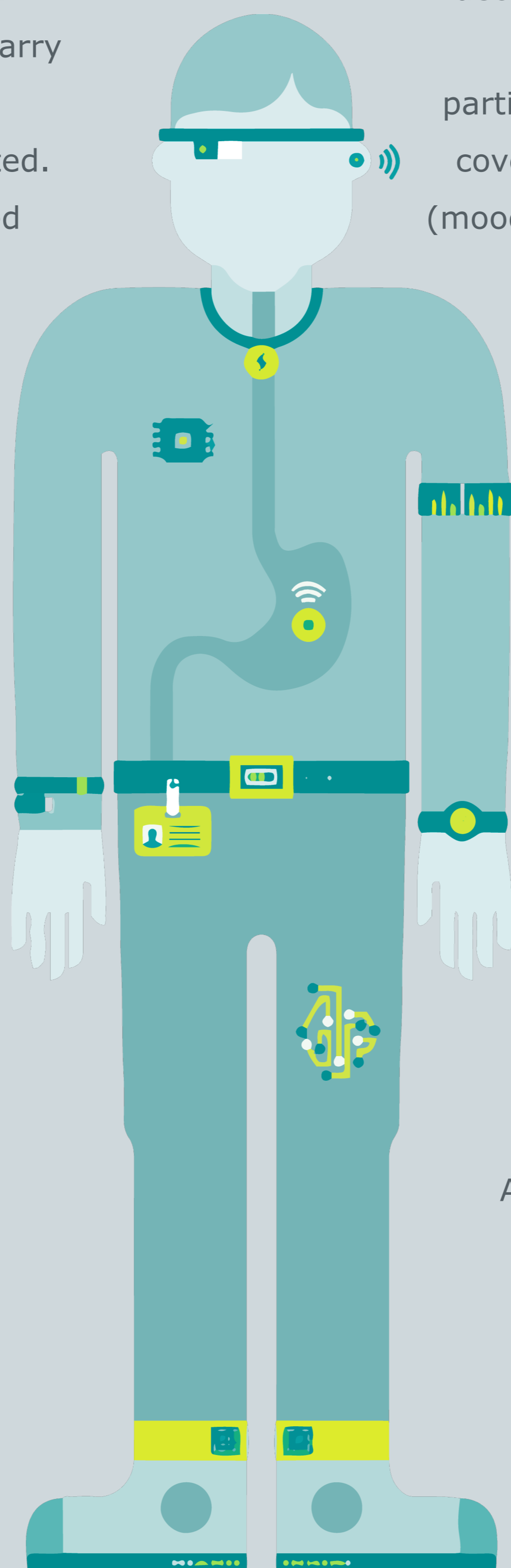


# Behavior-based authentication

Feature engineering and performance evaluation based on large user profiles

## Gait-based authentication as a new biometric factor

Since smartphones are equipped with a variety of sensors, they can measure the environment and behavior surrounding the phone. While people carry their phones closely attached to the body, data corresponding to the body movement is generated. Research shows that these signals can be shaped to a unique signature for the phone's holder.



## Large datasets challenge robustness of authentication

An increase in the number of subjects significantly decreases authentication performance. The project's training set contains data from more than 50 participants. Data was collected for up to one year to cover most gait variations according to physiological (mood, general gait abnormalities) and environmental nature (clothing, surfaces, obstacles).



## Future SOC Lab resources are needed to process data

An evaluation based on such a dataset needs additional resources, especially RAM. By parallel computing the whole analysis is accelerated. Specific project tasks were the calculation of performance metrics and evaluation of best feature combinations and model parameters, including best model selection.

## EER improvement by feature evaluation

An evaluation that comprises a realistic picture of people's walking behavior over a long time was conducted. Feature combinations and model parameters were adjusted to gain the best metrics. An improvement of 2% for the equal error rate (EER) was achieved, while also using less features.

Project Partner



Project Participants

Patrik Fiedler, Uwe Leppler, Leon Lowitzki,  
Marvin Mirtschin, Stephan Schultz, Vera Weidmann

