

# References

- [1] Y. Zhang and B. Wallace, "A sensitivity analysis of (and practitioners' guide to) convolutional neural networks for sentence classification," *arXiv preprint arXiv:1510.03820*, 2015.
- [2] G. Xu, Y. Meng, X. Qiu, Z. Yu, and X. Wu, "Sentiment analysis of comment texts based on bilstm," *IEEE Access*, vol. 7, pp. 51 522–51 532, 2019.
- [3] S. J. Pan and Q. Yang, "A survey on transfer learning," *IEEE Transactions on knowledge and data engineering*, vol. 22, no. 10, pp. 1345–1359, 2009.
- [4] A. Saroj and S. Pal, "Sentiment analysis on multilingual code mixing text using bert-base: participation of irlab@ iit (bhu) in dravidian-codemix and hasoc tasks of fire2020," 2020.
- [5] S. Dann, "Twitter content classification," *First Monday*, vol. 15, no. 12, 2010.
- [6] C. T. Carr and R. A. Hayes, "Social media: Defining, developing, and divining," *Atlantic journal of communication*, vol. 23, no. 1, pp. 46–65, 2015.
- [7] A. M. Kaplan and M. Haenlein, "Users of the world, unite! the challenges and opportunities of social media," *Business horizons*, vol. 53, no. 1, pp. 59–68, 2010.
- [8] M. Terry, "Twittering healthcare: social media and medicine," *Telemedicine and e-Health*, vol. 15, no. 6, pp. 507–510, 2009.
- [9] M. L. Kent, "Directions in social media for professionals and scholars," *The Sage handbook of public relations*, vol. 2, pp. 643–656, 2010.
- [10] P. N. Howard and M. R. Parks, "Social media and political change: Capacity, constraint, and consequence," 2012.
- [11] R. Blood *et al.*, "Weblogs: A history and perspective," *Rebecca's pocket*, vol. 7, no. 9, p. 2000, 2000.
- [12] Y. Jin, B. F. Liu, and L. L. Austin, "Examining the role of social media in effective crisis management: The effects of crisis origin, information form, and source on publics' crisis responses," *Communication research*, vol. 41, no. 1, pp. 74–94, 2014.
- [13] L. Y. Lin, J. E. Sidani, A. Shensa, A. Radovic, E. Miller, J. B. Colditz, B. L. Hoffman, L. M. Giles, and B. A. Primack, "Association between social media use and depression among us young adults," *Depression and anxiety*, vol. 33, no. 4, pp. 323–331, 2016.

- [14] D. L. Williams, V. L. Crittenden, T. Keo, and P. McCarty, "The use of social media: an exploratory study of usage among digital natives," *Journal of Public Affairs*, vol. 12, no. 2, pp. 127–136, 2012.
- [15] R. Weaver Lariscy, S. F. Tinkham, and K. D. Sweetser, "Kids these days: Examining differences in political uses and gratifications, internet political participation, political information efficacy, and cynicism on the basis of age," *American Behavioral Scientist*, vol. 55, no. 6, pp. 749–764, 2011.
- [16] M. Stanley, "Ten questions internet execs should ask and answer," *Morgan Stanley Research*, 2010.
- [17] A. Whiting and D. Williams, "Why people use social media: a uses and gratifications approach," *Qualitative market research: an international journal*, 2013.
- [18] R. Gomez, "8 ways customers interact and engage with your brand on social," *Social Media Engagement*, 2021.
- [19] Z. Papacharissi and A. M. Rubin, "Predictors of internet use," *Journal of broadcasting & electronic media*, vol. 44, no. 2, pp. 175–196, 2000.
- [20] P. K. Korgaonkar and L. D. Wolin, "A multivariate analysis of web usage," *Journal of advertising research*, vol. 39, no. 2, pp. 53–53, 1999.
- [21] T. Field *et al.*, *OECD e-government studies the e-government imperative*. OECD Publishing, 2003.
- [22] R. Heeks, "Understanding e-governance for development," *iGovernment Working Paper no. 11*, February 18, 2001.
- [23] J. C. Baumgartner and J. S. Morris, "Myfacetube politics: Social networking web sites and political engagement of young adults," *Social Science Computer Review*, vol. 28, no. 1, pp. 24–44, 2010.
- [24] G. J. "Jeff" Gulati and C. B. Williams, "Congressional candidates' use of youtube in 2008: Its frequency and rationale," *Journal of Information Technology & Politics*, vol. 7, no. 2-3, pp. 93–109, 2010.
- [25] T. A. Bryer, J. C. Callen, A. M. Eikenberry, T. M. Garrett, J. M. Love, C. R. Miller, B. Stich, and C. Wickstrom, "Public administration theory in the obama era," *Administrative Theory & Praxis*, vol. 32, no. 1, pp. 118–122, 2010.
- [26] M. J. Magro, S. D. Ryan, J. H. Sharp, and K. A. Ryan, "Using social networking for educational and cultural adaptation: An exploratory study," *AMCIS 2009 Proceedings*, p. 528, 2009.
- [27] N. Dufty, "Using social media for natural disaster resilience (booklet)," 2011.
- [28] S. R. Hiltz, J. A. Kushma, and L. Plotnick, "Use of social media by us public sector emergency managers: Barriers and wish lists." in *ISCRAM*, 2014.

