIA
USER IDENTITIES vs.
TOTAL POPULATION



59.9%

SOCIAL MEDIA USER
IDENTITIES AGED 18+ vs.
POPULATION AGED 18+



78.0%

SOCIAL MEDIA USER
IDENTITIES vs. INDIVIDUALS
USING THE INTERNET



92.7%

FEMALE SOCIAL MEDIA USER
IDENTITIES vs. TOTAL SOCIAL
MEDIA USER IDENTITIES



46.5%

MALE SOCIAL MEDIA USER
IDENTITIES vs. TOTAL SOCIAL
MEDIA USER IDENTITIES



53.5%

SOURCES: KEPIOS ANALYSIS; COMPANY ADVERTISING RESOURCES; CNNIC; BETA RESEARCH CENTER; OCDH; U.N.; GWI (Q4 2022). **NOTE:** AVERAGE NUMBER OF PLATFORMS INCLUDES DATA FOR YOUTUBE. **ADVISORY:** SOCIAL MEDIA USER IDENTITIES MAY NOT REPRESENT UNIQUE INDIVIDUALS. COMPARISONS WITH POPULATION AND INTERNET USERS MAY EXCEED 100% DUE TO DUPLICATE AND FAKE ACCOUNTS, AGE MISSTATEMENTS, DIFFERENT REPORTING PERIODS, AND DIFFERENCES BETWEEN CENSUS COUNTS AND RESIDENT POPULATIONS. SEE [NOTES ON DATA](#) FOR FURTHER DETAILS. **COMPARABILITY:** SIGNIFICANT REVISIONS TO SOURCE DATA MEAN THAT FIGURES SHOWN HERE ARE NOT COMPARABLE WITH PREVIOUS REPORTS.

Social Media/Value from Data

- Since Social Media are the result of a massively collective content creation process, they naturally contain a huge amount of data about what people think, like and dislike;
- If properly processed, this data can be used to obtain information about people behavior, such as, their preferences and interests;
- Also, since Social Media are a multi-way communication channel, they can be used to inform and influence people;
- In short, data coming from Social Media can be harnessed to create value which can be good in different contexts (cultural, societal, financial/industrial).

Social Media Data Types

The type of data we can find on social media is extremely varied. Among the main types of data:

- Text: this constitutes most of the content of posts and profiles;
 - Images: users often post images together with text. Some social media such as flickr and instagram are specialized on sharing images;
 - Video: video is becoming even more popular on media such as YouTube, Instagram and Facebook;
 - Metadata: this can include geo-location, tags related to other users (@ tags) and hashtags (# tags);

4.7 magnitude [#earthquake](#).
22 km from Tapachula, Chiapas, [#Mexico](#)



