



Data Analytics and Artificial Intelligence

Vol: 1(1), 2021

REST Publisher

ISBN: 978-81-948459-4-2

Website: <http://restpublisher.com/book-series/data-analytics-and-artificial-intelligence>

A study on Social Media Instagram using GRA Method

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Abstract: Social Media Instagram in GRA (Gray-related analysis). Instagram is a loose social media telephone for sharing pics and motion pictures together with your customers and fans. It's an easy manner to capture visual moments, whether or not its ordinary occasions, travel, sports, circle of relatives and social reports. It's easy to apply and its integrated enhancing equipment inspires creativity and expression. Instagram is an exquisite way to show your customers the color and motion of your business and growth sales; it is the stop recreation for all social media sports for commercial enterprise. Instagram has greater than 800 million customers, and Face book is its determine agency, making it an effective social channel that now has the business functionality and value of Face book. Because of the visual nature of Instagram, it is essential to work on constructing an engaged following by means of posting interesting, touching, funny, lovely, or unexpected pictures. Social Media Instagram in GRA (Gray-related analysis) method Alternative: Self-Promotion, Social Interaction, Diversion, Documenting, And Creativity. Evaluation Preference: To become popular, to self-promote myself, to show off, to see what other people share. shows that from the result it is seen that to self-promote myself and is got the first rank whereas is the to show off got is having the lowest rank. The value of the dataset for Social Media Instagram in GRA (Gray-related analysis) method shows that it results in to self-promote myself and top ranking.

Keywords: MCDM, Self-Promotion, Social Interaction, Diversion, Documenting, Creativity.

1. Introduction

Instagram is a loose, on line image-sharing utility and social networking platform that turned into received via Face e book in 2012. Instagram lets in customers to edit and add snap shots and brief films through the cell app. When used successfully, social media can be a treasured addition to a department's communications technique. As many employees have expressed a hobby in growing and keeping a social media presence in each non-public and expert capacities, the Office of University Communications and Marketing has designed the subsequent creation to social media. Read this assessment in advance than developing your social media presence. Social media is a net-based totally generation that helps social interaction between large groups of humans via a few form of network. The most commonly used community is the Internet. But social media systems also are for local networks. Due to the latest technological revolution, social media is unexpectedly developing and becoming an inevitable part of everyday lifestyles. This staggering Boom is attributed to the increasing use of clever telephones like Blackberry, Q-Mobile, Androids and telephones. These clever telephones make it easy to access any social media platform from truly anywhere. Mobile variations of those social media systems are very clean to get entry to and are person-friendly. Similarly, map offerings have been used significantly by mobiles to easily locate directions and locations.

2. Social Media Instagram

All of the examples summarize the contemporary and future significance of video Instagram, and because the authors envisioned, offers a broader view of society by means of comparing the media landscape with competitors like Snap chat and Twitter. However, the opening bankruptcy covers a lot element in short sections that it leaves out The target market wonders about the briefly stated examples and implications, what dramatic changes has Twitter made as compared to Instagram, and The significance of its appeal to the younger generation. Instagram's visibility is how authors position the app's effect this understanding emerges within the constitution of "website vernacular". By finding out how Instagram creates and nurtures positive visible genres and the way and why users engage with the utility. Specific aggregate of visible styles Creates patterns and formats that carry over to more than just Instagram from – and adapted from – other platforms like Snap chat [1]. We begin this article by briefly reviewing modern scholarship on social media and the useless. We are Offer our time period 'platform vernacular' as a manner to recognize how communicate practices Before thinking about how the vernacular of Instagram manifests itself in the manufacturing and circulation of the photo categorized #funeral, it freezes into categories inside specific SNSs. We define our findings and verify how various aspects of reminiscence are mediated or redefined Through the Instagram app. We finish by thinking about the intersectionality of virtual tradition Along with conventional commemorative practices, we speak social presence, commemorative