- [29] M. Mendoza, B. Poblete, and C. Castillo, "Twitter under crisis: Can we trust what we rt?" in *Proceedings of the first workshop on social media analytics*. ACM, 2010, pp. 71–79.
- [30] J. S. Leggitt and R. W. Gibbs, "Emotional reactions to verbal irony," *Discourse processes*, vol. 29, no. 1, pp. 1–24, 2000.
- [31] S. G. Shamay-Tsoory, R. Tomer, B. D. Berger, D. Goldsher, and J. Aharon-Peretz, "Impaired "affective theory of mind" is associated with right ventromedial prefrontal damage," *Cognitive and Behavioral Neurology*, vol. 18, no. 1, pp. 55–67, 2005.
- [32] J. R. Ragini and P. R. Anand, "An empirical analysis and classification of crisis related tweets," in *2016 IEEE International Conference on Computational Intelligence and Computing Research (ICIC)*. IEEE, 2016, pp. 1–4.
- [33] A. Balamurali, A. Joshi, and P. Bhattacharyya, "Cross-lingual sentiment analysis for indian languages using linked wordnets," in *Proceedings of COLING 2012: Posters*, 2012, pp. 73–82.
- [34] A. Bakliwal, P. Arora, and V. Varma, "Hindi subjective lexicon: A lexical resource for hindi polarity classification," in *Proceedings of the Eight International Conference on Language Resources and Evaluation (LREC)*, 2012, pp. 1189–1196.
- [35] S. Rani and P. Kumar, "A journey of indian languages over sentiment analysis: a systematic review," *Artificial Intelligence Review*, vol. 52, no. 2, pp. 1415–1462, 2019.
- [36] R. Caruana, "Multitask learning," *Machine learning*, vol. 28, no. 1, pp. 41–75, 1997.
- [37] S. E. Cho and H. W. Park, "Government organizations' innovative use of the internet: The case of the twitter activity of south korea's ministry for food, agriculture, forestry and fisheries," *Scientometrics*, vol. 90, no. 1, pp. 9–23, 2012.
- [38] G. F. Khan, J. Moon, H. W. Park, B. Swar, and J. J. Rho, "A socio-technical perspective on e-government issues in developing countries: A scientometrics approach," *Scientometrics*, vol. 87, no. 2, pp. 267–286, 2010.
- [39] P. Mittal and A. Kaur, "E-governance: A challenge for india," *International journal of advanced research in computer engineering & technology*, vol. 2, no. 3, 2013.
- [40] K. Yadav and S. Tiwari, "e-governance in india: Opportunities and challenges," *Advance in Electronic and Electric Engineering*, vol. 4, no. 6, pp. 675–680, 2014.
- [41] B. Godwin, S. Campbell, J. Levy, and J. Bounds, "Examples of agencies using online content and technology to achieve mission and goals," 2008.
- [42] F. Wigand, "Twitter takes wing in government: diffusion, roles, and management," in *Proceedings of the 11th annual international digital government research conference on public administration online: Challenges and opportunities*. Digital Government Society of North America, 2010, pp. 66–71.

- [43] N. Srivastava, "E-governance in rural india," *International Journal of Computer Science and Information Technologies*, 6 (1), pp. 741–744, 2015.
- [44] C. Ehnis and D. Bunker, "Social media in disaster response: Queensland police service-public engagement during the 2011 floods," in *ACIS 2012: Location, location, location: Proceedings of the 23rd Australasian Conference on Information Systems 2012*. ACIS, 2012, pp. 1–10.
- [45] M. Latonero and I. Shklovski, "Emergency management, twitter, and social media evangelism," 2011.
- [46] A. L. Hughes, L. A. St Denis, L. Palen, and K. M. Anderson, "Online public communications by police & fire services during the 2012 hurricane sandy," in *Proceedings of the 32nd annual ACM conference on Human factors in computing systems*. ACM, 2014, pp. 1505–1514.
- [47] M. Mirbabaie, D. Bunker, and S. Stieglitz, "The role of social media network participants in extreme events." ACIS, 2014.
- [48] J. C. Bertot, P. T. Jaeger, and J. M. Grimes, "Using icts to create a culture of transparency: E-government and social media as openness and anti-corruption tools for societies," *Government information quarterly*, vol. 27, no. 3, pp. 264–271, 2010.
- [49] T. Besley and R. Burgess, "Political agency, government responsiveness and the role of the media," *European Economic Review*, vol. 45, no. 4–6, pp. 629–640, 2001.
- [50] A. Signorini, A. M. Segre, and P. M. Polgreen, "The use of twitter to track levels of disease activity and public concern in the us during the influenza a h1n1 pandemic," *PloS one*, vol. 6, no. 5, p. e19467, 2011.
- [51] P. Analytics, "Twitter study–august 2009," *San Antonio, TX: Pear Analytics. Available at: www.pearanalytics.com/blog/wp-content/uploads/2010/05/Twitter-Study-August-2009.pdf*, 2009.
- [52] S. Chun, S. Shulman, R. Sandoval, and E. Hovy, "Government 2.0: Making connections between citizens, data and government," *Information Polity*, vol. 15, no. 1, 2, pp. 1–9, 2010.
- [53] A. Alasem, "e-government on twitter: The use of twitter by the saudi authorities." *Electronic Journal of e-Government*, vol. 13, no. 1, 2015.
- [54] J. Clement, "Countries with the most facebook users 2019," *Statista*, 2019.
- [55] S. Sawalha, M. Al-Jamal, and E. Abu-Shanab, "The influence of utilising facebook on e-government adoption," *Electronic Government, an International Journal*, vol. 15, no. 1, pp. 1–20, 2019.
- [56] M. Madden and K. Zickuhr, "65% of online adults use social networking sites," 2011.
- [57] K. Purcell, L. Rainie, and J. Brenner, "Search engine use 2012," 2012.

- [58] M. Petermann, “The twitter underground economy: A blooming business (2012).”
- [59] S. J. Horowitz, “Defusing a google bomb,” *Yale Law Journal Pocket Part*, vol. 117, 2007.
- [60] F. Franch, “(wisdom of the crowds) 2: 2010 uk election prediction with social media,” *Journal of Information Technology & Politics*, vol. 10, no. 1, pp. 57–71, 2013.
- [61] C. Shirky, “The political power of social media: Technology, the public sphere, and political change,” *Foreign affairs*, pp. 28–41, 2011.
- [62] A. Tumasjan, T. Sprenger, P. Sandner, and I. Welpe, “Predicting elections with twitter: What 140 characters reveal about political sentiment,” in *Proceedings of the International AAAI Conference on Web and Social Media*, vol. 4, no. 1, 2010, pp. 178–185.
- [63] B. Liu, “Sentiment analysis and opinion mining,” *Synthesis lectures on human language technologies*, vol. 5, no. 1, pp. 1–167, 2012.
- [64] D. J. S. Oliveira, P. H. d. S. Bermejo, and P. A. dos Santos, “Can social media reveal the preferences of voters? a comparison between sentiment analysis and traditional opinion polls,” *Journal of Information Technology & Politics*, vol. 14, no. 1, pp. 34–45, 2017.
- [65] E. T. K. Sang and J. Bos, “Predicting the 2011 dutch senate election results with twitter,” in *Proceedings of the workshop on semantic analysis in social media*, 2012, pp. 53–60.
- [66] M. A. Razzaq, A. M. Qamar, and H. S. M. Bilal, “Prediction and analysis of pakistan election 2013 based on sentiment analysis,” in *2014 IEEE/ACM International conference on advances in social networks analysis and mining (ASONAM 2014)*. IEEE, 2014, pp. 700–703.
- [67] W. Budiharto and M. Meiliana, “Prediction and analysis of indonesia presidential election from twitter using sentiment analysis,” *Journal of Big data*, vol. 5, no. 1, pp. 1–10, 2018.
- [68] P. Burnap, R. Gibson, L. Sloan, R. Southern, and M. Williams, “140 characters to victory?: Using twitter to predict the uk 2015 general election,” *Electoral Studies*, vol. 41, pp. 230–233, 2016.
- [69] B. Boatwright, J. P. Mazer, and S. Beach, “The 2016 us presidential election and transition events: A social media volume and sentiment analysis,” *Southern Communication Journal*, vol. 84, no. 3, pp. 196–209, 2019.
- [70] M. Zampieri, S. Malmasi, P. Nakov, S. Rosenthal, N. Farra, and R. Kumar, “Semeval-2019 task 6: Identifying and categorizing offensive language in social media (offenseval),” *arXiv preprint arXiv:1903.08983*, 2019.

