

OPINION MINING: A COMMUNICATION TOOL FOR CAREER MAKING

¹PRAJNA. P, * & ²ANUBHA. R

¹Professor & ²Professor ^{1&2} Department of English, ¹Centurion University of
Technology and Management, ²Birla Global University, India,
Email¹drprajnapani@gmail.com & ²anubha.ray@bgu.ac.in

Abstract:

We all are driven by a need to express our opinions and views, the need to communicate effectively and the need to be heard. We wish for information and discussion of specific problems; in other words, the right to be informed and the need to make right choices and decisions. The microblogging sites such as Twitter, Facebook have abundance of data and information. The web has changed from “read only” to “read -write”. Micro-blogging posts, comments and ratings are imbued with information and considered as opinion mining data sources. This paper will discuss in three phases opinion summary of selected entities which is an aide in decision making about career. The first phase will discuss the emerging fields of opinion mining and sentiment analysis. The social online interactions, reviews, forums, blogs, micro-blogs, twitter, comments, postings in social network sites and other collaborative media provide an opportunity to mine opinions and its related concepts such as sentiments, evaluations, attitudes and emotions. For organisations or individuals, it may no longer be necessary to conduct surveys, opinion polls, focus group discussions to gather public opinions because there is abundance of information. We can produce structured opinion summary about an entity and its aspects, and can draw more accurate statistics about aspects. The individuals and organisations are increasingly using the content available in these microblogging sites and other forums for decision making. Thus, the second phase of the paper describes briefly opinion mining, also known as sentiment analysis as a communication tool for decision making about career. The concluding phase presents the increasing relevance of and the need of analysing these discussions and opinions to support Opinion Leaders’ and ‘Decision Makers’ like ‘You’ and ‘I’ for effective leadership and career communication.

Keywords: *Opinion, Career, Communication, Decision*

1. INTRODUCTION

Opinion Mining is a process for automatic extraction of knowledge and information from the opinion of others. Sentiment classification and analysis are trending fields of research predominant in Sentiment Analysis. They are the formalization for studying and construing opinions and sentiments. Opinion mining is used interchangeably with Sentiment Analysis, Opinion Extraction, Sentiment Mining, Subjective Analysis, Emotion Analysis, Review Mining to create a knowledgebase of opinions, views, recommendations, preferences in a more structured and explicit form. This knowledgebase is very crucial to us when we have to make a decision. This is not only true for individuals but also true for organizations.

2. LITERATURE REVIEW

Opinion mining deals with analysing people's opinions, sentiments, attitudes and emotions towards different brands, companies, products and services. The opinion targets can be even individuals, events and circumstances. There are two types of opinions-regular opinions and comparative opinions (Jindal and Liu 2006; Liu 2010). Regular opinions are those sentiment/opinion expressions that focus on some target entities. Comparisons of more than one entity are called comparative opinions. Normally, we focus on regular opinions, and just call them opinions. A recent study has identified it as online word of mouth branding. This is the most attractive source of data. Companies may be interested to know brand perception to develop marketing strategies, to get customer feedback, to improve customer relations management. Opinion mining is the process of digging through online communications to extract valuable insights or information about how people really feel about the organisation, or about the products, objects and services. Sentiment analysis and opinion mining is the process of analysing the market research on user opinion, which is need of an organisation and requirement of a customer (Jandail et al, 2014). It offers advantages to a variety of domains, from sales predictions (Liu et al, 2007) to politics (Park et al. 2011) and investors' choices (Dergiades, 2012). Political parties may be interested to know if people support their program or not. Recently, opinionated postings in social media have swayed public sentiments and emotions. Such postings mobilise the masses for political changes. Opinion mining for market research require a large amount of useful data which consists of user reviews about the characteristics and behaviour of a particular product for decision making (Jandail et al, 2014). It helps to identify emerging societal trends based on views, dispositions, moods, attitudes and expectations of people. Opinion Mining is a process for tracking the mood of the public about a certain product, for example by building a system to examine the conversations happening around it. Opinion mining is a type of natural language processing for tracking the mood of the public about a particular product, which is also called Sentiment Analysis, involves building a system to collect and categorize opinions about a product (Ghunage, 2015). The Opinion mining tool can be used to process a set of research results for a given item, generating a list of product attributes such as quality, features and aggregating opinions about each of them as poor, mixed and good (Dave et al.69). Opinion Detection and Sentiment Analysis has been proposed as a key enabling technology in

