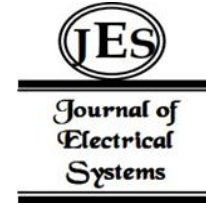


¹ Ankur Srivastava² Sifatullah Siddiqui

Sarcasm Unveiled: A Comprehensive Systematic Review of Transformer-Based Detection Models



Abstract: - Sarcasm Detection, the natural language processing region, to attract the attention of researchers and the corresponding papers published in this field is exposed. Though a considerable number of work in sarcasm detection involving the approaches, procedures and methodologies have been published using different scan methodologies and tools, the present work does not have a dedicated commitment to the evolution of the research practices and issues of sarcasm detection. The research papers collectively offer a comprehensive exploration of sarcasm detection within the realm of Natural Language Processing (NLP). Addressing challenges and advancements across diverse languages and platforms, the research introduces novel approaches like stance-level detection, unsupervised knowledge-enhanced methods, and hybrid deep learning models. The studies emphasize the importance of considering linguistic, aural, and visual cues for effective sarcasm detection and sentiment analyses as well as the main findings are comprehensiveness, novel approaches & multimodal nod. Introducing transformer model may increase powerful fight against misinterpreting online scornful. Reformer one of the transformers uses self-attention mechanism through which relationship between words may untie, data included may be social media posts, product reviews.

Keywords: Transformers, News Headlines, Sarcasm Detection, Social Media, Stance-Level-Detection.

I. INTRODUCTION

Delving into the intricacies of human expression, these research papers explore both the challenges and advancements in sentiment analysis and sarcasm detection within the rich landscape of Natural Language Processing. The texts offer a comprehensive window into the fascinating world of Natural Language Processing (NLP) spotlighting the intricate demanding and rousing advancements in sentiment analysis and sarcasm detection (Wankhade et al., 2022). They highlight the critical role of these techniques in diverse fields, from healthcare and finance to social media and customer service, while acknowledging the difficulties posed by language ambiguities like sarcasm and context dependence. The discussions showcase cutting-edge research efforts employing innovative models and methods like the Modified Switch Transformer and Unsupervised Knowledge-enhanced Prompt techniques, with specific attention given to Arabic sarcasm detection (Alharbi et al., 2021) and its importance in social media analysis (Bamman et al., 2015). Extending beyond these core NLP tasks, the texts delve into broader realms like fake news detection and ethical considerations in human-AI interaction, presenting a holistic picture of ongoing research to decode the complexities of human expression in text and navigate the challenges of nuanced language and misinformation. In essence, these passages paint a vibrant portrait of NLP's evolution and its immense potential to enhance our understanding and analysis of human communication.

Further it shows the ongoing advancement of sentiment analysis in NLP, emphasizing the need for tackling challenges like sarcasm, misinformation, and context-dependent language. It outlines the evolution of techniques from rule-based systems to complex deep learning models, including transformers, hyperbole features, and knowledge-enhanced prompts. Specific focus is given to Arabic sarcasm detection (Alharbi et al., 2021) and social media mining, while also acknowledging broader ethical considerations in human-AI interaction. In essence, the texts showcase the multifaceted research landscape in NLP aiming to decode human expression accurately, overcome misinformation and understand the complexities of natural language communication.

¹ Scholar, Computer Science and Engineering, Integral University, Lucknow, Uttar Pradesh-226026, India.

² Computer Science and Engineering, Integral University, Lucknow, Uttar Pradesh-226026, India. sifatullah@iul.ac.in

* Corresponding Author Email: ankurranu@student.iul.ac.in

II. LITERATURE REVIEW

The study summaries diverse perspectives on a collection of texts that delve into sarcasm detection within NLP, particularly focusing on Arabic text and the evolution of sentiment analysis (Eke et al., 2021). Some emphasize the challenges and approaches in Arabic sarcasm detection, while others highlight the broader shift towards deep maintaining the Integrity of the specifications learning methods and explore related topics like emotion (Chauhan et al., 2020) recognition and transformer-based models. And when it comes to scanned document analysis, these models outperform the traditional methods in interpreting the nuanced differences in features that get overlooked (Abdallah et al., 2024). Thanks to attention mechanisms, Transformers can distinguish context and the timbre of the statement, which is important when it comes to recognizing sarcasm. Overall, the texts collectively present a comprehensive and multifaceted exploration of sarcasm detection research, its advancements, and remaining challenges within the realm of NLP and sentiment analysis.