images, and technological development [2]. Has the capability to draw to set This has come to be a bonus for enterprise sellers. Sellers will interact all of those famous Instagrammers assist them sell their products at low value. Advertising on Instagram is a massive gain for these vendors is the shortage of 1/3-celebration involvement, fancy media or organization budgets required, so it's miles among them and the owner of the account. It also gives them an instantaneous hyperlink once these Instagrammers post a publish featuring their account, it'll pique the interest in their fans It invited them to click on. Once they attain the vendor's page, possibilities are they will click on This will boom their quantity of followers to "comply with" if involved. So that is essential Marketers do their homework and studies on who is relevant to their product and audience. This is not anything new, and outdoor of the virtual global, this concept is called advertising, and it probable is They price more due to the fact they must spend on production [3]. Image-based platforms inclusive of Snapchat and Instagram provide an enormous decrease in self-mentioned loneliness for their users. The use of those similarly crucial websites is predicted unsightly mental kingdom and Positives can be evoked with the aid either Communicating with a real man or woman in preference to an item. This is "Even without the anthropomorphic aspects of the technology can occur, although there are cues in the interface Human characteristics such as voice, language and personality The social presence heuristic appears to be more strongly motivated." naturally, can be heard Brain that friend is really there [4]. This explanation of the design precept underlying Instagram shows Temporality performs an important position inside the value of those photos. Although A possibility for 'immediate' picture publishing, which maximum of Instagram doesn't The photos are without a doubt tough 'factor and shoot' fashion photographs layout. Instagram photographs commonly use a suite of publish-processing techniques which include filtering, cropping, blurring – picture manipulation functionality available within the Instagram app. They can be categories of 'art' contain a complicated interaction between those in -art'. Types, especially basic, often domestic and casual, contexts [5]. Two types of images are most common on Flickr's Instagram feed It was painted in a 'with photographer' setting: An Annotated portrait and A university portrait, both created with 0.33-birthday party apps jogging at the user's Smartphone. Although the visible system does now not engrave, neither infers nor implies life Considering dimensions including photograph-textual content, the photographers direct The perceived courting in the annotated captions and the image-format relationship perceived in the collage setting make the reputable 'voice' of the photographer. It appears to be in chance. This voice is an annotator and observer of enjoy respectively [6]. This loose social networking application can be used Improve the tourist vacation spot by using developing Goal orientated attitude and purpose too. The characteristic of postcards is conventional Marketing equipment retain with photo sharing on Instagram, which the traveler can upload Share the revel in effortlessly and immediate Curiosity leading to express growth Marketing for a traveler vacation spot. Digital technology is more efficient and less costly while selling a tourist vacation spot. However, Risks exist on a man or woman foundation View and revel in can also vary One man or woman is every other man or woman. Positive photograph Advertising can result in success but terrible perception can cause a bad photo of the vacationer goal. [7] One of the primary consequences of the modern-day have a look at is proof of the way social networking exists Integra, owned