eRulemaking, allowing the automatic analysis of the opinions that people submit about pending policy or government-regulation proposals (Proceedings, 12th Annual International Conference on Digital Government Research, 318). Sentiment analysis and opinion mining is the computational study of user opinion to analyse the social, psychological, philosophical, behaviour and perception of an individual person or a group of people about a product, policy, services and specific situations using Machine Learning Technique (Jandail et al, 2014). Machine learning approaches not only return single quantitative (sentiment score) or qualitative (positive, negative or neutral) results but also deploy ontology-based techniques to receive a sentiment grade for each distinct notion in the post for a fine-grained sentiment analysis regarding a specific topic (Kontopoulous et al, 2013). Opinion Mining and Sentiment Analysis are used for polarity detection and emotion recognition, respectively. They mainly focus on opinions which express or imply positive or negative sentiments: ‘thumbs up’ and ‘thumbs down’, ‘like’ and ‘dislike’.

Sentiment analysis performs three tasks; informative text detection, information extraction, and sentiment interestingness, classification of emotions and polarity identification. Sentiment classification such as negative or positive is used to find the sentiment polarity based on users’ sentiment data such as blogs, reviews. The data is processed by a Natural Language Process (NLP) engine based on a syntax analyser and machine learning technique that detect which part of the sentence correspond to the expression of an opinion, and on specific topic. The vocabulary is presented in four categories such as positive opinion, neutral opinion, negative opinion and information.

As per literature reviews, opinions or data expressed normally follow a standard procedure:

- Use of adjectives, nouns, verbs, adverbs, and phrases
- Emotion mapping is used to process the data. Emoticons can be replaced with either smile or frown keywords. Here data is used to extract positive or negative sentiments thereby discarding emoticons that are ambiguous or irrelevant to sentiments.
- Tokenisation: Sentences are split into terms or tokens by removing white spaces, commas and other spaces.
- Case nominalisations: This process turns the entire document or sentences into lowercase/upercase.
- URL extraction
- Detection of pointers such as username <USER> and hashtags <HASHTAG>.
- Identification of punctuations
- Removal of irrelevant items, stop words (removes articles like a, an, the), query terms
- Compression of words
- Emphatic lengthening e.g. wowww, greeeeeeaaat!!! It is interesting to note that emphatic lengthening occur in every 6th tweet of dataset (Brody and Diakopoulos, 2011).

Reviews can be collected and analysed at three levels as shown in Figure1.

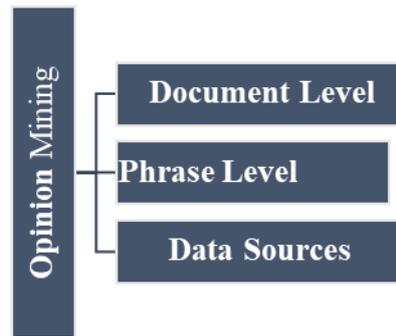


Figure 1: Levels of Opinion Mining

The opinion in the whole document is presented as positive, negative or neutral whereas the phrases in a sentence are classified according to polarity. The document level approach is considered to find sentiment which assigns a polarity to the predominant or concluding sentiment in the whole text. That means it determines the overall sentiment of a given review without considering the individuals' aspects provided in the document. The task at document level is to classify whether a whole opinion document expresses a positive or negative sentiment (Pang Lee et al. 2002). The data sources are mainly blogs, review sites and microblogging sites.

3. DIGITAL ECOSYSTEM AND OPINIONATED DATA

The paper goes into an exploration of digital ecosystem that has abundance of opinionated data recorded which can be used to make decisions with the introduction of BYOD Policy in educational organisations. Social media have shown a rapid growth of user counts and have been an object of scientific analysis (Wigand et al. 2010; McAfee 2006). The average internet user spends around 4 hours and 25 minutes each day on the internet. Smart phones prevail in the digital world. 58% of the world's population are internet users in October 2019. As per the collected data from wearesocial.sg (2019), 67% of world's population are the unique mobile users, 48% active social media users and 47% mobile social media users.



