

Analyzing effect of mood of a person on keystroke dynamics and mouse dynamics for imposter detection

Keystroke dynamics is a behavioral biometric which is used to authenticate a user. Primarily, two features i.e. hold time of an individual key and the latency of the consecutive keystrokes are used for authentication.

Mouse Dynamics is another behavioral biometric which is used to authenticate a user. A mouse-stroke is defined to be the set of points traversed from one click to the next and a set of one or more strokes are used in order to verify a user.

The mood of a person affects these two behavioral biometrics. So, analysis of mood of a person may prove to be very crucial while authentication using keystroke or mouse dynamics.

Submissions:

- Source code, executable, readme.txt, final and intermediate results
- Presentation and report
- You can use MATLAB/Python

Evaluation Criteria:

- Data acquisition (40%)
- Analysis of problem (20%)
- Results and analysis (20%)
- Presentation (20%)

Task:

Each group has to perform the following task:

1. Acquire data of keystroke dynamics
2. Acquire data of mouse dynamics
3. You need to collect the data of your group and also from the next group of the ***modality assigned to you***. i.e. k^{th} group will collect the data from $(k+1)^{\text{th}}$ group. Group 18 will collect data from the 1st group. So, you will have the data of 9-10 users of your assigned modality as per **Table 1**.
4. One of the following tasks has to be done as mentioned in the Table 1
 - i. Authenticate the user by training and testing your assigned classifier by the data acquired for *continuous authentication data*. Use five-fold validation to report results.
 - ii. Authenticate the user by training and testing your assigned classifier by the *neutral, happy and sad* mood data. Use five-fold validation to report results.

Perform the above-mentioned task using specified classifiers and modality as mentioned in *Table-1*.

Table-1

Problem No.	Classifier	Task	Modality
1	Guassian Mixture Model	i	Keystroke dynamics
2	Guassian Mixture Model	i	Mouse dynamics
3	Self Organizing Map	i	Keystroke dynamics
4	Self Organizing Map	i	Mouse dynamics
5	One class Support Vector Machine	i	Keystroke dynamics
6	One class Support Vector Machine	i	Mouse dynamics
7	Naïve-Bayes Classifier	i	Keystroke dynamics
8	Naïve-Bayes Classifier	i	Mouse dynamics
9	K- Nearest Neighbor Classifier	i	Keystroke dynamics
10	K- Nearest Neighbor Classifier	i	Mouse dynamics
11	Artificial Neural Network	ii	Keystroke dynamics
12	Artificial Neural Network	ii	Mouse dynamics
13	Support Vector Machine	ii	Keystroke dynamics
14	K- Nearest Neighbor Classifier (k- NN)	ii	Mouse dynamics
15	Guassian Mixture Model	ii	Keystroke dynamics
16	Self Organizing Map	ii	Mouse dynamics
17	One class Support Vector Machine	ii	Keystroke dynamics
18	Naïve-Bayes Classifier	ii	Mouse dynamics

References:

1. Perveen, N.; Gupta, S.; Verma, K., "Facial expression recognition using facial characteristic points and Gini index," in Engineering and Systems (SCES), 2012 Students Conference on , vol., no., pp.1-6, 16-18 March 2012
doi: 10.1109/SCES.2012.6199086
2. King, Davis E. "Max-Margin Object Detection." arXiv preprint arXiv:1502.00046(2015).
3. Viola, Paul, and Michael Jones. "Rapid object detection using a boosted cascade of simple features." Computer Vision and Pattern Recognition, 2001. CVPR 2001. Proceedings of the 2001 IEEE Computer Society Conference on. Vol 1. IEEE, 2001.
4. Rajat Kumar Das, Sudipta Mukhopadhyay and Puranjoy Bhattacharya "Continuous multimodal biometric authentication for PC and handheld devices", IETE Journal of Education, pp 59-69 vol. 52, Issue 2, July-December 2011
5. Rajat Kumar Das, Sudipta Mukhopadhyay, and Puranjoy Bhattacharya. "User Authentication Based on Keystroke Dynamics." IETE Journal of Research 60.3 (2014): 229-239.
6. Clint Feher, Yuval Elovici, Robert Moskovitch, Lior Rokach, Alon Schclar, User identity verification via mouse dynamics, Information Sciences, Volume 201, 15 October 2012, Pages 19-36, ISSN 0020-0255,
<http://dx.doi.org/10.1016/j.ins.2012.02.066>.
7. Shen, Chao, Zhongmin Cai, and Xiaohong Guan. "Continuous authentication for mouse dynamics: A pattern-growth approach." IEEE/IFIP International Conference on Dependable Systems and Networks (DSN 2012). IEEE