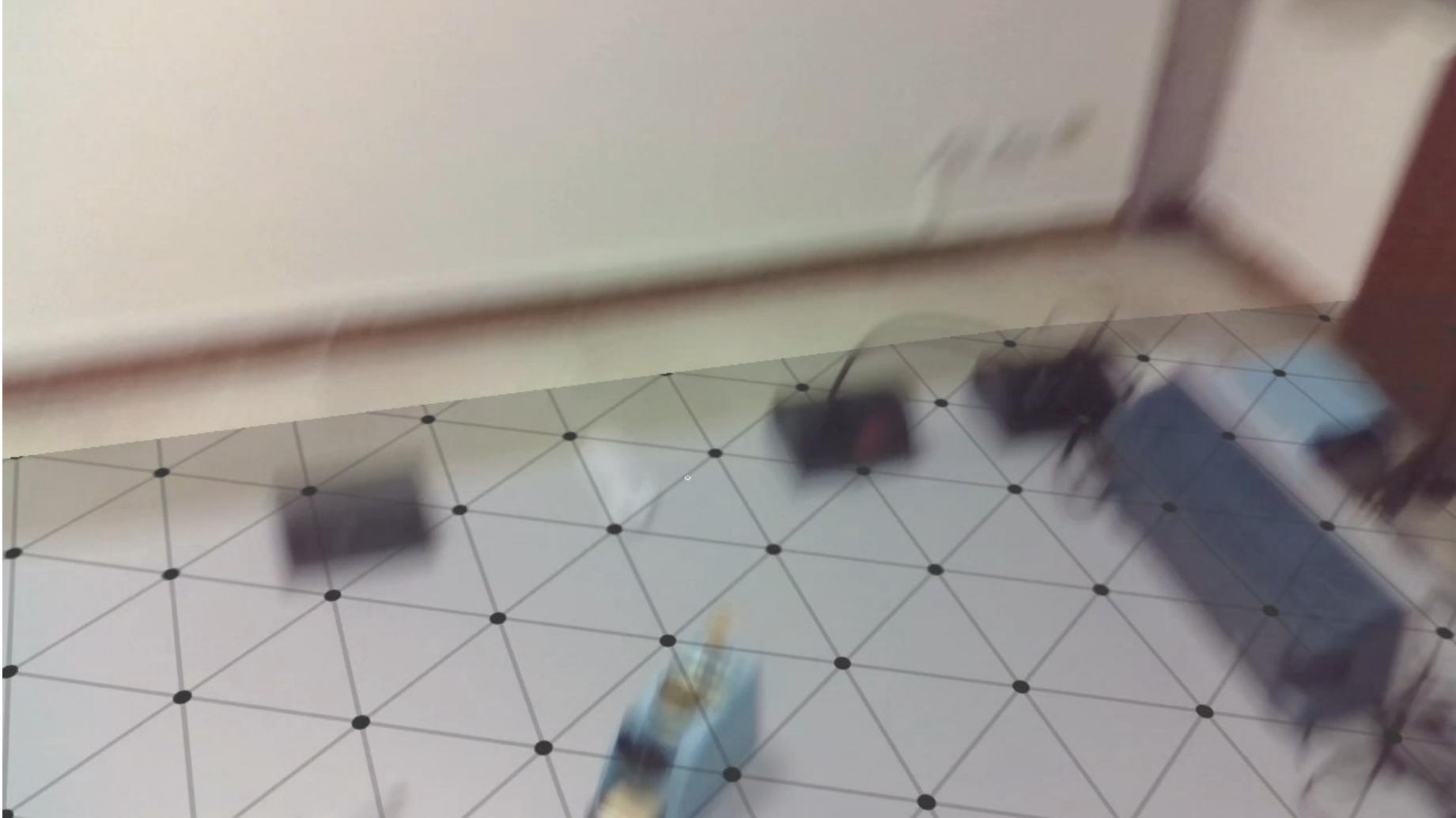
User-generated data is noisy and unstructured, with abundant social relations such as friendships and followers-followees.

We need specialized techniques to correctly handle and process these data!

Examples of Applications

(Possibilità di Stage/Tesi)