Figure 2: Global Digital Snapshot (Source: We are social, 2019)

India’s web traffic is also dominated by mobile devices. 76.2% of mobile web requests are from android devices, 22.5% mobile web requests come from Apple IOS devices and 1.3% requests from other mobile devices.

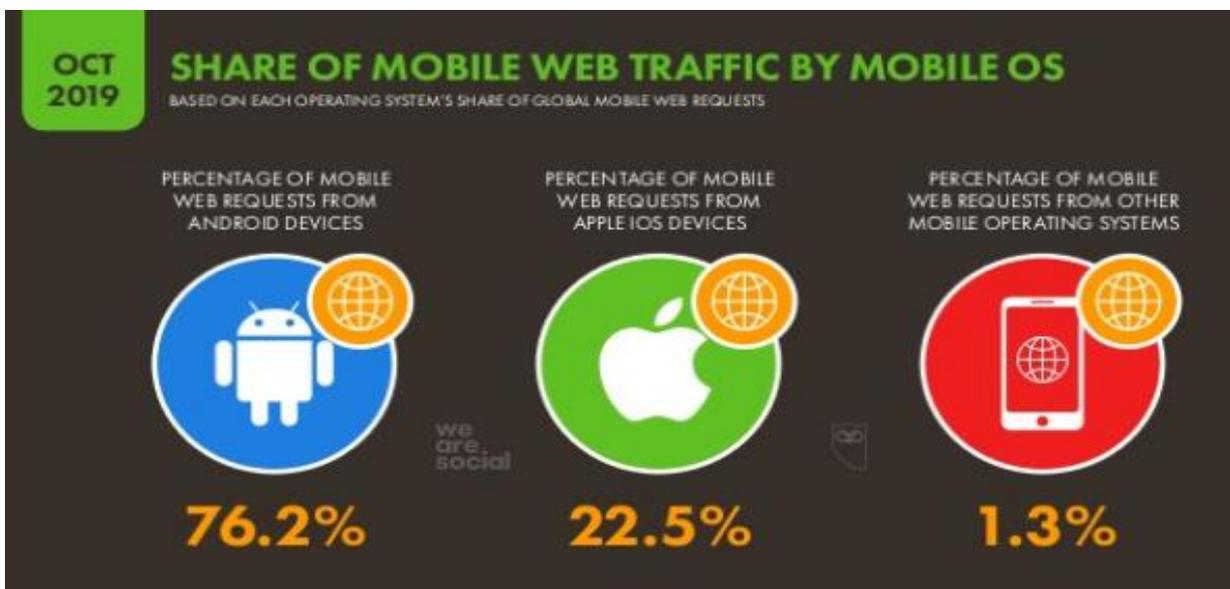


Figure 3: Share of Mobile Web Traffic, India (Source: We are social, 2019)

For organisations, it may no longer be necessary to conduct surveys, opinion polls, focus groups to gather public opinions because there is abundance of such information. Figure 4 highlights opinions extracted manually which express positive or negative sentiments about the global digital ecosystem and share of web traffic in India.

TEXTUAL ANALYSIS	EMOTICONS/SIGNS
<p>Amazing data / fact / information sheet!</p> <p>Awesome piece of work</p> <p>Outstanding</p> <p>Great information!</p> <p>Insightful things</p> <p>Mind-blowing</p> <p>Extensive, detailed and just right</p> <p>Superb data</p>	<p>Like </p>
<p>Error</p>	<p>Dislike </p>

Figure 4: Textual Analysis and Emoticons/Signs

4. NEED OF OPINION RESEARCH ON CAREER AND JOB SITES

There are numerous research papers that deal with product reviews, and there are few ones that seem to perform opinion research on job search and career building. Opinion mining and sentiment analysis can be useful in answering some of the frequently asked questions:

- What career path should I choose?
- What college/university should I apply?
- How positive or negative the market is about a stream/branch/domain?
- What company should I work for?
- What are the industry demands?
- What is the actual requirement of the candidate?
- Who is the job seeker? (Profile)
- What are the success factors?