- [71] F. M. P. del Arco, S. Halat, S. Padó, and R. Klinger, “Multi-task learning with sentiment, emotion, and target detection to recognize hate speech and offensive language,” in *Forum for Information Retrieval Evaluation, Virtual Event*, 2021.
- [72] D. Sarkar, M. Zampieri, T. Ranasinghe, and A. Ororbia, “Fbert: A neural transformer for identifying offensive content,” *arXiv preprint arXiv:2109.05074*, 2021.
- [73] R. K. T. C. K. McKeown and S. McGregor, “Predictive embeddings for hate speech detection on twitter,” *EMNLP 2018*, p. 26, 2018.
- [74] T. Marwa, O. Salima, and M. Souham, “Deep learning for online harassment detection in tweets,” in *2018 3rd International Conference on Pattern Analysis and Intelligent Systems (PAIS)*. IEEE, 2018, pp. 1–5.
- [75] M. Tolba, S. Ouadfel, and S. Meshoul, “Hybrid ensemble approaches to online harassment detection in highly imbalanced data,” *Expert Systems with Applications*, vol. 175, p. 114751, 2021.
- [76] P. Liu, W. Li, and L. Zou, “Nuli at semeval-2019 task 6: Transfer learning for offensive language detection using bidirectional transformers,” in *Proceedings of the 13th International Workshop on Semantic Evaluation*, 2019, pp. 87–91.
- [77] P. Kapil and A. Ekbal, “A deep neural network based multi-task learning approach to hate speech detection,” *Knowledge-Based Systems*, vol. 210, p. 106458, 2020.
- [78] S. Gaikwad, T. Ranasinghe, M. Zampieri, and C. M. Homan, “Cross-lingual offensive language identification for low resource languages: The case of marathi,” *arXiv preprint arXiv:2109.03552*, 2021.
- [79] D. Colla, T. Caselli, V. Basile, J. Mitrovic, and M. Granitzer, “Grupato at semeval-2020 task 12: Retraining mbert on social media and fine-tuned offensive language models,” in *Proceedings of the International Workshop on Semantic Evaluation (SemEval)*, 2020.
- [80] E. Riloff, A. Qadir, P. Surve, L. De Silva, N. Gilbert, and R. Huang, “Sarcasm as contrast between a positive sentiment and negative situation,” in *Proceedings of the 2013 Conference on Empirical Methods in Natural Language Processing*, 2013, pp. 704–714.
- [81] A. Joshi, P. Bhattacharyya, and M. J. Carman, “Automatic sarcasm detection: A survey,” *ACM Computing Surveys (CSUR)*, vol. 50, no. 5, pp. 1–22, 2017.
- [82] F. Kunneman, C. Liebrecht, M. Van Mulken, and A. Van den Bosch, “Signaling sarcasm: From hyperbole to hashtag,” *Information Processing & Management*, vol. 51, no. 4, pp. 500–509, 2015.
- [83] C. Van Hee, “Can machines sense irony?: exploring automatic irony detection on social media,” Ph.D. dissertation, Ghent University, 2017.
- [84] C. Baziotis, N. Athanasiou, P. Papalampidi, A. Kolovou, G. Paraskevopoulos, N. Ellinas, and A. Potamianos, “NTUA-SLP at semeval-2018 task 3: Tracking ironic tweets using ensembles of word and character level attentive rnns,” *CoRR*, vol. abs/1804.06659, 2018. [Online]. Available: <http://arxiv.org/abs/1804.06659>

