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| 8. | Develop a Social Media Text Analytics model to improve existing products or services by analyzing customer reviews and comments. |  |
| 9. | Use a network analytics tool to build a graph using a real-world social network dataset.(e.g., social media, co-authorship, citation networks, election).  a. Explore graph characteristics: number of nodes, edges, density, and components.  b. Calculate the degree centrality for each node in the network.  c. Compute betweenness centrality, which measures the extent to which a node lies on the shortest path between other nodes.  d. Compute closeness centrality, which measures how close a node is to all other nodes in the network.  e. Compute eigenvector centrality, which identifies nodes that are connected to other important nodes. |  |
| 10. | Create a hyperlink network from the extracted links.  a. Represent the network using a graph structure where nodes are web pages, and edges are hyperlinks.  b. Apply the PageRank algorithm to the hyperlink network to identify important pages. |  |
| 11. | Write a program to analyze the movement data (e.g., how users travel between locations). |  |
| 12. | Write a program to understand how retailers use location analytics to analyze foot traffic patterns and optimize store placement.. |  |

**Practical 1:To study various social media platforms (Facebook, Twitter, Instagram, YouTube, LinkedIn etc).**

### **Facebook**

### Facebook, launched in 2004 by Mark Zuckerberg, is one of the largest and most widely used social media platforms globally. It allows users to create personal profiles, share posts, photos, and videos, connect with friends, and join groups or communities based on common interests.

* **Key Features**:
  + **News Feed**: Personalized updates from friends, family, pages, and groups.
  + **Groups**: Communities where users can interact around shared interests.
  + **Marketplace**: A platform for buying and selling items.
  + **Messenger**: A separate messaging app for instant communication.
  + **Events**: Feature for organizing or RSVP-ing to events.
* **Challenges:**
  + **Privacy Concerns**: Facebook has been involved in numerous scandals related to data privacy.
  + **Misinformation and Fake News**: The platform has struggled to tackle the spread of fake news, especially around elections and public health.
  + **Algorithmic Bias**: The algorithms of Facebook's news feed can create "filter bubbles" by showing users content that reinforces their existing beliefs, limiting exposure to diverse viewpoints.
  + **Declining Younger Audience**: Younger users are increasingly turning to platforms like Instagram and TikTok, leading to a potential decline in Facebook's relevance among this demographic.

### **Twitter**

Twitter, launched in 2006, is a microblogging platform that allows users to post and interact with short messages called "tweets." With a character limit (originally 140, now 280 characters), it emphasizes quick, real-time communication.

* **Key Features**:
  + **Tweets**: Short posts (text, photos, videos, or links).
  + **Trending Topics**: A section for popular discussions and hashtags.
  + **Retweets & Likes**: Ways to share and show support for posts.
  + **Hashtags**: Used to categorize and discover content.
  + **Lists**: Allows users to categorize and organize accounts they follow.
* **Challenges**:
  + **Trolling and Harassment**: Twitter has struggled with toxic behavior such as trolling, harassment, and hate speech.
  + **Misinformation**: Similar to Facebook, Twitter has been criticized for allowing the rapid spread of false information.
  + **Bots and Fake Accounts**: Automated accounts (bots) can flood Twitter with spammy content, fake news, and disinformation, undermining trust in the platform.

### **Instagram**

Instagram, launched in 2010, is a photo and video-sharing platform, now owned by Meta (Facebook). It focuses on visual content, allowing users to share images, videos, and stories. Instagram also has features for messaging and shopping.