Riconoscimento di interazioni da dispositivi indossabili



Monitoring procedura di manutenzione



List of interactions

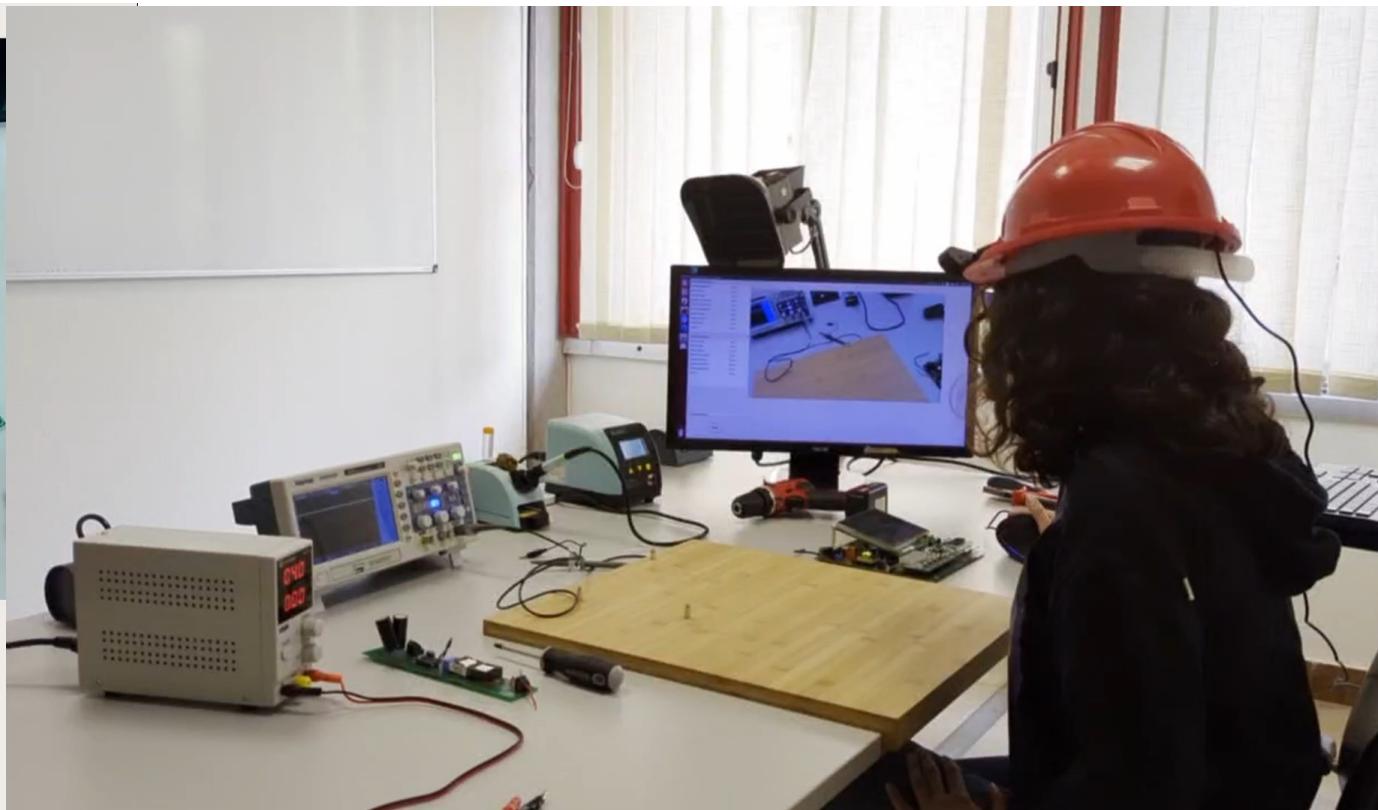
welder station	1 sec
low voltage board	1 sec
welder station	1 sec
low voltage board	1 sec
welder station	2 sec
low voltage board	3 sec
low voltage board	3 sec
electric screwdriver	1 sec
electric screwdriver	1 sec
electric screwdriver	4 sec