- [85] T. Hercig, “UWB at SemEval-2018 task 3: Irony detection in English tweets,” in *Proceedings of The 12th International Workshop on Semantic Evaluation*. New Orleans, Louisiana: Association for Computational Linguistics, Jun. 2018, pp. 520–524. [Online]. Available: <https://www.aclweb.org/anthology/S18-1084>
- [86] J.-Á. González, L.-F. Hurtado, and F. Pla, “ELiRF-UPV at SemEval-2018 tasks 1 and 3: Affect and irony detection in tweets,” in *Proceedings of The 12th International Workshop on Semantic Evaluation*. New Orleans, Louisiana: Association for Computational Linguistics, Jun. 2018, pp. 565–569. [Online]. Available: <https://www.aclweb.org/anthology/S18-1092>
- [87] R. S, A. D. S, S. M. Rajendram, and M. T T, “SSN MLRG1 at SemEval-2018 task 3: Irony detection in English tweets using MultiLayer perceptron,” in *Proceedings of The 12th International Workshop on Semantic Evaluation*. New Orleans, Louisiana: Association for Computational Linguistics, Jun. 2018, pp. 633–637. [Online]. Available: <https://www.aclweb.org/anthology/S18-1103>
- [88] O. Rohanian, S. Taslimipoor, R. Evans, and R. Mitkov, “WLV at SemEval-2018 task 3: Dissecting tweets in search of irony,” in *Proceedings of The 12th International Workshop on Semantic Evaluation*. New Orleans, Louisiana: Association for Computational Linguistics, Jun. 2018, pp. 553–559. [Online]. Available: <https://www.aclweb.org/anthology/S18-1090>
- [89] A. San, “Random decision syntax trees at SemEval-2018 task 3: LSTMs and sentiment scores for irony detection,” in *Proceedings of The 12th International Workshop on Semantic Evaluation*. New Orleans, Louisiana: Association for Computational Linguistics, Jun. 2018, pp. 560–564. [Online]. Available: <https://www.aclweb.org/anthology/S18-1091>
- [90] D. I. Hernández Farías, F. Sánchez-Vega, M. Montes-y Gómez, and P. Rosso, “INAOE-UPV at SemEval-2018 task 3: An ensemble approach for irony detection in twitter,” in *Proceedings of The 12th International Workshop on Semantic Evaluation*. New Orleans, Louisiana: Association for Computational Linguistics, Jun. 2018, pp. 594–599. [Online]. Available: <https://www.aclweb.org/anthology/S18-1097>
- [91] B. Peng, J. Wang, and X. Zhang, “Ynu-hpcc at semeval-2018 task 3: Ensemble neural network models for irony detection on twitter,” in *Proceedings of The 12th International Workshop on Semantic Evaluation*, 2018, pp. 622–627.
- [92] E. Fersini, E. Messina, F. A. Pozzi, and V. Sarca, “Subjectivity, polarity and irony detection: a multi-layer approach,” in *Proceedings of the First Italian Conference on Computational Linguistics CLiC-it 2014 & the Fourth International Workshop EVALITA*, 2014.
- [93] U. Ahmed, L. Zafar, F. Qayyum, and M. A. Islam, “Irony detector at semeval-2018 task 3: Irony detection in english tweets using word graph,” in *Proceedings of the 12th international workshop on semantic evaluation*, 2018, pp. 581–586.
- [94] A. Ghosh and T. Veale, “Ironymagnet at semeval-2018 task 3: A siamese network for irony detection in social media,” in *Proceedings of The 12th International Workshop on Semantic Evaluation*, 2018, pp. 570–575.

- [95] S. Zhang, X. Zhang, J. Chan, and P. Rosso, "Irony detection via sentiment-based transfer learning," *Information Processing & Management*, vol. 56, no. 5, pp. 1633–1644, 2019.
- [96] N. Dufty *et al.*, "Using social media to build community disaster resilience," *Australian Journal of Emergency Management, The*, vol. 27, no. 1, p. 40, 2012.
- [97] C. Balana, "Social media: major tool in disaster response," *Inquirer Technology*, vol. 15, p. 5, 2012.
- [98] H. Blanchard, A. Carvin, M. E. Whitaker, M. Fitzgerald, W. Harman, B. Humphrey, P. Meier, C. Starbird, J. Solomon, and R. Zeiger, "The case for integrating crisis response with social media," *White Paper, American Red Cross*, p. 32, 2012.
- [99] P. Meier, "New information technologies and their impact on the humanitarian sector," *International review of the Red Cross*, vol. 93, no. 884, pp. 1239–1263, 2011.
- [100] L. Plotnick, S. R. Hiltz, J. A. Kushma, and A. H. Tapia, "Red tape: Attitudes and issues related to use of social media by us county-level emergency managers." in *ISCRAM*, 2015.
- [101] D. Havlik, J. Pielorz, and A. Widera, "Interaction with citizens experiments: from context-aware alerting to crowdtasking." in *ISCRAM*, 2016.
- [102] S. Vieweg, A. L. Hughes, K. Starbird, and L. Palen, "Microblogging during two natural hazards events: what twitter may contribute to situational awareness," in *Proceedings of the SIGCHI conference on human factors in computing systems*. ACM, 2010, pp. 1079–1088.
- [103] A. H. Tapia, E. Maldonado, L.-M. Ngamassi Tchouakeu, and C. F. Maitland, "Coordinating humanitarian information: The problem of organizational and technical trajectories," *Information Technology & People*, vol. 25, no. 3, pp. 240–258, 2012.
- [104] C. Maitland and A. Tapia, "Coordinated icts for effective use in humanitarian assistance," *The Journal of Information Technology in Social Change*, vol. 1, no. 1, pp. 128–141, 2007.
- [105] C. Maitland, L. Ngamassi, and A. Tapia, "Information management and technology issues addressed by humanitarian relief coordination bodies," in *Proceedings of the 6th International ISCRAM Conference*, 2009.
- [106] L.-M. N. Tchouakeu, E. Maldonado, K. Zhao, H. Robinson, C. Maitland, and A. Tapia, "Exploring barriers to coordination between humanitarian ngos: A comparative case study of two ngo's information technology coordination bodies," in *Information Systems and Modern Society: Social Change and Global Development*. IGI Global, 2013, pp. 87–112.
- [107] P. T. Jaeger, B. Shneiderman, K. R. Fleischmann, J. Preece, Y. Qu, and P. F. Wu, "Community response grids: E-government, social networks, and effective emergency management," *Telecommunications Policy*, vol. 31, no. 10, pp. 592–604, 2007.