by way of making another statement in accounts with Islam phobic content (Figure 3), social norms principles were found Instagram continues to treat This conduct allowed by using Instagram widens and polarizes the distance among "us" and "them". Communities contribute to gaining the support of sure political parties and causing social struggle. So, the mixture of ghosting and social media can be stated to be oppressive Non-dominant cultures limit their freedom of expression and save you primary delight the needs of those people, and implicitly compels them to behave like them [8]. One of the principle outcomes of the contemporary have a look at is evidence of the way social networking exists Instagram, owned by means of Face eBook, with the hash tag #Stop slam. After making another statement in accounts with Islam phobic content (Figure 3), social norms principles were found Instagram continues to treat Hate speech as a detail or non-adverse content. This conduct allowed by means of Instagram widens and polarizes the space among "us" and "them". Communities make a contribution to gaining the assist of certain political events and inflicting social warfare. So, be said to be oppressive and prevent primary pleasure the wishes of those humans, and implicitly compels them to behave like them. [9] Instagram provides open supply unstructured information effortlessly handy via person profile, but this should be correct Extracted, prepared and understood. Instagram's Application Programming Interface (API) affords researchers with get admission to metadata general content and it allows queries round person-precise tags, Provides precise records. Apart from the Instagram API, there are many tools and services, inclusive of industrial and open supply loose Available programs support researchers in acquiring records Social media. Open supply is unfastened for the purposes of the existing take a look at Versions of the applications have been used for word processing and content creation Instagram data analysis [10]. To check those hypotheses, we conducted two on line experiments. Both examine Test Instagram results for extra (much less) provocative and travel content elevated upward assessment (H1) and motivation (H2). Furthermore, they have a look at whether or not this media-brought on motivation is experienced extra strongly Consolidating upward comparisons evaluate Inspired by the inspirational nature of Instagram and travel posts Inspiration Shows similar nicely-being associations in non-media contexts (H4). [11] The growing reputation (and accompanying frustration) of Instagram. Unreality has spawned the Instagram vs. Reality movement. It is a form an on line social interest where women post two pictures of themselves aspect with the aid of side: a The first-class 'Instagram' version is that it is properly lit and posed (eg abs clenched). A realistic version with their best attributes and most natural appearance (eg. visible abdominal rolling). and how a pose works Flexing certain muscles in a specific way can dramatically change the Perceived weight and appearance. The intent is that contrasting photographs [12]. Indeed, as we will see below, such The genealogies have their traces in the Instagram posts of HI jabbers prompts us to consider the activities of traffickers as exhibiting a "mixed habit" Orientation time period "mixed habit". Historical acknowledgment accommodates both A careful analysis of the organization and variation of technologies in the Cultures in their use. As we shall see, such variations Local things cannot always be accounted for through relating to long-standing methods of doing things. They can also well It need to be rooted in international methods that keep away from a Western-centric view Digital transformation [13]. However, it's far exciting that within the regression models, multiplied activity on social media had simplest