The texts collectively offer a comprehensive overview of sarcasm detection in the realm of natural language processing (NLP), with a specific focus on Arabic text. The discussions encompass challenges in Internet of Multimedia Things (IoMT)-oriented multimedia applications, proposing innovative unsupervised methods for sarcasm identification. Various existing approaches, categorized into lexicon-based, rule-based, machine learning, and deep learning methods, are scrutinized for their limitations and advantages (Eke et al., 2020). The evolution of sentiment analysis research is traced from historical origins to contemporary advancements, particularly within the context of social media. The overarching challenges in sarcasm detection, such as linguistic nuances, contextual modelling, and the need for labelled datasets, are emphasized. The survey extends to related topics like emotion recognition, sentiment analysis in diverse languages, and the application of transformer-based models. In summary, the texts collectively provide a comprehensive exploration of the complexities, methodologies, and recent advancements in sarcasm detection within the broader domains of NLP and sentiment analysis.

The discussed texts collectively present a detailed overview of the current state of research in sarcasm detection, emphasizing its evolution and diverse methodologies. Early work focused on lexical and pragmatic features, while recent advancements shifted towards deep learning methods, particularly CNNs, RNNs, and attention networks. These approaches aim to capture implicit semantic patterns that manual features struggle to identify. Challenges in sarcasm detection, such as domain specificity, context dependence, and data bias, are acknowledged across the texts (Li et al., 2022). The exploration includes rule-based methods, machine learning models, and hybrid approaches, showcasing the progression from manual rule design to automated feature learning. Additionally, the significance of context, historical user tweets, and attention mechanisms in improving sarcasm detection accuracy is highlighted. Length extrapolation has indeed emerged hottest topic when used in transformers so that models are able to process sequences outside of training data. Eventually, the capacity to provide the kind of improvements depicted here has been attainable only with the aid of specifically devised Relative Positional Encodings (RPEs) (Qin et al., 2024). The texts collectively provide a comprehensive landscape of research methodologies, challenges, and their comparison of approaches is shown in table 1.

A collection of literature lies here that offers an extensive synthesis of research on sarcasm identification in natural language processing (NLP) with a special emphasis on Arabic text. The discussions cover various issues concerning IoMT-related multimedia applications, developing new unsupervised approach to sarcasm detection (Godara et al., 2021). There are four main paradigms which include lexicon-based approach, rule-based approach, machine learning approach, and finally the deep learning approach. These texts discuss the subject of sentiment analysis and its history, and the historical progression and some of the achievements made in this field with special emphasis on social networks (Kanakam et al., 2021). The issues involved in identifying sarcasm consist of a failure to understand linguistic nuances, difficulties in context modelling and, importantly, the question of obtaining datasets that are labelled correctly. The survey also discusses related areas like emotion recognition, SA in different languages, and transformer model usage. Altogether, the texts provide an extensive discussion of the issues, methods, and the latest advancements pertaining to sarcasm identification from the degree of contextualization and within the framework of NLP and sentiment analysis.

The paper reviews sentiment analysis research, highlighting its rise from n-gram classification to deep learning techniques. Early on, sentiment lexicons like SentiWordNet (Ke et al., 2019) were popular, but by 2010, neural networks like CNNs and RNNs took over, achieving better results, especially in fine-grained tasks. Research is

now active in areas like multimodal analysis, sarcasm detection, and cross-lingual analysis, while applications include social media monitoring, review analysis, and even healthcare risk assessment. Challenges remain in subjectivity, domain dependence, and semantic composition, but ensembles and transfer learning offer promising solutions (Colin et al., 2020). As for the pixel level analysis to say the least, this approach can be extremely helpful when it comes to the detection of sarcasm. Like a reader who can discern that a statement is sarcastic based on the narrator's tone, the transformer model is able to determine the actual sentiment that lies behind an image based on the pathways, apparent in the color, texture, and pattern of the pixels that compose the picture (Nguyen et al., 2024). Overall, the study provides a comprehensive view of sentiment analysis, tracing its evolution and outlining future directions.