- [108] W. M. Lim and W. M. Lim, "Social media in medical and health care: opportunities and challenges," *Marketing Intelligence & Planning*, vol. 34, no. 7, pp. 964–976, 2016.
- [109] K. C. Finch, K. R. Snook, C. H. Duke, K.-W. Fu, Z. T. H. Tse, A. Adhikari, and I. C.-H. Fung, "Public health implications of social media use during natural disasters, environmental disasters, and other environmental concerns," *Natural Hazards*, vol. 83, no. 1, pp. 729–760, 2016.
- [110] B. R. Lindsay, "Social media and disasters: Current uses, future options, and policy considerations," 2011.
- [111] D. Velez and P. Zlateva, "Use of social media in natural disaster management," *Intl. Proc. of Economic Development and Research*, vol. 39, pp. 41–45, 2012.
- [112] L. Hjorth and K.-H. Y. Kim, "Good grief: the role of social mobile media in the 3.11 earthquake disaster in japan," *Digital Creativity*, vol. 22, no. 3, pp. 187–199, 2011.
- [113] N. Dufty *et al.*, "Twitter turns ten: its use to date in disaster management," *Australian Journal of Emergency Management, The*, vol. 31, no. 2, p. 50, 2016.
- [114] D. E. Alexander, "Social media in disaster risk reduction and crisis management," *Science and Engineering Ethics*, vol. 20, no. 3, pp. 717–733, 2014.
- [115] N. Kankanamge, T. Yigitcanlar, A. Goonetilleke, and M. Kamruzzaman, "Can volunteer crowdsourcing reduce disaster risk? a systematic review of the literature," *International journal of disaster risk reduction*, p. 101097, 2019.
- [116] S. D. C. A. M. C. L. Chaves, R. and M. R. Borges, "Crowdsourcing as a tool for urban emergency management: lessons from the literature and typology," *Sensors*, vol. 19, no. 23, p. 5235, 2019.
- [117] J. Jiang, "Information extraction from text," in *Mining text data*. Springer, 2012, pp. 11–41.
- [118] M. Imran, S. M. Elbassuoni, C. Castillo, F. Diaz, and P. Meier, "Extracting information nuggets from disaster-related messages in social media," *Proc. of ISCRAM, Baden-Baden, Germany*, 2013.
- [119] A. Gupta, A. Joshi, and P. Kumaraguru, "Identifying and characterizing user communities on twitter during crisis events," in *Proceedings of the 2012 workshop on Data-driven user behavioral modelling and mining from social media*. ACM, 2012, pp. 23–26.
- [120] J. Chae, D. Thom, Y. Jang, S. Kim, T. Ertl, and D. S. Ebert, "Public behavior response analysis in disaster events utilizing visual analytics of microblog data," *Computers & Graphics*, vol. 38, pp. 51–60, 2014.
- [121] A. Utani, T. Mizumoto, and T. Okumura, "How geeks responded to a catastrophic disaster of a high-tech country: rapid development of counter-disaster systems for the great east japan earthquake of march 2011," in *Proceedings of the Special Workshop on Internet and Disasters*. ACM, 2011, p. 9.

- [122] S. E. Middleton, L. Middleton, and S. Modafferi, "Real-time crisis mapping of natural disasters using social media," *IEEE Intelligent Systems*, vol. 29, no. 2, pp. 9–17, 2014.
- [123] S. McClendon and A. C. Robinson, "Leveraging geospatially-oriented social media communications in disaster response," *International Journal of Information Systems for Crisis Response and Management (IJISCRAM)*, vol. 5, no. 1, pp. 22–40, 2013.
- [124] T. Rattenbury, N. Good, and M. Naaman, "Towards automatic extraction of event and place semantics from flickr tags," in *Proceedings of the 30th annual international ACM SIGIR conference on Research and development in information retrieval*. ACM, 2007, pp. 103–110.
- [125] C. O'Brien, "Is twitter the newsroom of the future," *Retrieved March*, vol. 28, p. 2009, 2008.
- [126] R. Scoble, "Twittering the earthquake in china," *Recuperado el*, vol. 12, 2008.
- [127] P. Earle, M. Guy, R. Buckmaster, C. Ostrum, S. Horvath, and A. Vaughan, "Omg earthquake! can twitter improve earthquake response?" *Seismological Research Letters*, vol. 81, no. 2, pp. 246–251, 2010.
- [128] J. Li and H. R. Rao, "Twitter as a rapid response news service: An exploration in the context of the 2008 china earthquake," *The Electronic Journal of Information Systems in Developing Countries*, vol. 42, no. 1, pp. 1–22, 2010.
- [129] T. Sakaki, M. Okazaki, and Y. Matsuo, "Earthquake shakes twitter users: real-time event detection by social sensors," in *Proceedings of the 19th international conference on World wide web*. ACM, 2010, pp. 851–860.
- [130] P. S. Earle, D. C. Bowden, and M. Guy, "Twitter earthquake detection: earthquake monitoring in a social world," *Annals of Geophysics*, vol. 54, no. 6, 2012.
- [131] O. Aulov and M. Halem, "Human sensor networks for improved modeling of natural disasters," *Proceedings of the IEEE*, vol. 100, no. 10, pp. 2812–2823, 2012.
- [132] J. P. Singh, Y. K. Dwivedi, N. P. Rana, A. Kumar, and K. K. Kapoor, "Event classification and location prediction from tweets during disasters," *Annals of Operations Research*, pp. 1–21, 2017.
- [133] M. Adedoyin-Olowe, M. M. Gaber, C. M. Dancausa, F. Stahl, and J. B. Gomes, "A rule dynamics approach to event detection in twitter with its application to sports and politics," *Expert Systems with Applications*, vol. 55, pp. 351–360, 2016.
- [134] U. Hahn and I. Mani, "The challenges of automatic summarization," *Computer*, vol. 33, no. 11, pp. 29–36, 2000.
- [135] Y. Qu, C. Huang, P. Zhang, and J. Zhang, "Microblogging after a major disaster in china: a case study of the 2010 yushu earthquake," in *Proceedings of the ACM 2011 conference on Computer supported cooperative work*. ACM, 2011, pp. 25–34.

