

Smart Home: Comfort

Yunfei Hu, Xinyao Xu, Xinyue Liu

Introduce

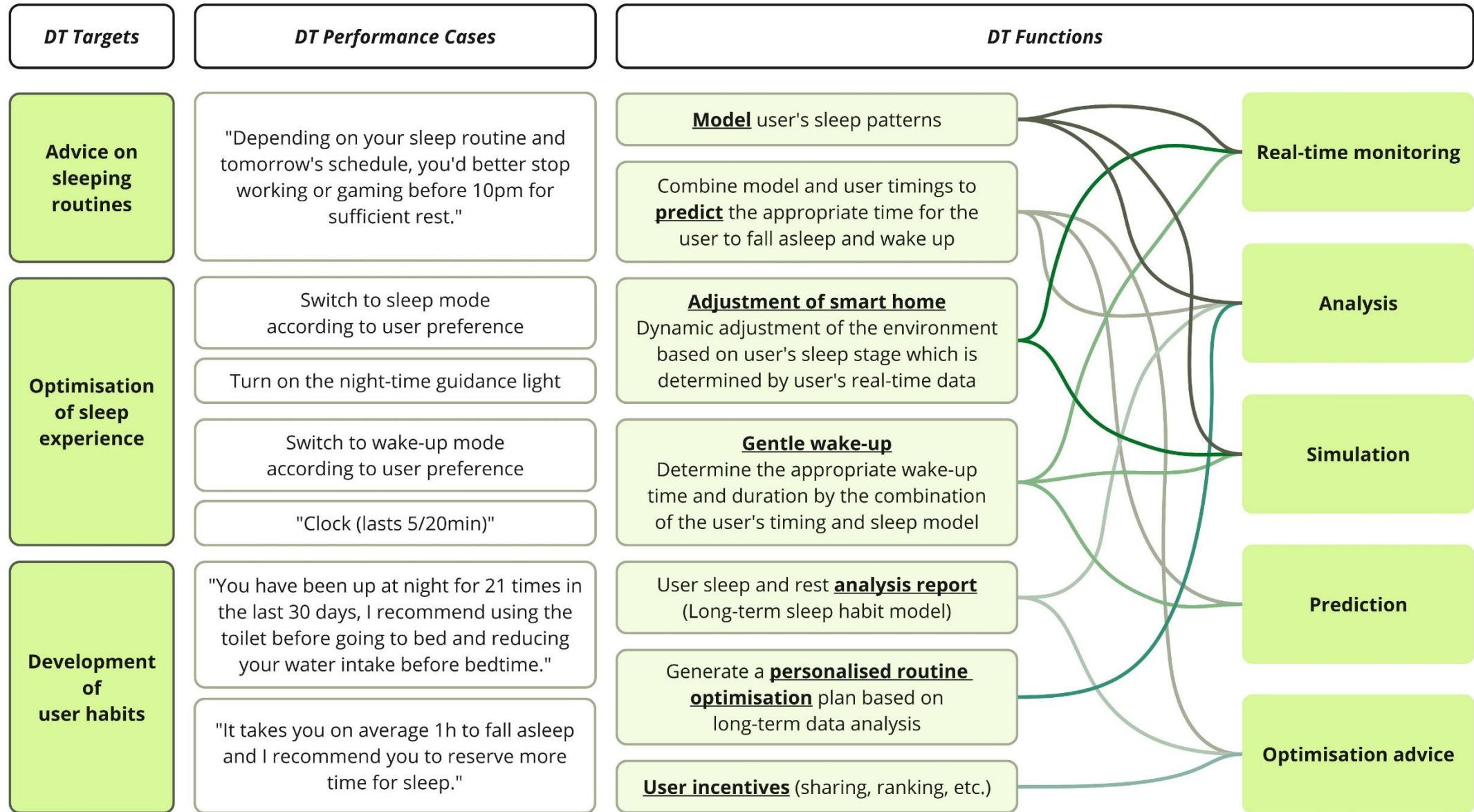


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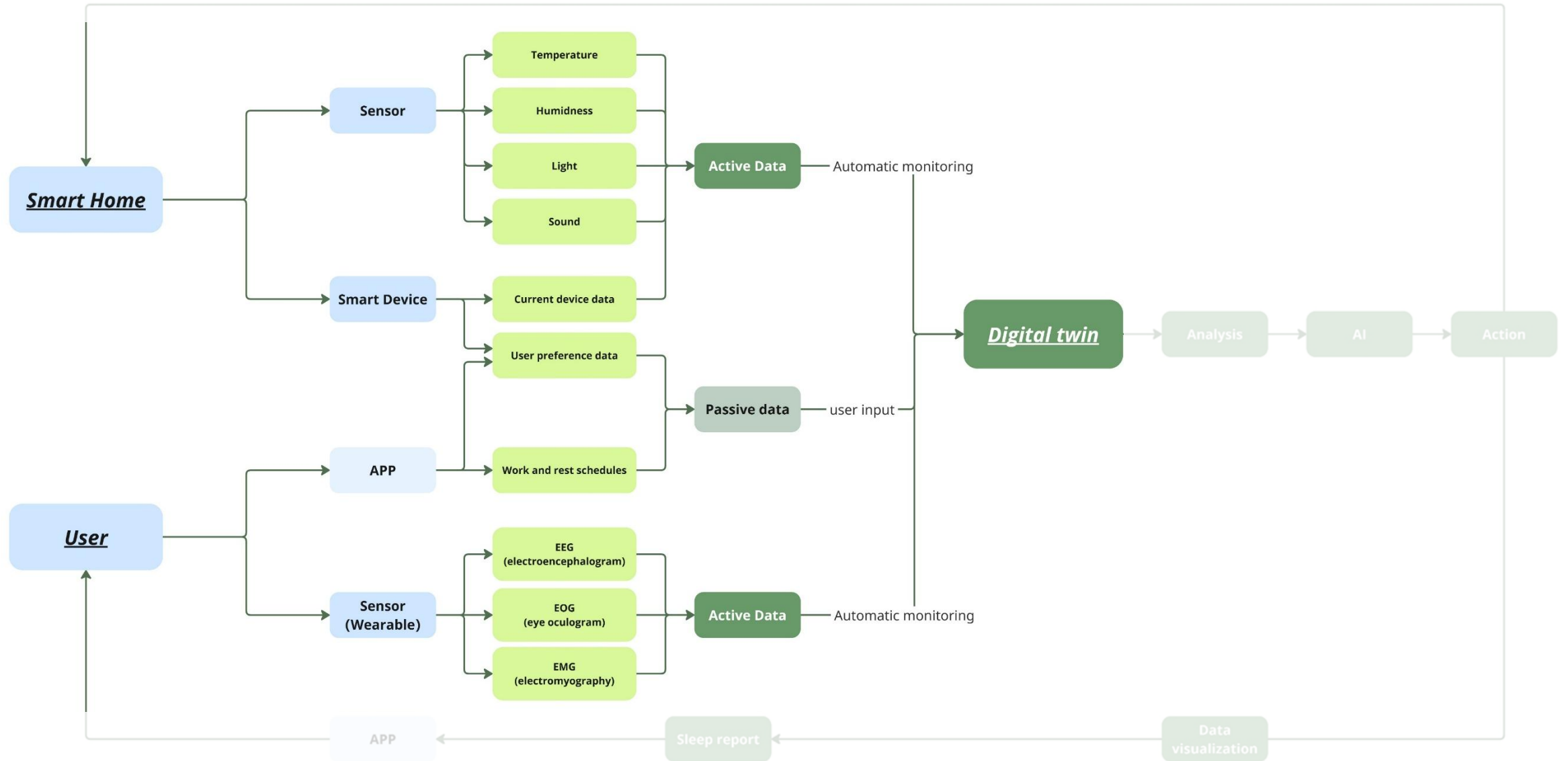
The Self Sculptor

The Self Sculptor helps you actively shape and mold your own behavior and mindset over time, almost like an artist working on a sculpture. It suggests incremental tweaks, showing how small changes in attitude or action lead to big transformations in the long run.

The Self-Sculptor encourages you to mold your habits like clay. "What if we chisel away at this behavior a little each day?" it asks, guiding you in making gradual changes. You see potential transformations take shape, and it empowers you with the understanding that you have the tools to sculpt your life into something beautiful.