Nath et al., 2024 in his research discusses the issues and challenges in aspect-based sentiment analysis, including sarcasm detection, aspect extraction, category detection, sentiment classification, and evolution. It presents an overview of aspect-based sentiment analysis techniques, applications, tasks, methods, challenges and trends. The ABSA (Aspect-Based Sentiment Analysis), with MCDM (Multi-criteria Decision-Making) frameworks and the Hybrid Deep Learning model are used in a research by (Deena Nath et al., 2024) to develop a more profound understanding of the coexistence of the trends of ABSA by identifying sarcasm. Sarcasm, as described by The Macmillan English Dictionary, is the act of writing or speaking something that contradicts the opinions of others. It is when words are used in a way that offends or makes someone feel foolish. This increases the difficulty of sentiment analysis. Everybody uses sarcasm on a regular basis. Sarcasm identification software is in great demand as a means of countering phoney attitudes. It can detect sarcastic expressions in any text automatically. Because of its intricacy and ambiguity, sarcasm detection is a challenging natural language processing task. Satire can be identified (Nath et al., 2024) in a variety of ways.

Abuteir et al., 2021 found various challenges faced in respect to sarcasm detection and sentiment analysis such as Automatic speech recognition (ASR), deep forged video identification, sentiment recognition, home domotics, heavy data annotation work, lack of irony/sarcasm corpora (Ghanem et al., 2019), lack of freely dedicated tools, absence of diacritics, ambiguous, contextual, complex taxonomy of the language and the large variety of idiolects.

Table 1: Comparison of Different Approaches for Sarcasm Detection of recent papers.

| Author | Model Used | Findings/Result | Dataset Used |
|------------------------------|--|--|--|
| Abdelrahman Abdallah | DocFormer, LayoutIM, BERT | State-of-the-art language model- 85%, error reduction decreased-40% | International Conference on Document Analysis and Recognition (ICDAR), Form Understanding in Noisy Scanned Documents (FUNSD) |
| Duy-Kien Nguyen et al., 2024 | Vanilla Transformer, patch-based methods, encoder-decoder model | Object classification - 85%, masked autoencoding -70 to 75% | CIFAR-100 and ImageNet |
| Zhen Qin et al., 2024 | Relative Positional Encodings (RPEs), Theoretical Receptive Field (TRF) | 30% increase to handle longer sequence, 22% enhancement in performance | Wikitext-103, Books, WikiBook |
| Ahsan Shehzad et al., 2024 | GraphiT Model, Ecoformer, Diffomer | Graph classification- 89%, link prediction-95% | Zinc, Pattern, Cluster, CIFAR-100, ImageNet-1K, Long Range Arena, Cora, Pubmed |
| Yazhou Zhang et al., 2023 | Bidirectional Encoder Representations from Transformers (BERT), Stance-centered Graph Attention Networks (SCGAT) | 92.1% | Twitter Sarcasm Corpus[1] |