a vulnerable association with high success (although common fashion models Should have done more with Instagram account programs). Perhaps, even these small differences can be overwhelming Opportunities to multiply Because of phrase of mouth and collective interest, so social media can facilitate the previously cited layers of information. No facts on Word of mouth amongst professionals, we in this paintings we did not look into the real data layers, however we accept as true with that further research is needed to higher clarify this factor [14]. Instagram is redefining the manner the artwork world does business organization. This might be the proper time to take a look at online art work interplay on Instagram. The theoretical contribution of this observe is to boom the research the interactive behaviors of social media clients in the artwork market are of extremely good significance to have a examine Art psychology and advertising and marketing and advertising verbal exchange inside the era of mobile net. And, we trust our evaluation famous vital intellectual components past artwork scope Citizen Observers provided treasured material for future research on sociological research regions. To the excellent of our expertise, this is, we be given as actual with, the primary systematic analysis of enormously sought-after works of art and contacts on Instagram [15].

3. GRA (Gray-Related Analysis) Method

Customary GRA strategies have neglected to address the natural uncertain MADM issues above with deficient weight data. An intriguing and significant examination point is the manner by which to acquire quality loads from both instinctive dubious data and not completely [16]. realized characteristic weight data given in view of the fundamental ideal of the customary GRA technique. Along these lines, zeroing in on this issue is vital [17]. The customary GRA technique will go after the administration of the above PHF MADM issue with totally obscure weight data. The most effective method to acquire the characteristic load from both the given PHF data and the completely obscure quality weight data given in view of the essential critical examination task. The motivation behind the technique is to choose options with the longest separation from the NIS and the briefest separation from the PIS [18]. Grey Relational Analysis (GRA) is an instrument for MCDM issues that was first proposed by Deng. It has been utilized effectively in tackling different MCDM issues. have a place with the kind of information investigation technique or calculation strategy. [19] Developing the idea of the conventional GRA framework, another augmentation of the GRA framework was presented in view of the Pythagorean uncertain data of the whole esteem. To begin with, incorporate all stretch worth Pythagorean questionable outcome scales utilizing the IVPFCIA administrator. Then, an improvement model was laid out in light of the fundamental ideal of the conventional dim contact investigation (GRA) strategy to acquire the weight vector of the properties [20] The exemplary GRA framework, the natural GRA framework, and the Pythagorean GRA framework have all neglected to address the above etymological vagueness MADM issues with totally obscure weight data. The intriguing and significant examination in this article is to acquire trademark loads from both the round phonetic vagueness data and the totally obscure trait weight data given in light of the conventional GRA strategy [21]. Because of the rising contest of globalization, choosing the most reasonable representatives is one of the vital elements for an organization's prosperity. The significance and intricacy of the worker determination issue requires a strategy that coordinates both emotional and objective evaluations instead of abstract outcomes. The GRA technique is one of the most well-known strategies for dynamic on numerous rules since it tends to be handily executed and perceived. Along these lines, the GRA framework is ordered with a bunch of instinctive ambiguities that poor person yet been investigated and has the potential for huge progress in the work force determination process [22]. An altered dark connection investigation (GRA) method in view of dim numbers is utilized to rank energy makers and wipe out equivocality in the phonetic upsides of the emotional inclinations of specialists. A contextual analysis is being viewed as in Iran's energy area to show the adequacy of the five-layered approach and to approve the created approach [23]. The ideal option is chosen by computing the biggest connection coefficient (PLPIS) from PLPIS, which is the biggest dark contact coefficient and the biggest dim contact coefficient (PLNIS) and the biggest dim contact coefficient (PLNIS). This proposed technique broadens the scope of utilizations of the old style GRA strategy. At last, the case number for the site determination a few similar examinations [24]. The outcomes show that the GRA-HMM technique is more exact in risk evaluation. Meanwhile, risk control measures can be created or changed ahead of time and proposals can be made to the food creation, exploration and the board areas. GRA-HMM has been proposed for variable assessment of food quality and danger, in view of the direct and transient attributes of the recognition information, to get risk evaluation results Grey relation evaluation is an effective approach that may be used to help selection-making in an environment of uncertainty and in conditions with more than one attributes by using examining the similarity of each alternative to a super answer. As referred to earlier, design idea evaluation is a complicated choice-making technique related to many criteria which include layout necessities and constraints inclusive of client desires, product value, and improvement time. The layout standards generated all through the conceptual design section are compared based on these criteria in order that the high-quality one may be identified [25]. The gray relation analysis is one which analyzes uncertain circle of relative's members among one fundamental aspect and all of the one-of-a-kind factors in a given machine. Grey relation analysis is primarily based on a clustering method in which the load patterns in the historical load set are classified into several groups in keeping with the members of the family between a given day and the hourly load styles. The corporations whose load styles are most similar to the weight sample for the day under examine are identified due to the fact the goal clusters. An initial time desk is received via averaging the hydro schedules for the styles in the aim cluster [26]. Since some sensible constraints can be violated within the initial time table reached via the clustering gray relation evaluation referred to above, a heuristic rule based totally seek algorithm is advanced to reach a likely suboptimal time table which satisfies all sensible constraints. With more noteworthy exactness. OESI depends on the GRA technique coordinated with the vague investigation progressive cycle (AHP). Unclear AHP is utilized to decide the heaviness of limited rules for navigation, and GRA is utilized to arrange choices. The proposed GRA framework incorporates changes and

expansions that precisely meet the objectives of in general energy manageability [27].