Total usage times

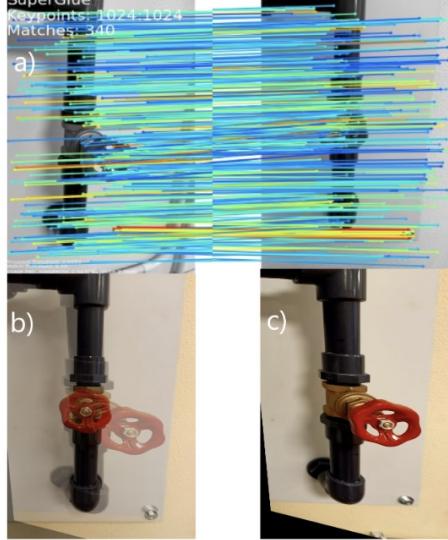
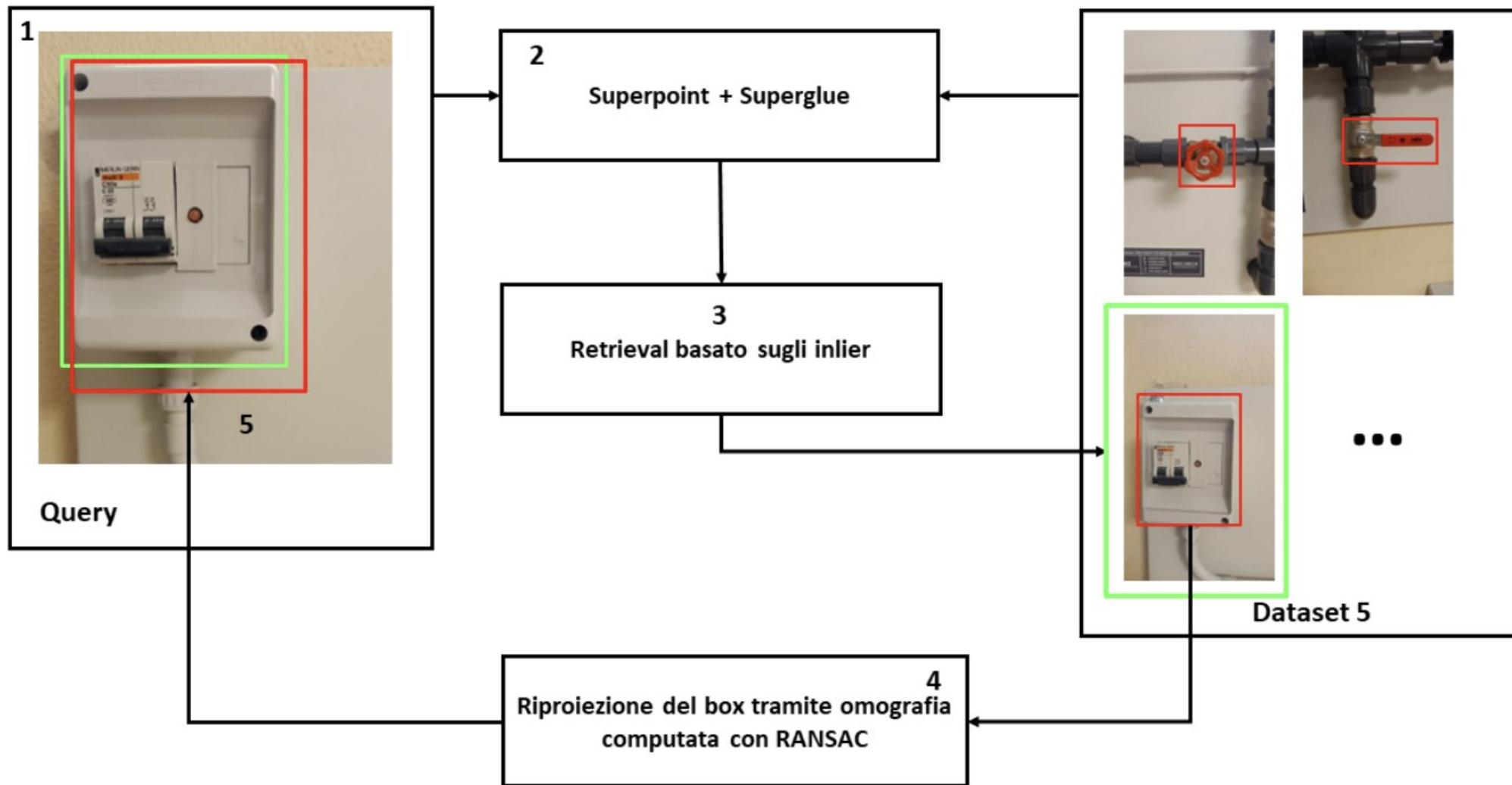
power supply	0 sec
oscilloscope	0 sec
welder station	3 sec
electric screwdriver	6 sec
welder probe tip	0 sec
low voltage board	16 sec
high voltage board	0 sec
socket	0 sec