| | | | |
|--|---|---|--|
| Minjie Yuan et al., 2023 | Knowledge-enhanced prompt. | 87.5% | Twitter Sarcasm Corpus[2] |
| Alaa Rahma et al., 2023 | Lexical-based techniques. Syntactic-based techniques. Semantic-based techniques. ML | 86.5% | Arabic Twitter Corpus[3] |
| S. Muhammad Ahmed Hassan Shah et al., 2023 | Modified Switch Transformer (MST) model or dynamic switching method, variational expert routing (VEeR) technique. | 83.57 | ArSarcasmDataset[4] |
| Akshi Kumar et al., 2023 | Deep learning, convolutional neural network (CNN). | 88.5% | Hinglish Twitter Corpus |
| Santosh Kumar Bharti et al., 2022 | N-grams. Voted classification. Decision trees. Random Forest. | Effective for sarcasm detection in news headlines. 85.5% | Headlines dataset |
| NovitasariArlim et al., 2022 | Hyperbole features | 87.5% | Indonesian Twitter Corpus[7] |
| Mondher Bouazizi et al., 2022 | Pattern features. Machine Learning. Deep Learning. | Evolution | Twitter, Reddit, and some news websites |
| Borja Arroyo Galende et al., 2022 | BORJIS: Best algorithm foR Joint conspiracy and sarcasm detection. | 82.0 | Twitter Sarcasm Corpus |
| Md Saifullah Razali et al., 2022 | CNN, Deep Learning, 2-Layer LSTM | 9.0 | Onion dataset |
| Martha T. Teye et al., 2022 | Convolutional neural network, emotion recognition, human-AI interaction Recurrent neural networks (RNNs). | 82.59 | Facial Emotion Recognition datasets (FER), Speech Emotion Recognition datasets (SER)[11] |
| Wangqun Chen et al., 2022 | Multi-task learning, sarcasm detection, semantic. | Reddit-74.53 IAC-78.28 | Reddit and IAC datasets |
| Amir Hossein Abaskohi et al., 2022 | Long Short Term Memory (LSTM) based models, Bidirectional, Encoder, Representations from Transformers or simply BERT T5 | 6.5 | iSarcasm datasets, Sarcasm Headlines datasets and Sentiment140 |
| Jiajun Li et al., 2022 | Question text generation, Transformer, Bi-LSTM, Deep learning. | Versatile | subject-predicate-object (S-P-O) dataset, Question-answer pair datasets |
| Li et al., 2022 | Transformer, CNN, Self-attention mechanism | 89.3 | RCV1(Reuters Corpus Volume I) and AAPD(All Appeals Pleadings Decisions) datasets |
| Mayur Wankhade et al., 2022 | Sentiment analysis, Text analysis, Word embedding, Machine learning, Social media. | Challenges/ 84 | Amazon review datasets, product review dataset |

| | | | |
|-----------------------------------|---|----------------|--|
| Avinash Kumar et al., 2021 | Adversarial and Auxiliary Features-Aware BERT (AAFAB), BERT, Deep neural network, Feature engineering, SVM. | Balanced-81.01 | Self-annotated corpus for sarcasm (SARC) |
| Yufeng Diao et al., 2021 | Bidirectional long short-term memory (Bi-LSTM) network. Feed-forward neural network. Attention mechanism. | F1-76.2 | Internet Argument Corpus V2 |
| Aytug Onan et al., 2021 | Term weighting. Neural language model. Bidirectional long short-term memory (Bi-LSTM). Support vector machine (SVM) classifier. | 95.3 | Self-Annotated Twitter Datasets |
| Md. Saifullah Razali et al., 2021 | Deep learning. Convolutional neural networks (CNNs). Long short-term memory (LSTM) networks. | 94 | Twitter Sarcasm Corpus |

III. SCOPE OF THE STUDY

This work comprises a synthesis of literature studies that have been conducted in the last five years regarding the detection of sarcasm and emotion analysis text data. And it will use useful approaches based on machine learning, deep learning, and natural language processing with focusing on the areas, where there is no experience. The review will be based on several datasets, feature extraction methods and the different algorithms utilized in sarcasm and emotion detection.

IV. METHODOLOGY

This collection of academic papers and their research provides a comprehensive overview of recent research methodologies in sentiment analysis and sarcasm detection as shown in fig 1. The figure states that what results were achieved by analyzing different research papers including state-of-the-art as well as classifications used during last ten years. It encompasses a diverse array of approaches, including the introduction of a deep learning framework named BORJIS (Galende et al., 2022), capable of jointly detecting conspiracy theories and sarcasm tweets with high accuracy. Summaries of various research papers detail hybrid CNN-LSTM models for sarcasm detection in Hindi tweets, frameworks combining BERT and a stance network for sarcasm detection in Chinese and English, and methodologies utilizing pre-trained models and transformer architectures in multiple languages. Additionally, the compilation explores emotion detection in user-agent interactions with a cultural focus, sarcasm detection models decomposed into sentiment concern and incongruity search modules, strategies involving data augmentation, and approaches using Transformers at word and sentence levels combined with a 1D CNN. Throughout these passages, the emphasis is placed on the importance of contextual information, feature diversity, and advanced model architectures, showcasing how deep learning models, handcrafted features, and neural language models contribute to improved accuracy in sentiment and sarcasm identification across languages and domains.