4. Analysis and Discussion

TABLE 1. Social Media Instagram in data set

	DATA SET				
	Self-Promotion	Social Interaction	Diversion	Documenting	Creativity
To become popular	70.00	80.00	97.00	39.00	49.00
To self-promote myself	74.00	50.00	79.00	69.00	60.00
To show off	69.00	76.00	86.00	53.00	33.00
To see what other people share	74.00	89.00	79.00	63.00	45.00

This table 1 shows that the value of dataset for Social Media Instagram in GRA (Gray-related analysis) method Alternative: Self-Promotion, Social Interaction, Diversion, Documenting, Creativity. Evaluation Preference: To become popular, To self-promote myself, To show off, To see what other people share.

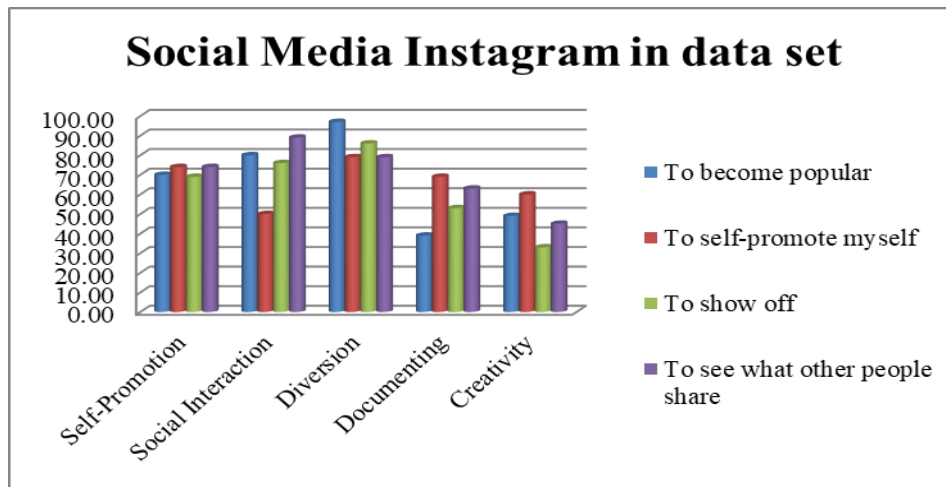


FIGURE 1. Social Media Instagram in data set

This figure 1 shows that the value of dataset for Social Media Instagram in GRA (Gray-related analysis) method Alternative: Self-Promotion, Social Interaction, Diversion, Documenting, Creativity. Evaluation Preference: To become popular, to self-promote myself, to show off, to see what other people share.

TABLE 2. Social Media Instagram in Normalized Data

	Normalized Data				
	Self-Promotion	Social Interaction	Diversion	Documenting	Creativity
To become popular	0.2	0.7692	1	0.0000	0.5926
To self-promote myself	1	0	0	1.0000	1.0000
To show off	0	0.6667	0.389	0.4667	0.0000
To see what other people share	1	1	0	0.8000	0.4444

This table 2 shows that the values of Social Media Instagram in Normalized Data from using gray relation analysis Find the fore to become popular, to self-promote myself, to show off, to see what other people share.

TABLE 3. Social Media Instagram in Deviation sequence

	Deviation sequence				
	Self-Promotion	Social Interaction	Diversion	Documenting	Creativity
To become popular	0.8	0.231	0	1.0000	0.4074
To self-promote myself	0	1	1	0.0000	0.0000
To show off	1	0.333	0.611	0.5333	1.0000
To see what other people share	0	0	1	0.2000	0.5556

This table 3 shows that the values of Social Media Instagram in Deviation sequence from using gray relation analysis Find the for Self-Promotion, Social Interaction, Diversion, Documenting, Creativity.

TABLE 4. Social Media Instagram in Grey relation coefficient

	Grey relation coefficient				
	Self-Promotion	Social Interaction	Diversion	Documenting	Creativity
To become popular	0.3846	0.6842	1	0.3333	0.5510
To self-promote myself	1	0.3333	0.333	1.0000	1.0000
To show off	0.3333	0.6	0.45	0.4839	0.3333
To see what other people share	1	1	0.333	0.7143	0.4737

This table 4 shows that the values of Social Media Instagram in Grey relation coefficient from using gray relation analysis Find the fore to become popular, to self-promote myself, to show off, to see what other people share.