- [136] F. Vis, “Twitter as a reporting tool for breaking news: Journalists tweeting the 2011 uk riots,” *Digital journalism*, vol. 1, no. 1, pp. 27–47, 2013.
- [137] M. A. Cameron, R. Power, B. Robinson, and J. Yin, “Emergency situation awareness from twitter for crisis management,” in *Proceedings of the 21st International Conference on World Wide Web*. ACM, 2012, pp. 695–698.
- [138] D. Yates and S. Paquette, “Emergency knowledge management and social media technologies: A case study of the 2010 haitian earthquake,” *International journal of information management*, vol. 31, no. 1, pp. 6–13, 2011.
- [139] J. Yin, S. Karimi, A. Lampert, M. Cameron, B. Robinson, and R. Power, “Using social media to enhance emergency situation awareness,” in *Twenty-Fourth International Joint Conference on Artificial Intelligence*, 2015.
- [140] H. Gao, G. Barbier, and R. Goolsby, “Harnessing the crowdsourcing power of social media for disaster relief,” *IEEE Intelligent Systems*, vol. 26, no. 3, pp. 10–14, 2011.
- [141] A. Singhal *et al.*, “Modern information retrieval: A brief overview,” *IEEE Data Eng. Bull.*, vol. 24, no. 4, pp. 35–43, 2001.
- [142] V. Bush *et al.*, “As we may think,” *The atlantic monthly*, vol. 176, no. 1, pp. 101–108, 1945.
- [143] H. P. Luhn, “A statistical approach to mechanized encoding and searching of literary information,” *IBM Journal of research and development*, vol. 1, no. 4, pp. 309–317, 1957.
- [144] G. Salton, *The SMART retrieval system—experiments in automatic document processing*. Prentice-Hall, Inc., 1971.
- [145] C. Cleverdon, “The cranfield tests on index language devices,” in *Aslib proceedings*. MCB UP Ltd, 1967.
- [146] D. Harman, “Overview of the first text retrieval conference (trec-1),” *NIST Special Publication*, pp. 500–207, 1992.
- [147] Y. Yang and J. O. Pedersen, “A comparative study on feature selection in text categorization,” in *Icml*, vol. 97, no. 412-420. Nashville, TN, USA, 1997, p. 35.
- [148] C. Manning, P. Raghavan, and H. Schütze, “Introduction to information retrieval,” *Natural Language Engineering*, vol. 16, no. 1, pp. 100–103, 2010.
- [149] D. M. Blei and M. I. Jordan, “Modeling annotated data,” in *Proceedings of the 26th annual international ACM SIGIR conference on Research and development in informaion retrieval*, 2003, pp. 127–134.
- [150] Y. Song, S. Pan, S. Liu, M. X. Zhou, and W. Qian, “Topic and keyword re-ranking for lda-based topic modeling,” in *Proceedings of the 18th ACM conference on Information and knowledge management*, 2009, pp. 1757–1760.
- [151] V. Mitra, C.-J. Wang, and S. Banerjee, “Text classification: A least square support vector machine approach,” *Applied soft computing*, vol. 7, no. 3, pp. 908–914, 2007.

- [152] J. Su, J. S. Shirab, and S. Matwin, “Large scale text classification using semisupervised multinomial naive bayes,” in *ICML*, 2011.
- [153] D. E. Rumelhart, G. E. Hinton, and R. J. Williams, “Learning internal representations by error propagation,” California Univ San Diego La Jolla Inst for Cognitive Science, Tech. Rep., 1985.
- [154] J. E. Dennis Jr and R. B. Schnabel, *Numerical methods for unconstrained optimization and nonlinear equations*. SIAM, 1996.
- [155] D. Nguyen, N. A. Smith, and C. Rose, “Author age prediction from text using linear regression,” in *Proceedings of the 5th ACL-HLT workshop on language technology for cultural heritage, social sciences, and humanities*, 2011, pp. 115–123.
- [156] A. Bouaziz, C. Dartigues-Pallez, C. d. Costa Pereira, F. Precioso, and P. Lloret, “Short text classification using semantic random forest,” in *International Conference on Data Warehousing and Knowledge Discovery*. Springer, 2014, pp. 288–299.
- [157] Wikipedia contributors, “Random forest — Wikipedia, the free encyclopedia,” 2022, [Online; accessed 18-July-2022]. [Online]. Available: [https://en.wikipedia.org/w/index.php?title=Random\\_forest&oldid=1094130824](https://en.wikipedia.org/w/index.php?title=Random_forest&oldid=1094130824)
- [158] A. Capozzoli, T. Cerquitelli, and M. Piscitelli, “Enhancing energy efficiency in buildings through innovative data analytics technologies,” *Next Generation Platforms for Intelligent Data Collection; Dobre, C., Xhafa, F., Eds*, pp. 353–389, 2016.
- [159] J. Brownlee, “A gentle introduction to xgboost for applied machine learnings,” February 17, 2021.
- [160] G. Chatzigeorgakidis, S. Karagiorgou, S. Athanasiou, and S. Skiadopoulos, “Fml-knn: scalable machine learning on big data using k-nearest neighbor joins,” *Journal of Big Data*, vol. 5, no. 1, pp. 1–27, 2018.
- [161] Y. Tan, “An improved knn text classification algorithm based on k-medoids and rough set,” in *2018 10th International Conference on Intelligent Human-Machine Systems and Cybernetics (IHMSC)*, vol. 1. IEEE, 2018, pp. 109–113.
- [162] Y. LeCun, Y. Bengio, and G. Hinton, “Deep learning,” *nature*, vol. 521, no. 7553, pp. 436–444, 2015.
- [163] D. H. Hubel and T. N. Wiesel, “Receptive fields and functional architecture of monkey striate cortex,” *The Journal of physiology*, vol. 195, no. 1, pp. 215–243, 1968.
- [164] K. Fukushima and S. Miyake, “Neocognitron: A self-organizing neural network model for a mechanism of visual pattern recognition,” in *Competition and cooperation in neural nets*. Springer, 1982, pp. 267–285.
- [165] Y. LeCun, B. Boser, J. Denker, D. Henderson, R. Howard, W. Hubbard, and L. Jackel, “Handwritten digit recognition with a back-propagation network,” *Advances in neural information processing systems*, vol. 2, 1989.

