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Abstract

Security over the years remains a major concern of all especially the law enforcement agencies. One way of arresting this concern is to be able to reliably detecting deception. Detecting deception remains a difficult task as no perfect method has been found for the detection. Past researches made use of a single cue (verbal or nonverbal), it was found that examining combinations of cues will detect deception better than examining a single cue. Since no single verbal or nonverbal cue is able to successfully detect deception the research proposes to use both the verbal and nonverbal cues to detect deception. Therefore, this research aims to develop a KNN model for classifying the extracted verbal, nonverbal and VerbNon features as deceptive or truthful. The system extracted desired features from the dataset of Perez-Rosas. The verbal cues capture the speech of the suspect while the nonverbal cues capture the facial expressions of the suspect. The verbal cues include the voice pitch (in terms of variations), frequency perturbation also known as jitters, pauses (voice or silent), and speechrate (is defined as the rate at which the suspect is speaking). The Praat (a tool for speech analysis) was used in

extracting all the verbal cues. The nonverbal features were extracted using the Active Shape Model (ASM). The work was implemented in 2015a MatLab. The classification was done using KNN model. KNN performed well with VerbNon dataset with a percentage score of 96.2%.

References

1. Baron-Cohen, Simon, Wheelwright, Sally, Hill, Jacqueline, Raste, Yogini and Plumb, Ian. 2001. The Reading the Mind in the Eyes Test Revision Version: A Study with Normal Adults, and Adults with Asperger Syndrome or High-functioning Autism. *Journal of Child Psychology and Psychiatry*, 241-251, vol.42, no 2.
2. Picornell I.C. 2013. Cues to Deception in a Textual Narrative Context: Lying in Written Witness Statements. A Thesis Submitted for the Degree of Doctor of Philosophy to Centre for Forensic Linguistics, School of Languages and Social Sciences, Aston University.
3. Depaulo B. M., Stone J. I., and Lassiter G. D. 1985. Deceiving and Detecting Deceit. *The Self and Social*. 323-370. New York: McGraw-Hill,
4. Ekman Paul. 1992. An Argument for Basic Emotions. *Journal of Cognition and Emotion*, 169-200, vol 6, no 3/4.
5. Vrij A. 2000. Telling and detecting lies as a function of raising the stakes. In *New Trends in Criminal Investigation and Evidence*, by M.M Kommer, J.F Nijboer and J.M Reintjes C.M Breur, 699-709. Belgium: Antwerpen.
6. Zuckermzn M., Depaulo B. M., and Rosenthal R. 1981. Verbal and Nonverbal Communication of Deception. In *Advances in Experimental Social Psychology*, by Berkowitz L., 1-59. New York: Academic Press.
7. Ekman P., 1985. *Telling Lies: Clues to deceit in the market place, politics and marriage*. New York: Norton.
8. Navarro J., and Schafer R. J. 2001. Detecting Deception. *FBI Law Enforcement Bulletin*.
9. Depaulo B. M., Linsay J. J., Malone B. E., Muhlenbruck L., Charlton K., and Cooper H. 2003. Cues to Deception. *Psychological Bulletin*. 74-112, vol 129.
10. Sporer S. L., and Schwandt B. 2006. Paraverbal Correlates of Deception: A meta-analysis. *Applied Cognitive Psychology*. 421-446, vol. 20.
11. Vrij A. 2008. *Detecting Lies and Deceit: Pitfalls and Opportunities*. Chichester: Wiley.
12. Enos F., Benus S., Cautin R. L., Graciarena M., Hirschberg J., and Shriberg E. 2006. Personality factors in human deception detection: Comparing human to machine performance." *Proceedings of the 9th International Conference on Spoken Language Processing, ISCA 2006*. Pittsburgh, USA.
13. Reid J. and Associates. 2000. *The Reid Technique of Interviewing and INterrogation*. Chicago: John E. Reid and Associates.
14. Zhou L., Twitchell D. P., Qin T., Burgoon J. K., and Nunamaker J. F., Jr. 2003. An exploratory study into deception detection in text-based computer-mediated communication. *Proceedings of the 36th Annual Hawaii International Conference on System Sciences* . Hawaii, 2003.
15. Rothwell J., Bandar Z., O'Shea J., and McLean D. 2006. Charting the behavioural state of a person using a Backpropagation Neural Network. *Journal of Neural Computing and Applications*.
16. Almela A., Valencia-Garcia R., and Cantos P. 2012. Seeing through Deception: A Computational approach to deceit detection in written communication." In *proceedings of the*

Workshop on Computational Approaches to Deception Detection. Avignon, France. 15-22.

17. Bachenko Joan, Eileen Fitzpatrick and Michael Schonwetter. 2008. Verification and implementation of language based deception indicators in civil and criminal narratives. proceedings of the 22nd International Conference on Computational Linguistics. Manchester, U.K. 41-48.

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