TABLE 5. Social Media Instagram in GRG

	GRG
To become popular	0.5906
To self-promote myself	0.7333
To show off	0.4401
To see what other people share	0.7043

This table 5 shows that from the result it is seen that to self-promote myself and is got the first value whereas is the to show off got is having the lowest value.

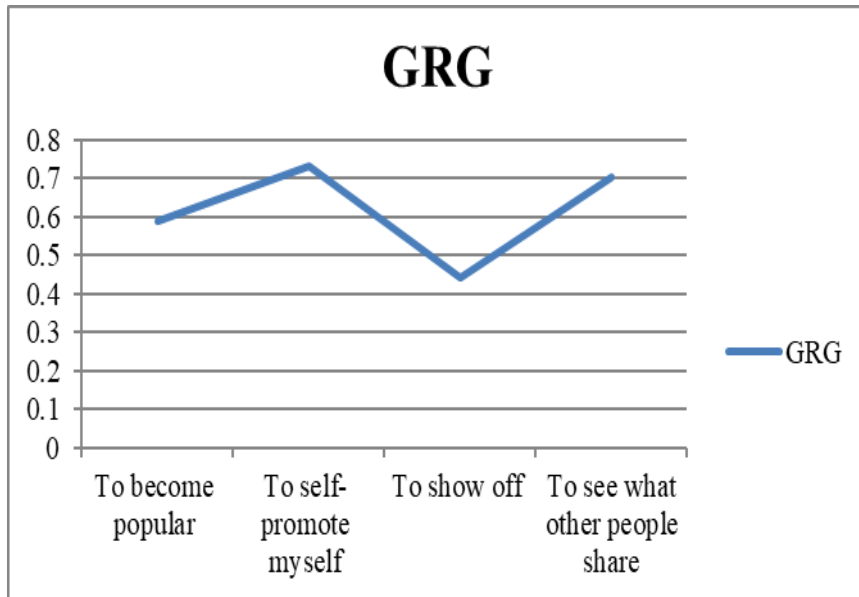


FIGURE 2. Social Media Instagram in GRG

This figure 2 shows that from the result it is seen that to self-promote myself and is got the first value whereas is the to show off got is having the lowest value.

TABLE 5. Social Media Instagram in Rank

	Rank
To become popular	3
To self-promote myself	1
To show off	4
To see what other people share	2

This table 5 shows that from the result it is seen that to self-promote myself and is got the first rank whereas is the to show off got is having the lowest rank.

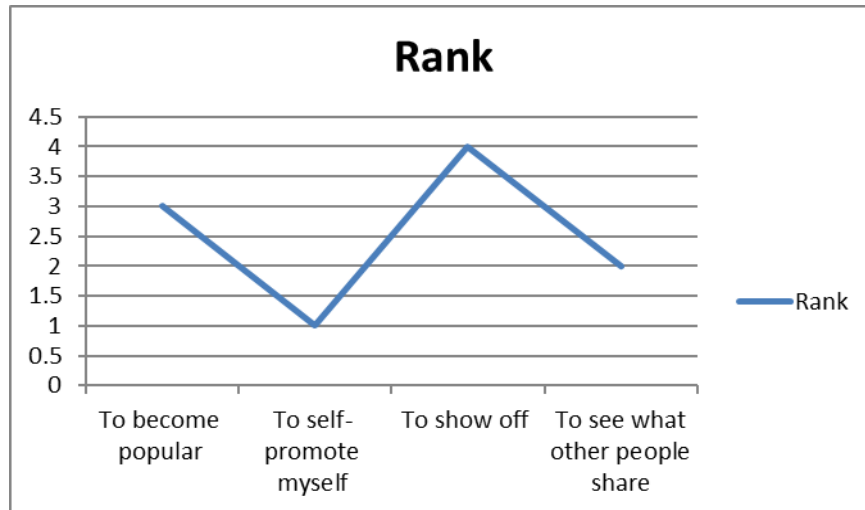


FIGURE 3. Neural Network in Rank

Figure 3 is analysis the rank of Neural Network. From the result it is seen that Range of to self-promote myself and is got the first rank whereas is the to show off got is having the lowest rank. To see what other people share is on the 2nd rank, to become popular is on the 3rd rank, to show off is on the 4th rank.

