

Database for Micro-Expressions Among Indians

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Abstract

Background: Face is the index of mind. Facial expressions and micro-expressions are important nonverbal means of communication of true intent. They are hardly identified and understood among the people. It plays vital role in understanding true intent of human interactions and behavior. There are limited databases available on micro-expressions among Indians. The aim of the project was to build a database for micro expressions among Indians. **Material and Methods:** The study is a descriptive qualitative cross-sectional observational study designed after literature survey. Institutional Ethical clearance was obtained from Sri Devaraj Urs Academy of Higher Education and Research. Informed 112 Indian subjects were materials of study, selected by random sampling for the database. They participated after giving informed consent. Emotionally valent videos which were validated were played. Participants were instructed to watch these videos without displaying any facial expressions on the face. Face was being recorded while they watched. Later, micro expressions were identified, clipped and compiled into a Database. **Results:** Micro expression databases are very limited. Indian micro expression database is first of its kind. The Indian Micro Expression Database [IMED] was compiled from the videos obtained from the face micro-expressions recorded. **Conclusion:** Micro expressions databases are very good cue for lie detection, in improving human interactions be it healthcare, disease diagnosis, business, academic, social or familial.

Keywords: Micro expressions, Indians, Face, Database

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INTRODUCTION

Micro expression is a brief facial movement that reveals the true emotion of an individual that he or she intends to conceal. [1]. An individual intends to hide it badly, but gets leaked in non verbal mode. These are of low intensity and last for less than 0.5 seconds.^[1] Facial expressions are said to be universal but change from region to region based on the ethnicity, cultural background and genetic pre disposition. Micro-expressions are also similar in that they are leakages of the basic expressions i.e., anger, contempt, disgust, happiness, fear, sadness and surprise.^[2-4]

We find handful of micro expression databases in the world. Therefore, an attempt is made to develop a micro expression database among Indians through this project.

In intensifying, neutralizing or masking a facial expression, an individual may hold or interrupt the expression from displaying. Basically, the original emotion is very finely hidden. Even with facial expression manipulation techniques well applied, there will be some cues of expressions that leaks which may hardly last for few mili-seconds or seconds during an interaction. [Ekman et al., 2003]. These expressions which leak for not more than 1/5th to 1/25th of a second, are very difficult to identify are called micro expressions.^[5,6]

At-least some of the micro expressions are result of interruptions; where the felt facial expressions are interfered with. [Ekman et al., 2003] Micro expressions can be identified only on keen observations by the investigator. The observer should be vigilant to note any of these micro expressions which are leaked during a conversation or an interaction.^[7,8]

Inconsistencies and discrepancies in speech, body movement, voice-tone, speed, etc. are important clues for understanding the intent of an individual. [Ekman et al., 2003]. Even though micro expressions are good source of information regarding identification of deceit, the micro expressions easily go unnoticed. There are many factors important and involved in micro-expressions difficult to identify even after special training since they are very brief and subtle expressions. [Li et al., 2013].^[9,10]

Facial micro expressions are one of the unlocking key to emotions that are usually concealed by an individual. [Liong et al., 2014]. Therefore, Facial expressions and micro-expressions may be a hint to detect the concealed emotions of an individual.^[11]

This may be of utility in the world of commerce, communications, medical illness diagnosis, also may be of utility to assess a student attention, cognition, performance., etc.

There are databases available for micro-expression by Li. et al., (2013) which is Spontaneous Micro-expression Database

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(SMIC), which includes 164 micro-expression video clips elicited from 16 participants. Developed in Centre for Machine Vision Research, Finland. [Li et al., 2013]

CASME I, and CASME II developed by Yan et al., (2013, 2014) in China which has 247 micro expressions selected and labeled from 35 participants [Yan et al., 2014].

Lacunae in Literature: There are hardly few databases of micro expressions among humans across the world which were collected from European and Chinese mongoloid races. There are hardly any databases available of micro expressions among Indians.