* **Key Features**:
  + **Posts**: Static images and videos shared on a user's profile.
  + **Stories**: Temporary content that disappears after 24 hours.
  + **Reels**: Short-form video content similar to TikTok.
  + **Direct Messages**: Private messaging feature.
* **Challenges:**
  + **Mental Health Impact**: Instagram has been linked to negative impacts on mental health, especially among teens, due to body unrealistic beauty standards, and comparison culture. Studies have shown that the platform can contribute to anxiety, depression, and low self-esteem.
  + **Fake Influencers and Bots**: The rise of influencer culture has led to problems with fake followers, fake engagement, and influencer fraud. Many brands rely on influencer marketing but struggle to assess authenticity.
  + **Algorithm Limitations**: Instagram's algorithm prioritizes engagement (likes, comments, shares), which has led to "clickbait" content that may not be authentic or informative, but gets attention because of sensationalism.
  + **Privacy and Data Collection**: Instagram, being part of Meta (formerly Facebook), faces similar privacy concerns.

### **YouTube**

YouTube, founded in 2005 and acquired by Google in 2006, is the world's largest video-sharing platform. Users can upload, watch, like, share, and comment on videos. It caters to all kinds of content, from educational videos to entertainment, music, and vlogging.

* **Key Features**:
  + **Channels**: Personal or brand accounts where users can upload videos.
  + **Subscriptions**: Allows users to follow channels and receive notifications.
  + **Live Streaming**: Real-time video broadcasts.
  + **Comments and Likes**: Interaction with content creators and viewers.
  + **Monetization**: Content creators can earn revenue from ads, sponsorships, and memberships.
* **Challenges**:
  + **Content Moderation**: YouTube faces criticism for allowing harmful content, such as hate speech, conspiracy theories, and explicit material, to remain on the platform despite efforts to enforce stricter guidelines.
  + **Copyright Issues**: YouTube has long struggled with copyright infringement, where videos featuring copyrighted material (such as music, video clips, or even memes) can be removed or demonetized.
  + **Algorithmic Recommendations**: YouTube’s recommendation algorithm sometimes promotes controversial or extreme content because it generates more views and engagement, contributing to radicalization and misinformation.

### **LinkedIn**

LinkedIn, launched in 2003, is a professional networking platform designed to connect professionals, job seekers, and businesses. It is used to share work-related achievements, post job listings, and build professional relationships.

* **Key Features**:
  + **Profile**: Personal or company pages showcasing professional experience and qualifications.
  + **Networking**: Connecting with professionals, colleagues, or industry peers.
  + **Job Listings**: Posting and applying for jobs.
  + **Endorsements & Recommendations**: Users can endorse skills or write recommendations for others.
  + **Content Sharing**: Articles, posts, and videos related to professional growth and business.
* **Uses**:
  + Professional networking, career development, and job searching.
  + Industry thought leadership and content sharing.
  + Company promotion and employee recruitment.
  + Business B2B (business-to-business) marketing.
* **Challenges**:
  + **Privacy Concerns**: LinkedIn collects a lot of personal and professional data, leading to concerns about privacy and how that information is shared or used by third parties.
  + **Spam and Inappropriate Content**: LinkedIn has become increasingly plagued by spam messages, irrelevant connection requests, and "sales pitches" that can make the platform feel less professional and more like a commercial space.
  + **Algorithmic Challenges**: The platform’s algorithm sometimes prioritizes posts that generate higher engagement, which can lead to a focus on sensational content instead of meaningful, career-related insights.
  + **Diversity and Inclusion**: Despite LinkedIn's claims of being a diverse platform, there are ongoing concerns about underrepresentation of certain groups in higher-level job opportunities, particularly women, racial minorities, and other marginalized groups.

**Practical 2: To study the social media analytics tools used in different layers of social media analytics.**

### **1. Text Layer:**

This layer involves tools that analyze textual data found in social media platforms. Tools in this category help in discovering, analyzing, and interpreting the content of posts, tweets, comments, and other written forms of communication.

* **Discover Text**: This tool helps in text mining and sentiment analysis. It allows users to extract relevant social media content (tweets, posts, etc.), analyze the text for keywords, themes, and sentiment, and uncover patterns in user conversations. It’s useful for understanding public opinion, trends, and key topics.
* **Twitonomy**: Specifically focused on Twitter, Twitonomy offers deep analytics into Twitter accounts, tweets, mentions, and followers. It helps users analyze the content of tweets, measure engagement, and track the activity of specific users or topics over time.