5. Conclusion

This explanation of the design precept underlying Instagram shows Temporality performs an important position inside the value of those photos. Although a possibility for 'immediate' picture publishing, which maximum of Instagram doesn't the photos is without a doubt tough 'factor and shoot' fashion photographs layout. Instagram photographs commonly use a suite of publish-processing techniques which include filtering, cropping, blurring – picture manipulation functionality available within the Instagram app. They can be categories of 'art' contain a complicated interaction between those in -art'. Types, especially basic, often domestic and casual, contexts. Developing the idea of the conventional GRA framework, another augmentation of the GRA framework was presented in view of the Pythagorean uncertain data of the whole esteem. To begin with, incorporate all stretch worth Pythagorean questionable outcome scales utilizing the IVPFCIA administrator. Then, an improvement model was laid out in light of the fundamental ideal of the conventional dim contact investigation (GRA) strategy to acquire the weight vector of the properties. The exemplary GRA framework, the natural GRA framework, and the Pythagorean GRA framework have all neglected to address the above etymological vagueness MADM issues with totally obscure weight data. The intriguing and significant examination in this article is to acquire trademark loads from both the round phonetic vagueness data and the totally obscure trait weight data given in light of the conventional GRA strategy.

References

- [1]. Leaver, Tama, Tim Highfield, and Crystal Abidin. Instagram: Visual social media cultures. John Wiley & Sons, 2020.
- [2]. Gibbs, Martin, James Meese, Michael Arnold, Bjorn Nansen, and Marcus Carter. "# Funeral and Instagram: Death, social media, and platform vernacular." Information, communication & society 18, no. 3 (2015): 255-268.
- [3]. Latiff, Zulkifli Abd, and Nur Ayuni Safira Safiee. "New business set up for branding strategies on social media–Instagram." Procedia Computer Science 72 (2015): 13-23.
- [4]. Pittman, Matthew, and Brandon Reich. "Social media and loneliness: Why an Instagram picture may be worth more than a thousand Twitter words." Computers in Human Behavior 62 (2016): 155-167.
- [5]. Zappavigna, Michele. "Social media photography: construing subjectivity in Instagram images." Visual Communication 15, no. 3 (2016): 271-292.
- [6]. Arora, Anuja, Shivam Bansal, Chandrashekhar Kandpal, Reema Aswani, and Yogesh Dwivedi. "Measuring social media influencer index-insights from Facebook, Twitter and Instagram." Journal of retailing and consumer services 49 (2019): 86-101.
- [7]. Hanan, H., and N. Putit. "Express marketing of tourism destinations using Instagram in social media networking." Hospitality and tourism: Synergizing creativity and innovation in research 471 (2013): 1074-1090.
- [8]. Civila, Sabina, Luis M. Romero-Rodríguez, and Amparo Civila. "The demonization of Islam through social media: A case study of# StopIslam in Instagram." Publications 8, no. 4 (2020): 52.