Need for the study: Building a valid, authentic Database for facial expression and micro expression of Indian Races may be the need of the hour for application into various fields of medicine like psychiatry, psychology, aesthetics, plastic surgery, automatic facial analysis software development, lie detection, criminology, etc.

MATERIALS AND METHODS

With statistical sample size estimation derived from data in the previous literature survey, we had arrived at a sample size of 112 Indian subjects required in the age group of 18-40years, who were healthy and not undergone any facial palsy, facial surgeries in the past.

Study was implemented only after getting Institutional Ethical Clearance [IEC] from the University, all the participants were given information sheet about the project, queries were answered in the language known and understandable to each of them. Preliminary details were collected after obtaining informed consent from the participant. Then, if they met inclusion and exclusion criterias, they were selected for the study.

The participant was instructed to conceal his or her expressions while watching the validated emotionally valent videos which were shown to them one after another using a computer Desktop. The videos which were played lasted from 1 minute to 3minute videos. Videos were validated priorly before the experiment from 10 volunteers from varied background of different age groups upto 60 years. Videos were validated for basic emotions -Anger, Contempt, Disgust, Fear, Happiness, Sadness and Surprise. While they are watching the videos, their face was being recorded with a Webcam Logitech C920HD at a 30fps speed, FHD 1080p; with HD Auto-Focus and Automatic Light Correction.

Participants were instructed to give a self-report after playing each video about what they felt while they watched the video. But not to reveal/express anything on the face while watching the videos. Any queries regarding the self-report or experiment were answered before the beginning of the experiment.

The experiment took 20 minutes in total for each participant to complete watching and assessing the videos.

Experimental Set up:

Consists of a computer desktop placed in front of a participant at a distance of 45cm.

Webcam was placed on the desktop. The camera video recording was at the speed of 30fps and 1080p resolution. The camera is connected to investigator's computer behind the

studio. Only one participant was taken at a time.

Participant's were not interrupted in any manner once the experiment begun. They were allowed undisturbed to get themselves involved well and micro expressions were elicited. Then recorded videos were classified by a Paul Ekman Company METT trained investigator, videos were clipped and finally compiled into a database.



[Photo published with consent]. For representation purposes only.

RESULTS

The Database for Micro expressions contains videos of 103 participants from different parts of India. Mean age of the participants was 20 years. 60 percent of participants were from south zone of India.

We observed that

- A. Few participants had a single expression for masking all unwanted emotions. Most of the participants smiled and masked their true emotion. Esp. sadness, disgust, contempt, negative emotions and related micro-expressions.
- B. Happiness being a positive expression, it was leaked easily during the experiment. From this we can conclude that happiness is what is well understood and leaked easily.

Table 1: to show the mean time required for leakage of micro-expressions among participants

Expression	Micro expressions	% participants	Mean time	Video Total time
Anger	62/112	55.36	0.05 sec	1.01 minute
Contempt	32/112	28%	0.45 sec	1.34 minutes
Disgust	34/112	30.36	0.32 sec	0.38 minute
Fear	59/112	52.68	0.08 sec	0.10 minute
Happiness	108/112	96.43	0.26 sec	0.59 minutes
Sadness	93/112	83	1.19 sec	2.50 minutes
Surprise	98/112	87.5	0.76 sec	1.36 minutes

Table 2: Indian Micro-expression Database[IMED] components

	IMED[Present]
No. of Subjects	103 valid out of 112 [80 females+32 males]
Samples	571 video clips
Frames per second	30 fps
Posed/Spontaneous/Evoked	Spontaneous
Emotions involved	7

The micro expression database is also available for research uses under the website address

<http://www.indianmicroexpressiondatabase.com> which can be accessed by obtaining a license key from the author.

