A Proposal for Continuous and Silent User Authentication Through Mouse Dynamics and Explainable Deep Learning

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Summary:

Over the years, the number of compromised accounts dramatically increased. Many types of authentication methods have been introduced to avoid this type of attack. In particular, recently taken hold biometric-based such as physical-biometric and behavior-biometric. The idea at the bottom of the last technique is that each person has a unique behavior. Starting from the touch dynamics, and keyboard dynamics nowadays, one of the most promising investigation areas is currently represented by mouse dynamics. Opposite to the other techniques, mouse dynamics require simpler hardware to capture the biometric data without using sensitive data from the users. In this paper, we propose an approach for continuous and silent user authentication based on mouse dynamics and explainable deep learning. We generate a set of images starting from mouse dynamics, and we input a deep learning model to discriminate between legitimate and malicious users. We also propose to adopt the Gradient-weighted Class Activation Mapping, to allow highlighting the areas of the images which are responsible for a specific legitimate/attack prediction, thus providing explainability behind the model classification. The preliminary experimental analysis based on ten different users shows that the proposed method can be promising in silent and continuous user authentication.

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