- [9]. Sheldon, Pavica, Philipp A. Rauschnabel, Mary Grace Antony, and Sandra Car. "A cross-cultural comparison of Croatian and American social network sites: Exploring cultural differences in motives for Instagram use." *Computers in human behavior* 75 (2017): 643-651.
- [10]. Gon, Marika. "Local experiences on Instagram: Social media data as source of evidence for experience design." *Journal of Destination Marketing & Management* 19 (2021): 100435.
- [11]. Meier, Adrian, Alicia Gilbert, Sophie Börner, and Daniel Possler. "Instagram inspiration: How upward comparison on social network sites can contribute to well-being." *Journal of Communication* 70, no. 5 (2020): 721-743.
- [12]. Tiggemann, Marika, and Isabella Anderberg. "Social media is not real: The effect of 'Instagram vs reality' images on women's social comparison and body image." *New Media & Society* 22, no. 12 (2020): 2183-2199.
- [13]. Baulch, Emma, and Alila Pramiyanti. "Hijabers on Instagram: Using visual social media to construct the ideal Muslim woman." *Social Media+ Society* 4, no. 4 (2018): 2056305118800308.
- [14]. Park, Jaehyuk, Giovanni Luca Ciampaglia, and Emilio Ferrara. "Style in the age of instagram: Predicting success within the fashion industry using social media." In *Proceedings of the 19th ACM Conference on computer-supported cooperative work & social computing*, pp. 64-73. 2016.
- [15]. Kang, Xin, Wenying Chen, and Jian Kang. "Art in the age of social media: Interaction behavior analysis of Instagram art accounts." In *Informatics*, vol. 6, no. 4, p. 52. MDPI, 2019.
- [16]. Wei, Gui-Wu. "GRA method for multiple attribute decision making with incomplete weight information in intuitionistic fuzzy setting." *Knowledge-Based Systems* 23, no. 3 (2010): 243-247.
- [17]. Ullah, Waheed, Muhammad Ibrar, Asghar Khan, and Musa Khan. "Multiple attribute decision making problem using GRA method with incomplete weight information based on picture hesitant fuzzy setting." *International Journal of Intelligent Systems* 36, no. 2 (2021): 866-889.
- [18]. Zhang, Shi-fang, San-yang Liu, and Ren-he Zhai. "An extended GRA method for MCDM with interval-valued triangular fuzzy assessments and unknown weights." *Computers & Industrial Engineering* 61, no. 4 (2011): 1336-1341.
- [19]. Khan, Muhammad Sajjad Ali, and Saleem Abdullah. "Interval-valued Pythagorean fuzzy GRA method for multiple-attribute decision making with incomplete weight information." *International Journal of Intelligent Systems* 33, no. 8 (2018): 1689-1716.
- [20]. Ashraf, Shahzaib, Saleem Abdullah, and Tahir Mahmood. "GRA method based on spherical linguistic fuzzy Choquet integral environment and its application in multi-attribute decision-making problems." *Mathematical Sciences* 12, no. 4 (2018): 263-275.
- [21]. Zhang, Shi-fang, and San-yang Liu. "A GRA-based intuitionistic fuzzy multi-criteria group decision making method for personnel selection." *Expert Systems with Applications* 38, no. 9 (2011): 11401-11405.
- [22]. Ebrahimi, Mehri, and Donya Rahmani. "A five-dimensional approach to sustainability for prioritizing energy production systems using a revised GRA method: A case study." *Renewable energy* 135 (2019): 345-354.
- [23]. Wei, Guiwu, Jianping Lu, Cun Wei, and Jiang Wu. "Probabilistic linguistic GRA method for multiple attribute group decision making." *Journal of Intelligent & Fuzzy Systems* 38, no. 4 (2020): 4721-4732.
- [24]. Han, Yongming, Shiyang Cui, Zhiqiang Geng, Chong Chu, Kai Chen, and Yajie Wang. "Food quality and safety risk assessment using a novel HMM method based on GRA." *Food Control* 105 (2019): 180-189.
- [25]. Altintas, Koray, Ozalp Vayvay, Sinan Apak, and Emine Cobanoglu. "An extended GRA method integrated with fuzzy AHP to construct a multidimensional index for ranking overall energy sustainability performances." *Sustainability* 12, no. 4 (2020): 1602.