Procedura 0

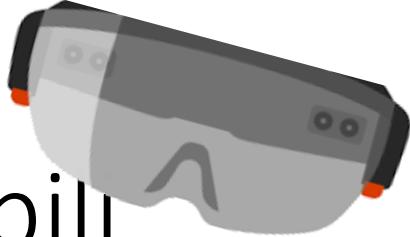
Start



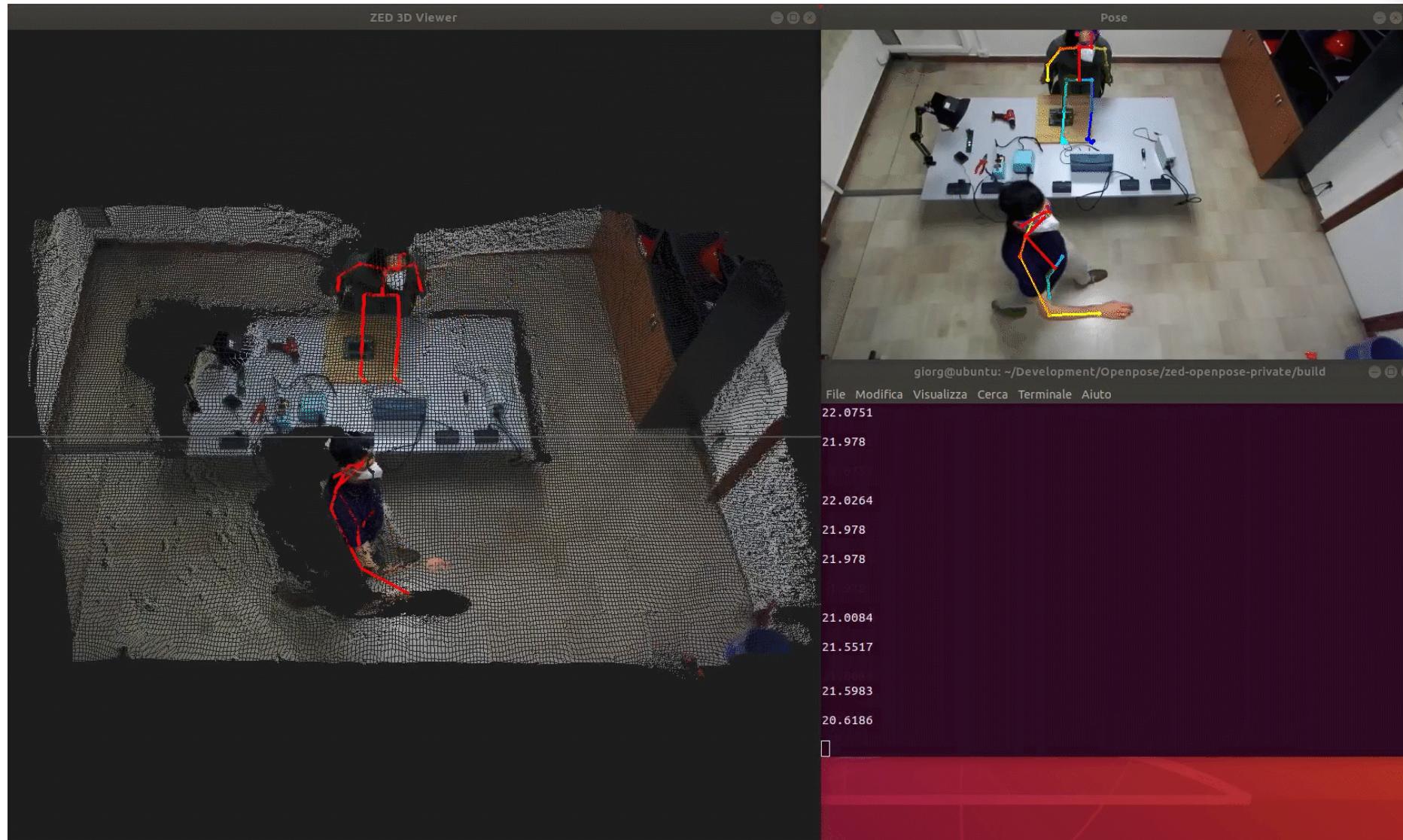
Object detection da immagini



Assistere gli utenti con dispositivi indossabili



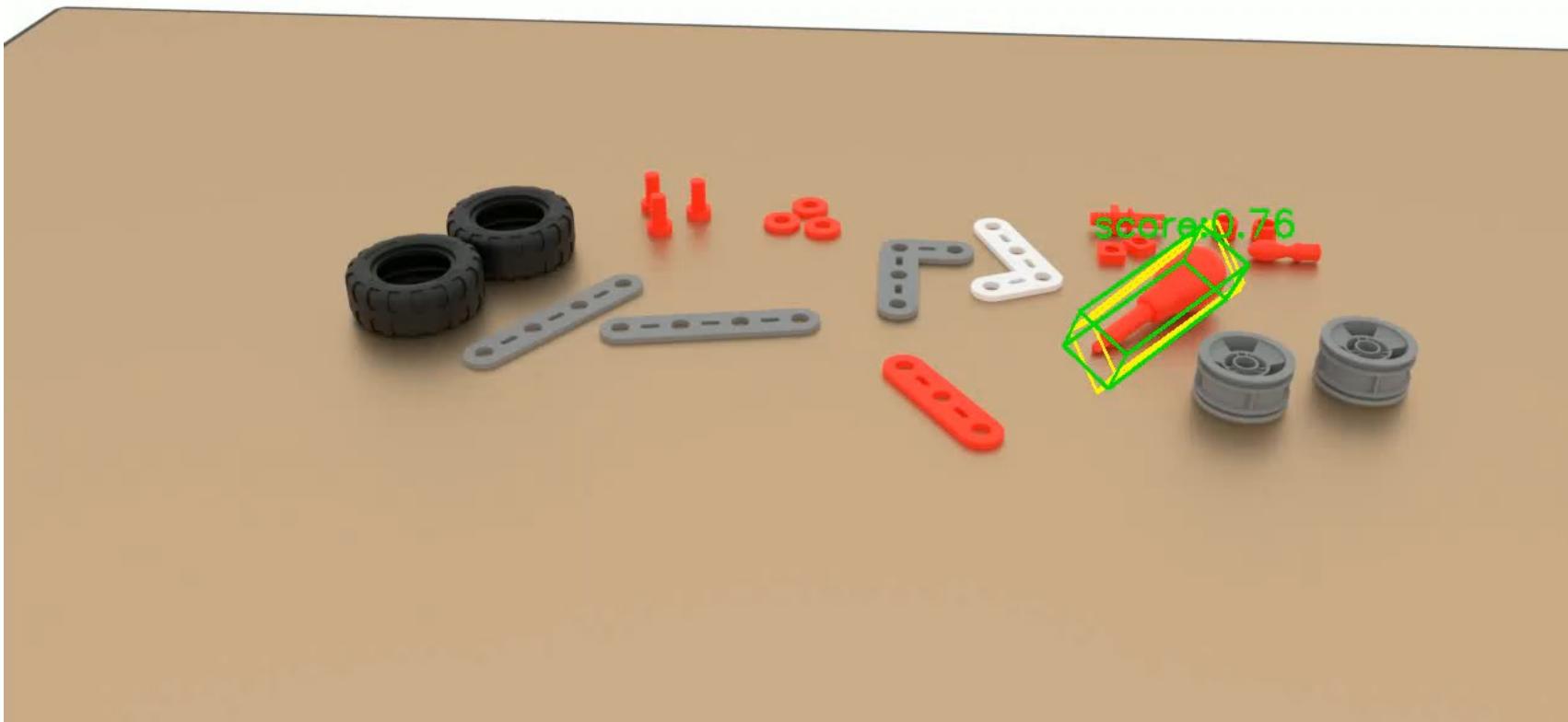
Rilevazione di interazioni in 3D



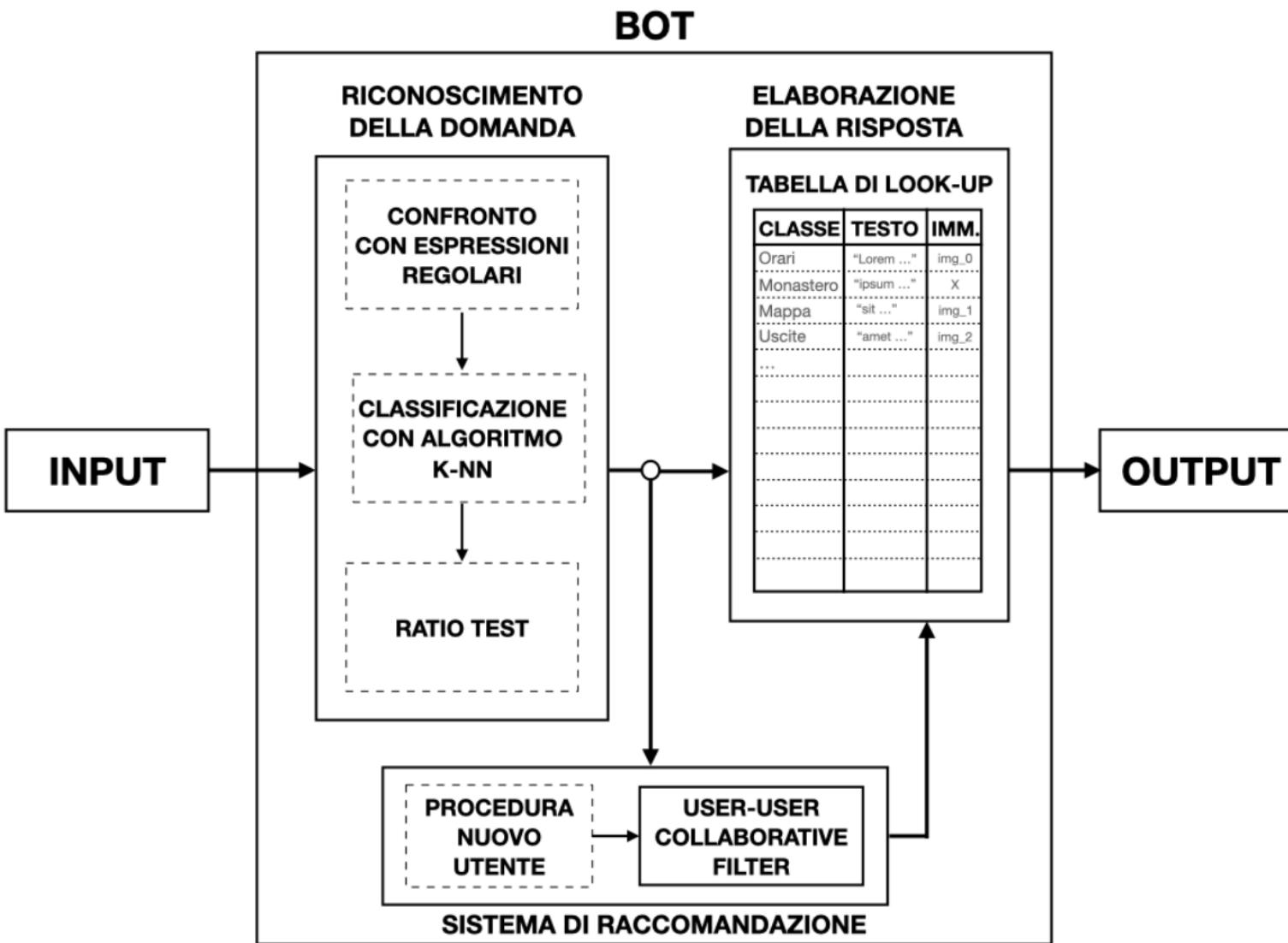
Stima della posa 3D di oggetti

x: 0.2 y: -0.01 z: -0.79

x: 0.21 y: -0.01 z: -0.82



Chatbots



References – Optional Readings

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- <https://biteable.com/blog/the-7-different-types-of-social-media>
- <https://www.forbes.com/advisor/business/social-media-statistics/#:~:text=The%20number%20of%20social%20media,5.85%20billion%20users%20by%202027>
- [https://it.wikipedia.org/wiki/Social_media;](https://it.wikipedia.org/wiki/Social_media)
- [https://fredcavazza.net/2017/04/19/social-media-landscape-2017/;](https://fredcavazza.net/2017/04/19/social-media-landscape-2017/)
- Richthammer, C., Netter, M., Riesner, M., Sänger, J., & Pernul, G. (2014). Taxonomy of social network data types. *EURASIP Journal on Information Security*, 2014(1), 11.