

# Towards Implicit Visual Memory-Based Authentication

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Selecting and remembering secure passwords puts a high cognitive burden on the user, which has adverse effects on usability and security. Authentication schemes based on implicit memory can relieve the user of the burden of actively remembering a secure password. In this paper, we propose a new authentication scheme (MooneyAuth) that relies on implicitly remembering the content of previously seen Mooney images. These images are thresholded two-tone images derived from images containing single objects. Our scheme has two phases: In the enrollment phase, a user is presented with Mooney images, their corresponding original images, and labels. This creates an implicit link between the Mooney image and the object in the user's memory that serves as the authentication secret. In the authentication phase, the user has to label a set of Mooney images, a task that gets performed with substantially fewer mistakes if the images have been seen in the enrollment phase. We applied an information-theoretical approach to compute the eligibility of the user, based on which images were labeled correctly. This new dynamic scoring is substantially better than previously proposed static scoring by considering the surprisal of the observed events. We built a prototype and performed three experiments with 230 and 70 participants over the course of 264 and 21 days, respectively. We show that MooneyAuth outperforms current implicit memory-based schemes, and demonstrates a promising new approach for fallback authentication procedures on the Web.