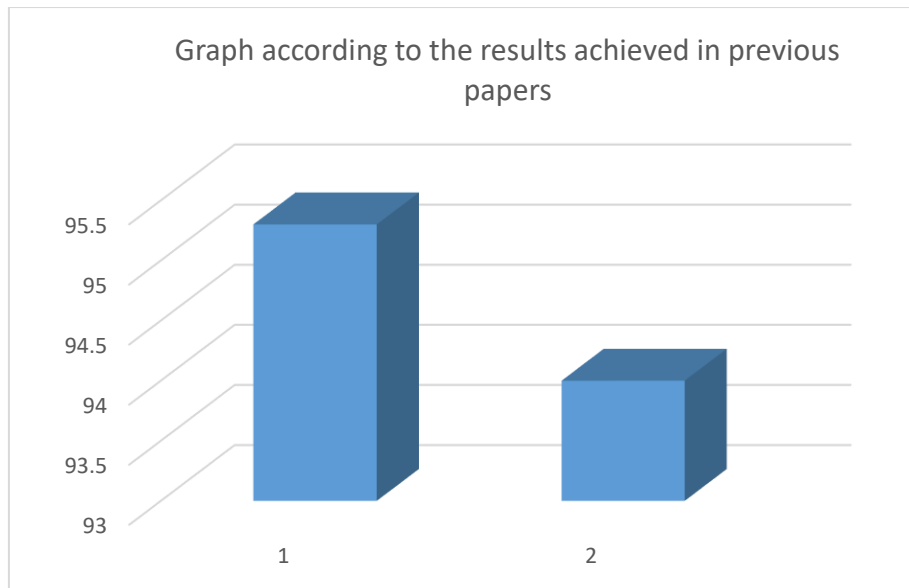


Fig 1. Graph shown according to the results achieved

This compilation covers all relevant genres of prior art across the areas of sentiment analysis and sarcasm detection across multi-disciplinary, multi-lingual, multi-utility domains and multi scanning of documents. From it, we can derive how the context, the features introduced as well as the architectural structure plays a significant role in promoting the right and comprehensive sentiment and sarcasm analysis. Key approaches include:

- Hybrid models: combining the manual designed features with deep learning to enhance the context learning in the tasks such as sarcasm detection in tweets and satire in news articles.
- Novel architectures: such as multi-dimensional question answering networks and stacked LSTMs for getting more information of language features.
- Data augmentation: improving the sarcasm identification efficiency by using the generator-based and mutation-based approaches.
- Cultural considerations: the addition of cultural biases into the emotion detection systems.
- Transformer-based approaches (Li et al., 2022): for question generation, and representation of local and global semantic features in sarcasm identification.
- Analytical methodologies: using web content analysis that in its turn involve data/text mining, graph analysis and science mapping assessment tools to conduct the literature review of the recent tendencies in the field of sentiment analysis.
- Graph transformers: Here, the graph transformers are one of the biggest steps in machine learning that targets specifically graph data. Combining the power of transformers with graph learning capabilities, the efficacy of these models proves both versatile and high performing across tasks. This survey carefully recalls the background and challenges of graph transformer, basic concepts of graph theory, and transformer in deep learning (Shehzad et al., 2024).

Altogether, these cumulatively expand the possibilities of the affective computing paradigm by focusing on feature variety, semantic base, contextual modelling, and cross-disciplinary approaches. This work serves as a useful reference for people, who frequently work with textual data and consciously or unconsciously try to gain better automated understanding of sentiments, emotions, sarcasm or subjectivity within them. This rather diverse collection of chapters concerns itself with the recent developments in the areas of sentiment analysis, as well as the identification of sarcasm, through such novel approaches as BORJIS, for joint conspiracy and sarcasm identification; through the integration of CNNs, LSTMs, and a contextual feature set across the Multiple Language framework; through frameworks built around sentiment elements, or through sentiment and incongruity definitions using Transformer constructions; data augmentation techniques Altogether, these works demonstrate the successful application of feature engineering, neural representation learning, as well as embodied/digital data and methodology advances in enhancing CAAC (Razali et al. , 2021). They focus on the feature variation,

meaning representation or semantic modulation and integration of interdisciplinary means to improve the automated identification of fine-grained sentiment, emotions, sarcasm and subjective information in the text.