### **2. Actions Layer:**

The actions layer focuses on tools that track and analyze user actions and behaviors, such as clicks, shares, likes, retweets, etc. These tools help evaluate the impact of actions taken on social media, such as engagement metrics.

* **Google Analytics**: While commonly used for website analytics, Google Analytics also tracks social media traffic and engagement. It provides insights into how social media interactions (like clicks or shares) affect website traffic and conversions, helping businesses track the ROI of their social media campaigns.
* **Twitonomy** (again): Besides analyzing textual content, Twitonomy can track engagement metrics, including retweets, likes, and replies. It’s valuable for understanding user behavior on Twitter and the performance of specific content.

### **3. Network Layer:**

This layer deals with tools that analyze social networks, connections, and relationships between users or entities. Network analysis tools allow users to visualize and understand how people or topics are connected and identify key influencers.

* **NodeXL**: This is a powerful network analysis tool that integrates with Microsoft Excel to visualize and analyze social media networks. It helps in mapping relationships between users, content, or hashtags on platforms like Twitter. NodeXL is useful for detecting influential nodes (people or topics) within a network.
* **NetMiner**: Similar to NodeXL, NetMiner is a software tool designed for social network analysis. It provides advanced features for mapping relationships, detecting clusters, and performing network analysis on large datasets from social media.

### **4. Apps Layer:**

The apps layer refers to tools used for analyzing mobile app data and user engagement across different platforms, often providing insights into mobile-specific behaviors like app downloads, in-app interactions, and retention rates.

* **Google Mobile Analytics**: A mobile version of Google Analytics, this tool tracks mobile app performance, user engagement, and acquisition. It’s essential for understanding how users interact with mobile applications, including data related to social media integrations within those apps.
* **Countly**: This is a real-time mobile analytics platform that provides insights into mobile apps, websites, and digital products. It tracks user behavior, interactions, and social media engagements within the app, offering analytics to optimize user experience and retention.

### **5. Location Layer:**

Tools in the location layer focus on geospatial data and help analyze social media activities in terms of location-based metrics, such as geo-tagged posts, regional trends, and geographic distribution of users.

* **Google Fusion Tables**: A data visualization tool that allows users to analyze and visualize geospatial data. In the context of social media, it can be used to map location-based interactions or visualize the geographic distribution of social media users or trends.
* **Trend Maps**: A tool for visualizing trends over time across different regions. It provides location-based insights and helps businesses or organizations understand regional variations in social media behavior, engagement, and sentiment.

### **6. Hyperlinks Layer:**

This layer focuses on analyzing the links shared and spread across social media platforms, including the impact of those links on traffic, engagement, and influence.

* **Webometrics Analyst**: A tool used for analyzing the web’s hyperlink structure. It focuses on understanding the links between websites, blogs, or social media profiles. It helps track how content spreads and gains visibility across the internet through shared links.
* **VOSON**: The Virtual Observatory for the Study of Online Networks (VOSON) analyzes the structure and dynamics of social networks, including the role of hyperlinks. It provides insights into how web content is interlinked and how hyperlinks contribute to the spread of information or influence on the web.

### **7. Search Engines Layer:**

This layer focuses on tools related to search engine behavior and the influence of search engines on social media. It helps in understanding how social media content is indexed and how search engine results reflect social media trends.

* **Google**: As a search engine, Google is crucial for understanding how social media content and discussions appear in search results. It also plays a significant role in determining SEO (Search Engine Optimization) and ranking of social media content across different platforms.
* **Yahoo**: Similar to Google, Yahoo also offers search engine results that can provide insights into how social media content is indexed. Though less dominant than Google, it still plays a role in the broader search ecosystem, influencing how content from social media is ranked and found online.