- [166] Y. LeCun, L. Bottou, Y. Bengio, and P. Haffner, "Gradient-based learning applied to document recognition," *Proceedings of the IEEE*, vol. 86, no. 11, pp. 2278–2324, 1998.
- [167] A. Rios and R. Kavuluru, "Convolutional neural networks for biomedical text classification: application in indexing biomedical articles," in *Proceedings of the 6th ACM Conference on Bioinformatics, Computational Biology and Health Informatics*, 2015, pp. 258–267.
- [168] Y. Kim, "Convolutional neural networks for sentence classification. arxiv 2014," *arXiv preprint arXiv:1408.5882*, 2019.
- [169] X. Zhang, J. Zhao, and Y. LeCun, "Character-level convolutional networks for text classification," *Advances in neural information processing systems*, vol. 28, 2015.
- [170] W.-t. Yih, X. He, and C. Meek, "Semantic parsing for single-relation question answering," in *Proceedings of the 52nd Annual Meeting of the Association for Computational Linguistics (Volume 2: Short Papers)*, 2014, pp. 643–648.
- [171] Y. Shen, X. He, J. Gao, L. Deng, and G. Mesnil, "Learning semantic representations using convolutional neural networks for web search," in *Proceedings of the 23rd international conference on world wide web*, 2014, pp. 373–374.
- [172] E. Grefenstette, P. Blunsom *et al.*, "A convolutional neural network for modelling sentences," in *ACL*, 2014.
- [173] I. H. Witten, E. Frank, and M. Hall, "Data mining: Practical machine learning tools and techniques 3rd edition. vol. 40," *Elsevier*. [https://doi.org/10.1002/1521-3773\(20010316\)](https://doi.org/10.1002/1521-3773(20010316)), vol. 40, no. 6, p. 9823, 2011.
- [174] H. Shimodaira, "Improving predictive inference under covariate shift by weighting the log-likelihood function," *Journal of statistical planning and inference*, vol. 90, no. 2, pp. 227–244, 2000.
- [175] T. Mikolov, J. Kopecky, L. Burget, O. Glembek *et al.*, "Neural network based language models for highly inflective languages," in *2009 IEEE international conference on acoustics, speech and signal processing*. IEEE, 2009, pp. 4725–4728.
- [176] P. Krbec, "Language modeling for speech recognition of czech," 2006.
- [177] J. L. Elman, "Finding structure in time," *Cognitive science*, vol. 14, no. 2, pp. 179–211, 1990.
- [178] D. E. Rumelhart, G. E. Hinton, and R. J. Williams, "Learning representations by back-propagating errors," *nature*, vol. 323, no. 6088, pp. 533–536, 1986.
- [179] T. Mikolov, K. Chen, G. Corrado, and J. Dean, "Efficient estimation of word representations in vector space," *arXiv preprint arXiv:1301.3781*, 2013.

- [180] M. E. Peters, M. Neumann, M. Iyyer, M. Gardner, C. Clark, K. Lee, and L. Zettlemoyer, “Deep contextualized word representations,” in *Proceedings of the 2018 Conference of the North American Chapter of the Association for Computational Linguistics: Human Language Technologies, Volume 1 (Long Papers)*. New Orleans, Louisiana: Association for Computational Linguistics, Jun. 2018, pp. 2227–2237. [Online]. Available: <https://aclanthology.org/N18-1202>
- [181] E. Grave, P. Bojanowski, P. Gupta, A. Joulin, and T. Mikolov, “Learning word vectors for 157 languages,” *arXiv preprint arXiv:1802.06893*, 2018.
- [182] A. Joulin, E. Grave, P. Bojanowski, and T. Mikolov, “Bag of tricks for efficient text classification,” *arXiv preprint arXiv:1607.01759*, 2016.
- [183] R. D. Waters and J. M. Williams, “Squawking, tweeting, cooing, and hooting: Analyzing the communication patterns of government agencies on twitter,” *Journal of Public Affairs*, vol. 11, no. 4, pp. 353–363, 2011.
- [184] H. Kwak, C. Lee, H. Park, and S. Moon, “What is twitter, a social network or a news media?” in *Proceedings of the 19th international conference on World wide web*. ACM, 2010, pp. 591–600.
- [185] wikipedia, “Facebook,” <https://en.wikipedia.org/wiki/Facebook>.
- [186] T. K. Dr. Jakob Jünger, “Facepager,” *An application for generic data retrieval through APIs*, 2019.
- [187] J. M. Kleinberg, “Authoritative sources in a hyperlinked environment,” *Journal of the ACM (JACM)*, vol. 46, no. 5, pp. 604–632, 1999.
- [188] Y. Wang, J. Luo, R. Niemi, Y. Li, and T. Hu, “Catching fire via" likes": Inferring topic preferences of trump followers on twitter.” in *ICWSM*, 2016, pp. 719–722.
- [189] R. Krikorian, “Twitter by the numbers,” *Youtube, September*, 2010.
- [190] B. Suh, L. Hong, P. Pirolli, and E. H. Chi, “Want to be retweeted? large scale analytics on factors impacting retweet in twitter network,” in *Social computing (socialcom), 2010 ieee second international conference on*. IEEE, 2010, pp. 177–184.
- [191] M. A. Bashar and R. Nayak, “Qutnocturnal@ hasoc’19: Cnn for hate speech and offensive content identification in hindi language,” *arXiv preprint arXiv:2008.12448*, 2020.
- [192] S. Mishra and S. Mishra, “3idiots at hasoc 2019: Fine-tuning transformer neural networks for hate speech identification in indo-european languages.” in *FIRE (Working Notes)*, 2019, pp. 208–213.
- [193] B. Wang, Y. Ding, S. Liu, and X. Zhou, “Ynu\_wb at hasoc 2019: Ordered neurons lstm with attention for identifying hate speech and offensive language.” in *FIRE (Working Notes)*, 2019, pp. 191–198.

- [194] A. K. Mishraa, S. Saumyab, and A. Kumara, “Iit\_dwd@ hasoc 2020: Identifying offensive content in indo-european languages,” 2020.
- [195] T. Ezike and M. Sivanesan, “Chrestotes@ hasoc 2020: Bert fine-tuning for the identification of hate speech and offensive language in indo-european languages.” in *FIRE (Working Notes)*, 2020, pp. 175–179.
- [196] J. Han, S. Wu, and X. Liu, “jhan014 at semeval-2019 task 6: Identifying and categorizing offensive language in social media,” in *Proceedings of the 13th International Workshop on Semantic Evaluation*, 2019, pp. 652–656.
- [197] A. Nikolov and V. Radivchev, “Nikolov-radivchev at semeval-2019 task 6: Offensive tweet classification with bert and ensembles,” in *Proceedings of the 13th International Workshop on Semantic Evaluation*, 2019, pp. 691–695.
- [198] D. Wilson and D. Sperber, “On verbal irony,” *Lingua*, vol. 87, no. 1, pp. 53–76, 1992.
- [199] E. N. Hutchens, “The identification of irony,” *ELH*, vol. 27, no. 4, pp. 352–363, 1960. [Online]. Available: <http://www.jstor.org/stable/2872064>
- [200] I. P. Cvijikj and F. Michahelles, “Monitoring trends on facebook,” in *2011 IEEE ninth international conference on dependable, autonomic and secure computing*. IEEE, 2011, pp. 895–902.
- [201] C. Van Hee, E. Lefever, and V. Hoste, “Semeval-2018 task 3: Irony detection in english tweets,” in *Proceedings of The 12th International Workshop on Semantic Evaluation*, 2018, pp. 39–50.
- [202] M. L. McHugh, “Interrater reliability: the kappa statistic,” *Biochemia medica: Biochemia medica*, vol. 22, no. 3, pp. 276–282, 2012.
- [203] M. F. Porter, “Snowball: A language for stemming algorithms,” 2001.
- [204] Y. Zhang, R. Jin, and Z.-H. Zhou, “Understanding bag-of-words model: a statistical framework,” *International Journal of Machine Learning and Cybernetics*, vol. 1, no. 1-4, pp. 43–52, 2010.
- [205] Z. Deng, X. Zhu, D. Cheng, M. Zong, and S. Zhang, “Efficient knn classification algorithm for big data,” *Neurocomputing*, vol. 195, pp. 143–148, 2016.
- [206] F. Pedregosa, G. Varoquaux, A. Gramfort, V. Michel, B. Thirion, O. Grisel, M. Blondel, P. Prettenhofer, R. Weiss, V. Dubourg, J. Vanderplas, A. Passos, D. Cournapeau, M. Brucher, M. Perrot, and E. Duchesnay, “Scikit-learn: Machine learning in Python,” *Journal of Machine Learning Research*, vol. 12, pp. 2825–2830, 2011.
- [207] B. A. Wahiba and B. E. F. Ahmed, “New fuzzy decision tree model for text classification,” in *The 1st International Conference on Advanced Intelligent System and Informatics (AISII2015), November 28-30, 2015, Beni Suef, Egypt*. Springer, 2016, pp. 309–320.