In this age of big data and mobile revolution, the educational organisations can easily produce structured opinion summary about an entity and its aspects, and can draw more accurate statistics about aspects as shown in Figure 4. The paper has used content from www.reviews.com and WANTED Analytics to extract knowledge for decision making about career choice, and a particular stream or job that, what is the actual need of a student.

5. CONTENT ANALYSIS

A brief analysis has been done on the procedure of content analysis to show the benefits of opinion summary to the students, trainers, facilitators, mentors, job seekers, educators and educational organisations. Opinion analysis has been possible through semantic web standards and methods, machine learning methods in natural language processing, review-aggregation websites, user-rated content.

5.1. Semantic Web Standards and Methods

It is the explicit representation of the domain based on semantic annotations that map a text to the domain ontology via keywords or tags.

5.2. Machine Learning Methods in Natural Language Processing (NLP)

It is the implicit representation of meaning, based on a vector representation of texts and meaning, which enables the definition of similarities between texts and degrees of positive or negative opinions.

5.2. Review-aggregation Websites

It means aggregation of votes that may be registered on different scales e.g., stars, numbers, selective highlighting of opinions, representation of points of disagreement and points of consensus, identification of communities of opinion holders. Here is an example of the best jobsites that aim to find the absolute best for the users.

Table 1: Ratings of Best Job Sites, 2019

	Indeed	Glassdoor	LinkedIn	Dice	MediaBistro	JobisJob
Best For	No. of Listings	Company Profile	Networking Tools	Tech & Engineering Jobs	Marketing, PR & Journalism Jobs	International Jobs
Free Search Engine	Yes	Yes	Yes	Yes	Yes	Yes
Paid Version	-	-	Premium starting at \$29.99/mo.	-	Career services starting at \$99	-
Employers find you	-	-	Yes	Yes	Yes	Yes
Networking Tools	-	-	Yes	Yes	Yes	-
New Job Notifications	Yes	Yes	Yes	Yes	Yes	Yes

5.3. User-rated Content

The paper aims to discuss how online content from various social networking resources are exploited to share information with decision makers about perceived opinions, emerging trends and its potential impact on users. The summary of importance of jobsites and reviewed attributes is graphically presented.

