# PACCS

**Prediction and Analysis of Cyber Scenarios**

Predicting Mental States with Keystrokes

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*Predicting Mental States with Keystrokes*

## OVERVIEW

PACCS is an Assured Information Security (AIS) internal research and development effort focused on predicting cognitive load using behavioral biometrics, such as keystrokes. AIS developed novel deep learning models to accurately predict changes in cognitive load using only keystrokes. These models were developed from data collected during a small pilot study.

## Research Methodology

Fourteen subjects participated in an experiment where cognitive load varied as subjects were asked to remember different sequences of numbers while performing typing tasks. The experiment was designed to minimize interference between the memorization and typing tasks. EEGs were used to collect ground-truth data.

## Results

A generalized model that predicts workload across all users proved infeasible; however, models that were trained for an individual user were able to successfully distinguish between four levels of cognitive load: baseline, low, medium and high. The accuracy for distinguishing between all four states is 69.4%, while distinguishing between baseline and high workload is 84.8%. Additional data is required to further refine the modules and validate the results.

### KEY FEATURES

- Remote cognitive state detection
- No additional or expensive hardware required
- Discrete and unobtrusive



**Interested in Learning More?**

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**About Assured Information Security (AIS)**

AIS is a cyber and information technology company that plays a leading role in supporting critical cyber operations for the United States Department of Defense and Intelligence Community. AIS employs expert engineers and research scientists across the United States.