This compilation of scholarly articles give a comprehensive overview of new methodologies in the sentiment analysis and sarcasm detection, new and different perspectives and approaches have been shown. In this-anniversary introduction, it inserts a new method, known as BORJIS, a deep learning system that effectively identifies conspiracy theories and sarcastic tweets with excellent accuracy (Nayel et al., 2019). In the research work’s summaries, there are several ideas using hybrid CNN-LSTM networks for sarcasm detection of Hindi tweets and the frameworks that combine BERT and stance network for detecting sarcasm both in Chinese and English; Moreover, the methodologies that introduce the pre-trained models and the transformer architectures across the multiple languages. The compilation also tackles essential areas like detecting emotion while introducing user-agent interaction with culture specificity, sarcasm detection models divided into sentiment concern, and an incongruity search component, data augmentation techniques, as well as Word and Sentence Transformer together with 1D CNN.

Across all these review sections there is a consistent stress put on the importance of contextual information, features variety and sophisticated model architectures highlighting the centrality of deep learning models, handcrafted features and neural language models in the continuous improvement of sentiment and sarcasm identification across languages and cultures (Jamil et al ., 2021). This compilation is beneficial for assigned instant researchers and practitioners in the area of affective computing that offers overviews of novel approaches and methods as well as extending the possibilities of automatic analysis of sentiment, emotion, sarcasm and subjectivity of textual information.

This mixture of documents extracted from the research articles offer a broad view of sentiment analysis and sarcasm detection, including new deep learning structures, combined models, new neural methods, data augmentation, reflector models, data and culture aspects, analytic tools using data mining and data visualization techniques, analysis of various documents and more. Figure 2 shows different datasets used to analyze and detection of sarcasm and sentiments. Among all of them Twitter was highest rated platform to be consider for testing and detection of sarcasm. Altogether, these elaborate approaches demonstrate the progress in feature extraction, representation learning, dataset’s diversity, and research paradigms focusing on context distinction, features’ heterogeneity, semantically meaningful representations, and interdisciplinary approaches. The works emphasize the value of handling minor details and potential influences, identifying and evaluating the literature from the field, and exploring the advanced borders for creating automated understanding of textual data containing sentiment, emotions, sarcasm, and subjectivity. Scientists and engineers from various fields may use the ideas presented here to improve the portfolio of affective computing solutions. The following graph is illustrating the findings of the frequency of datasets based on the number of review articles published.