- [208] P. Komarek and A. Moore, “Fast logistic regression for data mining, text classification and link detection,” *Proceedings of NIPS2003*, 2003.
- [209] T. Chen and C. Guestrin, “Xgboost: A scalable tree boosting system,” in *Proceedings of the 22nd acm sigkdd international conference on knowledge discovery and data mining*, 2016, pp. 785–794.
- [210] M. E. Peters, M. Neumann, M. Iyyer, M. Gardner, C. Clark, K. Lee, and L. Zettlemoyer, “Deep contextualized word representations,” in *Proc. of NAACL*, 2018.
- [211] J. Devlin, M.-W. Chang, K. Lee, and K. Toutanova, “Bert: Pre-training of deep bidirectional transformers for language understanding,” *arXiv preprint arXiv:1810.04805*, 2018.
- [212] T. Vu, D. Q. Nguyen, X.-S. Vu, D. Q. Nguyen, M. Catt, and M. Trenell, “NIHRIO at SemEval-2018 task 3: A simple and accurate neural network model for irony detection in Twitter,” in *Proceedings of The 12th International Workshop on Semantic Evaluation*. New Orleans, Louisiana: Association for Computational Linguistics, Jun. 2018, pp. 525–530. [Online]. Available: <https://aclanthology.org/S18-1085>
- [213] L. Rokach, “Ensemble-based classifiers,” *Artificial Intelligence Review*, vol. 33, no. 1-2, pp. 1–39, 2010.
- [214] I. Redko, E. Morvant, A. Habrard, M. Sebban, and Y. Bennani, *Advances in domain adaptation theory*. Elsevier, 2019.
- [215] D. Bahdanau, K. Cho, and Y. Bengio, “Neural machine translation by jointly learning to align and translate,” *arXiv preprint arXiv:1409.0473*, 2014.
- [216] J. Chorowski, D. Bahdanau, D. Serdyuk, K. Cho, and Y. Bengio, “Attention-based models for speech recognition,” *arXiv preprint arXiv:1506.07503*, 2015.

# Appendix A

## List of Publications

### A.1 Journal Papers

1. Anita Saroj, Sukomal Pal (2020).“ [Use of social media in crisis management: A survey](#)”, International Journal of Disaster Risk Reduction, 101584, 2020, Elsevier (SCI, IF-4.6)
2. Anita Saroj, Sukomal Pal, (2021),“ [e-Governance through social media: An Analysis on the use of Facebook and Twitter by Indian Government](#)”, The electronic government an international journal, (Scopus)
3. Anita Saroj, Akash Thakur, & Sukomal Pal, “[Sentiment Analysis on Hindi Tweets during COVID-19 Pandemic](#)” (Under Review: Computational Intelligence (SCI, IF-2.330))
4. Anita Saroj, Sukomal Pal, “[Ensemble-based Domain adaptation on Social Media post for irony identification](#)” (Under Review: Multimedia Tools and Applications (SCI, IF-2.757))

5. Anita Saroj, Rajesh Kumar Munodtiya, & Sukomal Pal, "Emotion Oriented Multitask Learning for Hate and Offensive Content Identification on Social Media" (Under Review: = ACM Transactions on Asian and Low-Resource Language Information Processing (SCI, IF-1.4))

## A.2 Conference Papers

1. Saroj, Anita.,Munodtiya, R. K., & Pal, S. (2018).“ Rule based Event Extraction System from Newswires and Social Media Text in Indian Languages (EventXtract-IL) for English and Hindi Data". In FIRE (Working Notes) (pp. 302-307). (Scopus)
2. Saroj, Anita., Mundotiya, R. K., & Pal, S. (2019). "IRLab@IITBHU at HASOC 2019: Traditional Machine Learning for Hate Speech and Offensive Content Identification". Working Notes of the Forum for Information Retrieval Evaluation (FIRE 2019). CEUR Workshop Proceedings. (Scopus)
3. Saroj, Anita and Pal, Sukomal, "An Indian Language Social Media Collection for Hate and Offensive Speech", Proceedings of the Workshop on Resources and Techniques for User and Author Profiling in Abusive Language, 2–8, 2020. (Scopus)
4. Saroj, Anita and Chanda, Supriya & Pal, Sukomal, "@IITV at SemEval-2020 Task 12 - Multilingual Offensive Language Identification in Social Media using SVM", Proceedings of the International Workshop on Semantic Evaluation (SemEval), 2020. (Scopus)
5. Saroj, Anita and Pal, Sukomal, "Sentiment Analysis on Multilingual Code Mixing Text Using BERT-BASE: participation of IRLab@IIT(BHU) in Dravidian-CodeMix and HASOC tasks of FIRE2020". (Scopus)