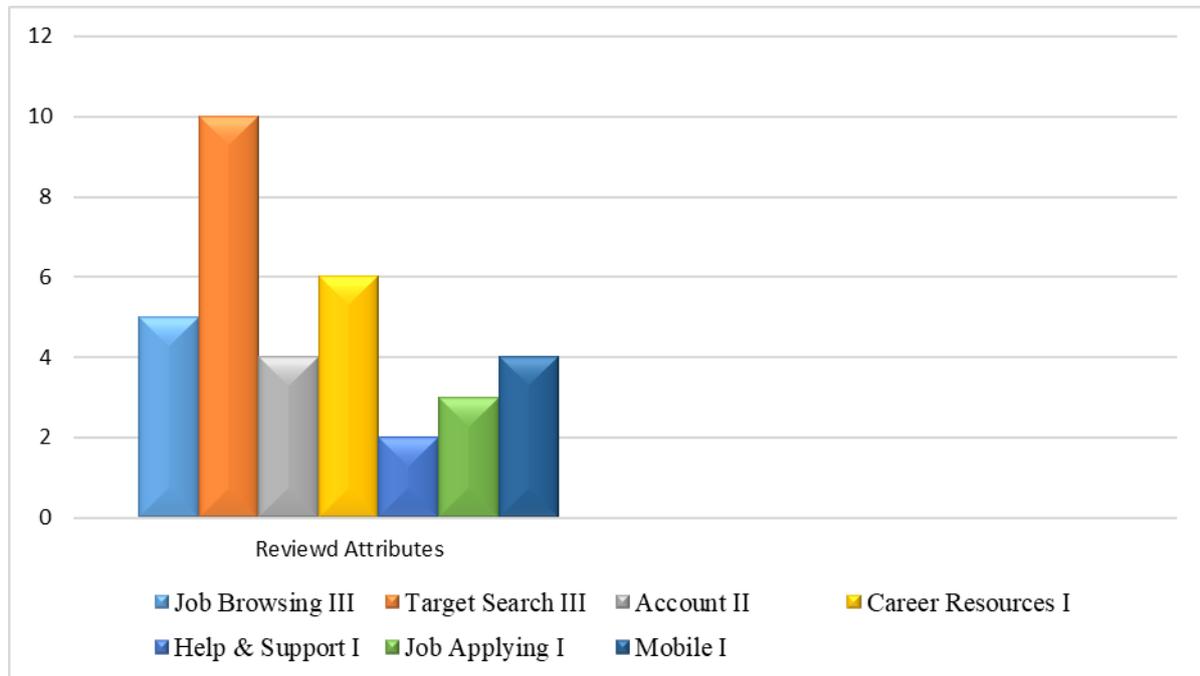


Figure 5: Importance of Job Sites and Reviewed Attributes

Job browsing and target search are considered to be the most important categories. In the job browsing category, users can search and browse for the most recent jobs on the website without user account or sign in. The volume of job postings is very high. So, target search refers to specific categories, such as industry, to narrow the job search. The user can browse jobs by company, job title and experience level. Account category provides additional features such as create account, email alerts and post resumes.

The website delivers tailored jobs based on the user's profile, experience or resume information. Job searchers don't have to constantly check the site as it delivers new job postings that match predetermined search criteria via email. Career resources, help and support, job applying and mobile category refer to job search sites that receive minimal preference in the comparative study. Career resources enable access to enriching content and features on website. Career articles and advice help job searches better their career, improve job prospects, or even help them to make a new career. It offers assistance with interview preparation. The job forums help them to understand the current employment trends and

success factors in job interviews. The sites offer resume writing and editing assistance to help users stand out in an application. The site also offers salary and compensation statistics for different positions so that the applicants can assess their worth and negotiate with confidence. Help and Support, i.e., Email Support and FAQ Section are made available in the job search sites' help function for job searches. Job Applying is a job application process that involves creating a separate account to apply to jobs without paying. The user can upload and store multiple resumes, and can also apply to multiple jobs. The mobile-optimised version of the website is also available to offer iPhone, iPad and Android apps to enable the user anywhere, anytime access.

The paper gives an insight on how educational organisations can use opinionated data to prepare the students for industry life. The 2020 estimate calls for 2.7 million job postings for data science and analytics roles. The landscape that has two distinct job markets. Data Scientist and Data Engineer are the fast-growing occupations. Estimated postings in 2020, i.e., new hires will be in the dotted occupations as shown in Figure 6.