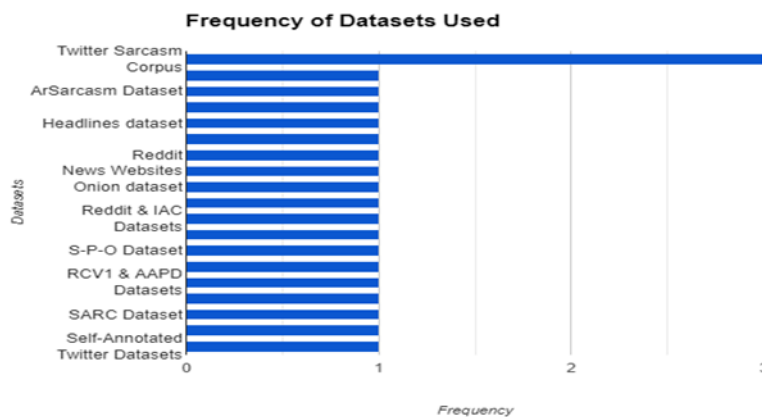


Fig 2. Frequency of Datasets used in various research papers

V. RESULTS

The collectively study of the scholarly papers is done with the aim to discover the contextual overview of the NLP field, concerning mostly sarcasm detection and sentiment analysis (Kumar et al., 2019; Kumar et al., 2023; Li et al., 2021). It looks to the more in-depth analysis of different deep learning models: BERT, CNN-LSTM, and Transformers, augmented with sentiment and inconsistency features to improve the sarcasm, identification on different languages and platforms. They pay attention to the usefulness of manually designed features, and algorithms specific to context, like AAFAB for imbalanced data set, and MQA for quotes and/or responses to optimize the level of detection. The research reveals issues with Units in the natural language processing tasks and recognizes that sarcasm, shifting language, and recursive affects present problems for the ANN to solve show the requirement for machine learning and spherical linguistic reflection. Moreover, the extract focuses on four sub-areas of research within NLP; they include platforms, algorithms, opinion mining, and by language such as the Arabic language. In total, the study highlights that introducing a combination of the appropriate features and deep learning functionality can continue increasing the results obtained in the sphere of sarcasm detection and, more generally, sentiment analysis across various settings and with a number of existing and future difficulties.

VI. DISCUSSION

The discussed text reveals different kinds of research works and strategies in case of practicing sarcasm identification more specifically, which focuses on English, Arabic, and other languages. Different methods have been used by researchers in the detection of sarcasm in the text posted in social media especially twitter and some of them include fixed word sticking, contextualized rooting like MARBERT, and multi-task swotting models. Transformer-based language models like BERT (Bidirectional Encoder Representations from Transformers), GPT (Generative Pre-trained Transformer), and ELECTRA (Efficiently Learning an Encoder that Classifies Token Replacements Accurately) have also novel approaches and challenges were addressed.

The text stated studies, such as those evaluating different framework for sarcasm detection and detecting discrimination and sarcasm in text. During the years growth of transformers in text prediction has increased. Transformers have restructured text prediction by occupying lengthy-range reliance with strings, leading to outstanding advancements in numerous NLP tasks. The field resumes yielding with current research and development, encouraging even some more commendable improvements in text prediction ability in the later.

A study carried out for the growth of transformers for predicting text from 2017 to till now is shown in fig 3. The figure shows the two axes as X-axis shows flow (years), the Y-axis designates several scales of transformer performance in text prediction efforts. Data points show the sprinkled dots which show distinct transformer models or improvement along the agenda.

Further, the problems in sarcasm detection, including the use of deep learning and machine learning techniques, are focused. The factual context of sarcasm detection, early works in English and the importance of considering amplification features for sarcasm detection are also sheltered. Finally, the text briefly holds upon sentiment analysis, its historical expansion, and its widespread supplication, particularly on social media platforms like Twitter.

The outcomes for the above studied research papers may vary from analysis to analysis, as many historical data used for sarcasm detection and sentiment analysis. These are various collection of techniques used for analysis using deep learning and machine learning with natural language processing.

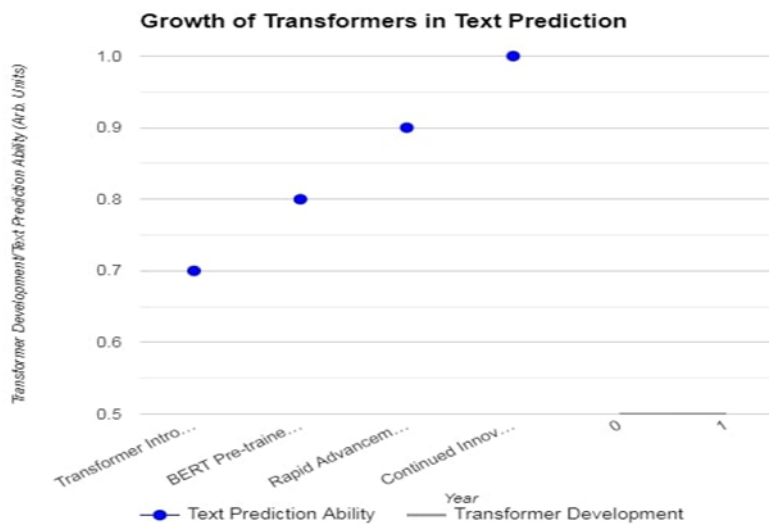


Fig 3. Growth of Transformers in text prediction

The above passage incorporated several outcomes in sarcasm detection such as model improvement for transformers, importance of multimodal cues, focusing shifted towards surveys in gaps and evolvment over time and challenges accepted to handle sarcasm across languages and platforms. Many new emerging approaches are incorporated such as Stance-level detection, hybrid learning models, unsupervised learning with external knowledge, etc.