DISCUSSION

Table 3: To show comparison of existing databases and present micro-expression database

	CASME 2 [Yan et al., 2014]	SMIC Database [Li et al., 2013]	IMED[Present]
No. of Subjects	19 Valid	16	103 valid out of 112
Samples	195	164	571 video clips
Frames per second	60	100fps	30 fps
Posed/Spontaneous/Evoked	Spontaneous	Spontaneous	Spontaneous
Emotions involved	7	6	7

Previous databases of micro expressions namely SMIC, CASME 1 and 2 both have better frame per second capacity to detect micro expressions. The drawback is number of subjects are too limited and are mainly developed in Finland and China respectively. These databases are different from the Indian dravidian and aryan races even-though the expressions are considered as universal.

Present developed micro-expression database is available online under the web address <http://www.indianmicroexpressiondatabase.com>. The database will be of greater utility to understand subtle minor cues to facial deceit which is well practiced amongst humans during an interaction. The database will be of greater utility in student-teacher interactions, criminal interrogations, psychology counsellors, researchers in the field of developing Man-Machine interface, robotics, etc.

CONCLUSION

For micro expression the database available are very limited and are done on very limited number of participants. The present database [IMED], even-though the frame per second speed is limited, the number of video clips showing the micro expressions are a large number of around 571.

The micro expressions database among Indians is compiled with the minimal available resources. Micro expressions can be better elicited and studied using high speed cameras with higher frame speed and larger sample size with male and female participants in equal proportions. A comparison may be done to observe the difference in emotional quotient among both the genders. Micro expressions are of high utility to detect

lies, to identify the disparity between the thought and talk which may be crucial to in human interactions, the sales and business progression.

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Conflicts of interest

There are no conflicts of interest.

REFERENCES

- Ekman, P., Friesen, W. V., (1969). Non-verbal Leakage and clues to Deception. *Psychiatry:Journal For The Study of Interpersonal Processes*, Vol.32(1), Pp 88-105.
- Bettadapura, V., (2012). Face Expression Recognition and Analysis: The state of Art. pp 1-27. <https://arxiv.org/abs/1203.6722>.
- Ekman, P., Friesen, V.W., (2003). *Unmasking the Face: A guide to recognizing emotions from facial clues*. Malor books. Pp 1-202.
- Happy, S.L., Patnaik, P., Aurabindo, R., Guha, R., (2016). The Indian Spontaneous Expression Database for Emotion Recognition. *IEEE transactions on Affectiva Computing*, pp 1-13; <https://arxiv.org/ftp/arxiv/papers/1512/1512.00932.pdf>.
- Li,X., Pfiser,T., Huang,X., Zhao,G., Pietikainen,M., (2013). A spontaneous Micro expression Database: Inducement, Collection, Baseline.pp1-6. <https://tomas.pfister.fi/files/li2013microexpressions.pdf>.
- Liong, S.T., See, J., Phan, R.C.W., Le, N.A.C., Oh, Y.H., Wong, K., (2014). Subtle Expression Recognition Using Optical Strain Weighted Features. *Computer Vision –ACCV Workshops*. pp 644-657.

7. Tian, L.Y., Kanade, T. & Cohn, J.F., (1998). Cohn-Kanade AU-coded Facial Expression Database. <https://www.ri.cmu.edu/project/cohn-kanade-au-coded-facial-expression-database>.
8. Tian, L.Y., Kanade, T., Cohn, J.F., (2000). Recognizing Lower facial action units for facial expression Analysis. pp1-7 pages. http://www.pitt.edu/~emotion/fulltext/2000/Tian_Recognizing.pdf.
9. Tian, L.Y., Kanade, T., Cohn, J.F., (2001). Recognizing Action Units for facial expression Analysis' IEEE Trans Pattern Anal Mach. Intell.,23(2), pp 97-115.
10. Yan, W.J., Liu, Y.J., Qi, W., Fu, X., (2014). For Micro-expression recognition: Database and Suggestions. Neurocomputing, pp 1-9.
11. Yan,W.J., Li,X., Wang, S., Zhao, G., et al., (2014). CASME II: An Improved Spontaneous Micro-expression Database and the Baseline Evaluation. Plos One,Vol.9(1), pp1-8.