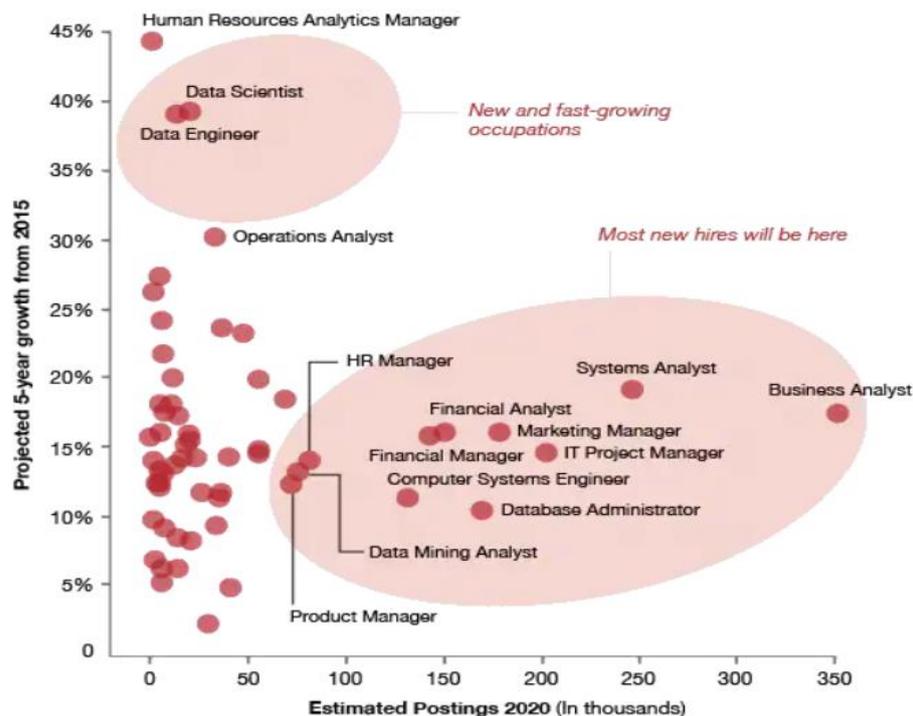


Figure 6: Job Postings for data science and analytics roles (Source: PwC Analysis based on burning class technologies, 2017)

Similarly, Figure 7 outlines technologies by proportion of companies likely to embrace them by 2020. User and entity big data analytics (85%), App and web-enabled markets (75%), , internet of things (75%), machine learning (73%) and cloud computing (72%) are the top most domains the organisations should master to impart skills to the students.

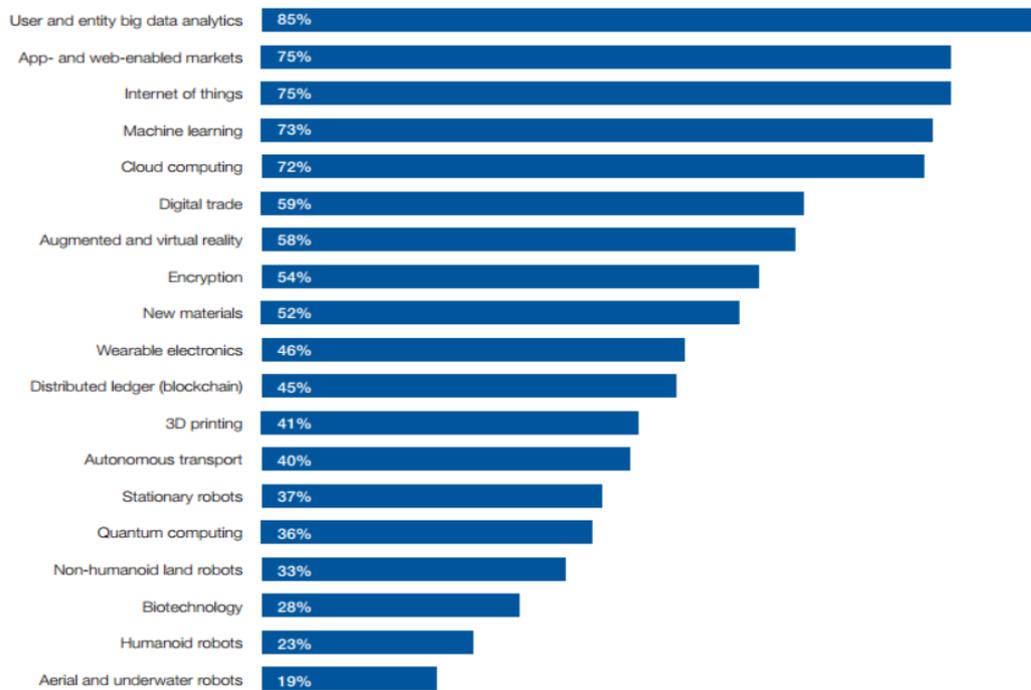


Figure 7: Future of Jobs Survey (Source: Future of Jobs Survey 2018, World Economic Forum)

6. CONCLUSION

Thus, the paper suggests extraction of opinion from various review sites and jobsites to find what jobsite matters and why. It further recommends opinion research on jobsites such as naukri.com, Placement India, Shine.com, monster India, TIMESJOBS.COM, jobsAhead.com, CLICKJOBS.com and other social networking sites such as LinkedIn, Twitter and share the opinion summary with the educational organisations. Opinion Summary of interesting and informative sections like upcoming job trends, new career options, self-improvement tips and expert advice to be in tune with job trends which will help accelerate learning and formulate better career decisions.

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