The passage shows the field of sarcasm detection research and the improvement of basic approaches for improving accuracy, especially across diversified languages and suitable platforms. Reformer one of the best transformers is a promising technique which works with its self-attention mechanism is checked as an approach for understanding relationships among words and eliminates misinterpretations of online sarcasm. There is an increase in research papers and literature survey showing deep interest in the field.

The significance and potential impacts of the research what we have reviewed in various sarcasm detection and sentiment analysis methods under natural language processing with deep learning and machine learning procedures are such as it's a large growing field which designates an increasing need for computers to acknowledge the refinement of human connections and the potential of various applications.

Some other implications are soundness of research which covers a well-rounded understanding of sarcasm detection techniques with natural language processing; it also provides a heavy base for later advancements in the field. Applications such as a better interaction between Human-Computer, certainly in applications like social media scanning, virtual assistants, sensors, virtual reality, healthcare, electronic commerce, team collaboration, user learning and training, system development.

With the intense utilization of technologies used in sarcasm detection and sentiment analysis there may be several restrictions such as size of the dataset to be trained for NLP models as it requires large amount of data. Further it heavily banks on context; still it's a challenging part for NLP to cover full part of conversation. Another limitation may be evolution of languages from time to time as well as changing of patios, especially in online needs to be constantly updated to keep velocity with new swatch and current ways of revealing derision. Additionally lucidity and interpretability are other limitations as it understands how they occur and take place at their conclusion (increased lucidity) is important for researchers and builders to improve exactness and solidity.

VII. LIMITATIONS

In this type of review, the author surveyed the literature that has been published in the last five years in the areas of sarcasm detection and emotion analysis using ML/DL/NLP. It incorporates datasets regarding these fields and how they're feature extracted as well as the applied algorithms. Some issues are still there such as conceptual sarcasm and emoticons, which are easily counted but handled with low accuracy because training datasets, have

few examples of such. This is because some of the areas are cultural and language related and therefore impact humor which differs across different languages and dialects: there is also a lack of research data specific to the social media.

VIII. CONCLUSION AND RECOMMENDATIONS

The initial articles related to sarcasm detection explores into different aspects of sarcasm detection and sentiment analysis in the field of natural language processing (NLP). It covers novel tasks like stance-level sarcasm detection, introducing integrated frameworks involving BERT and graph attention networks. Other passages discuss research questions on detecting topics and causes of sarcasm, review the state-of-the-art in Arabic sarcasm detection, propose switch transformer architectures for text classification in Arabic, and suggest approaches for improving sarcasm detection, including in Hindi and Indonesian contexts. The second set delves into broader NLP research, addressing conspiracy detection, satire identification, emotion recognition, sarcasm analysis, and question generation, showcasing diverse methodologies such as deep learning architectures and Transformer models. Combined, these passages provide a clear perspective about the endeavour of NLP and the specific directions of sarcastic analysis, as well as the difficulties and progression witnessed and expected within the near future, along with related possibilities in the broad field of NLP.

Besides, it explores various areas of NLP research involving sarcasm, sentiment, emotion, satire, conspiracy, question, and text. They discuss brand new paradigms such as graph neural networks, CNN LSTM models, Transformers, contextual feature learning, and knowledge injection to address some of the issues such as, availability of scant labeled data, context and culture identity. The papers demonstrate the gradual enhancements of NLP performances in major domains including affect, emotion, and sentiment analysis, or semantic prosody and polarity; however, the papers still reveal demands of data scale enlargement, the combination of various modes of analysis, and integration of external knowledge. Altogether, they offer a glimpse of the current endeavour in extending NLP's discriminating capacity of emotive and semantic nuances in textual content through the use of neural networks and feature engineering.

This review will identify previous works in the area of sarcastic text classification and emotion detection from the texts using machine learning, deep learning, and natural language processing techniques. This is because some of these languages are not well developed; it has barriers to accommodation of cultural differences, and problems of insufficiency of various training sets. In general, regarding the analyzed paper, the authors indicate the necessity of the collection of more extended and less biased data and enhancing the validation techniques of the models.

IX. CONFLICT OF INTEREST

The authors declare that they have no conflict of interest regarding this research study.

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