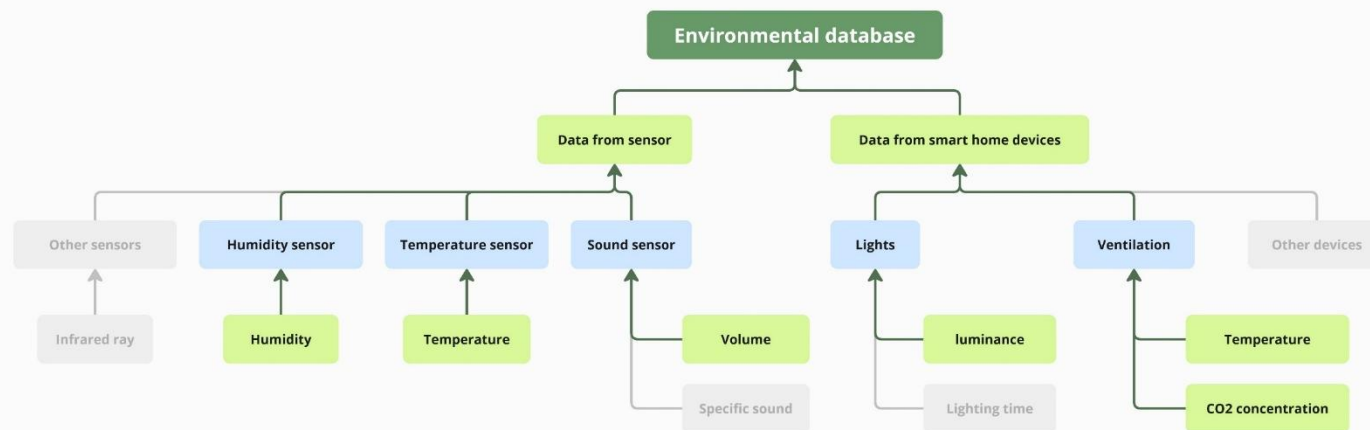


Data flow



Active Data

Home environmental monitoring data, Sleep monitoring data



Urban Big Data Centre

Home Datasets Data Providers Research Themes UBDC Website Login

UBDC / Data Providers / Urban Big Data Centre (UBDC) / **Sensor-Enhanced Housing...**

Provider

Dataset Research Themes

Sensor-Enhanced Housing Survey Data for Urban Heat Investigation open data [REQUEST DATA](#)

Environment and CL... Heat Wave Indoor Air Quality Indoor Relative Hum... Indoor Temperature

Data and Metadata

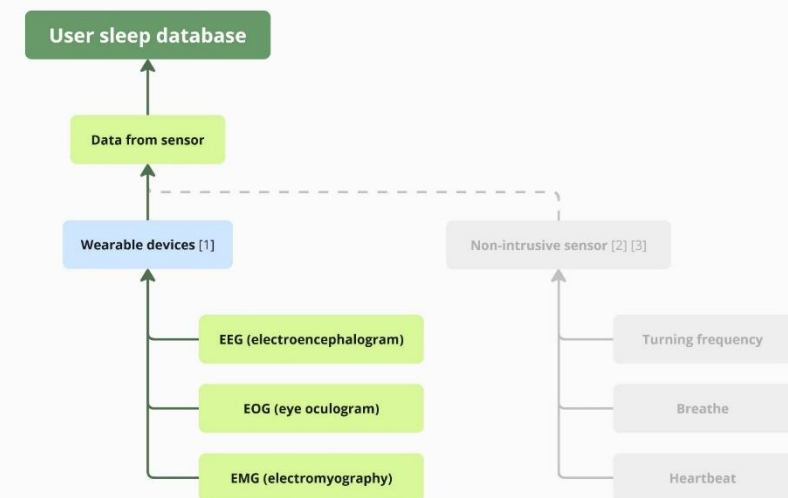
Sensor-Enhanced Housing Survey Data for Urban Heat Investigation ...
During the summer months from July 2023 to September 2023 (including a mini...
[MORE INFORMATION](#) [DOWNLOAD](#)

Urban Big Data Centre (UBDC)
The Urban Big Data Centre (UBDC) is a

The sensors were used to capture a range of environmental parameters in homes, including air temperature, relative humidity, air quality, noise condition and light condition. Validation procedures were implemented to ensure the accuracy and quality of the air temperature data and relative humidity data by comparing records between survey sensors and commercial sensor (HOBO MX1101 Wireless Temperature and Humidity Data Logger - Optional Remote Monitoring).

Air temperature, relative humidity, air quality, noise condition and light condition

Sensor-Enhanced Housing Survey Data for Urban Heat Investigation open data. (n.d.). *Dataset - UBDC Data Catalogue*. <https://doi.org/10.20394/flvpqm4v>



OpenNEURO

Bitbrain Open Access Sleep Dataset

Our dataset includes:

1. **PSG recordings** from 128 nights (files ending with "psg_eeg.edf"),
2. **Wearable EEG recordings** from the same nights (files ending with "headband_eeg.edf"),
3. **Human-consensus sleep stage labels**, obtained from the PSG recordings ("stage_hum" in the PSG data's event files),
4. **AI-generated sleep stage labels**, separately obtained from PSG recordings and from wearable EEG recordings ("stage_ai" in both the PSG and headband data's event files),
5. **Further meta data** for each recording (i.e., the participants' age, sex, and BMI, provided in the file "participants.tsv")

Sleeping Data of EEG, EOG and EMG

Eduardo López-Larraz and María Sierra-Torralba and Sergio Clemente and Galit Fierro and David Oriol and Javier Minguez and Luis Montesano and Jens G. Klinzing (2025). Bitbrain Open Access Sleep Dataset. OpenNeuro. [Dataset] doi:10.18112/openneuro.ds005555.v1.1.0

Passive Data

Home environment preferences, Work and rest schedules

Model user's sleep patterns

Combine model and user timings to predict the appropriate time for the user to fall asleep and wake up

Adjustment of smart home

Dynamic adjustment of the environment based on user's sleep stage which is determined by user's real-time data

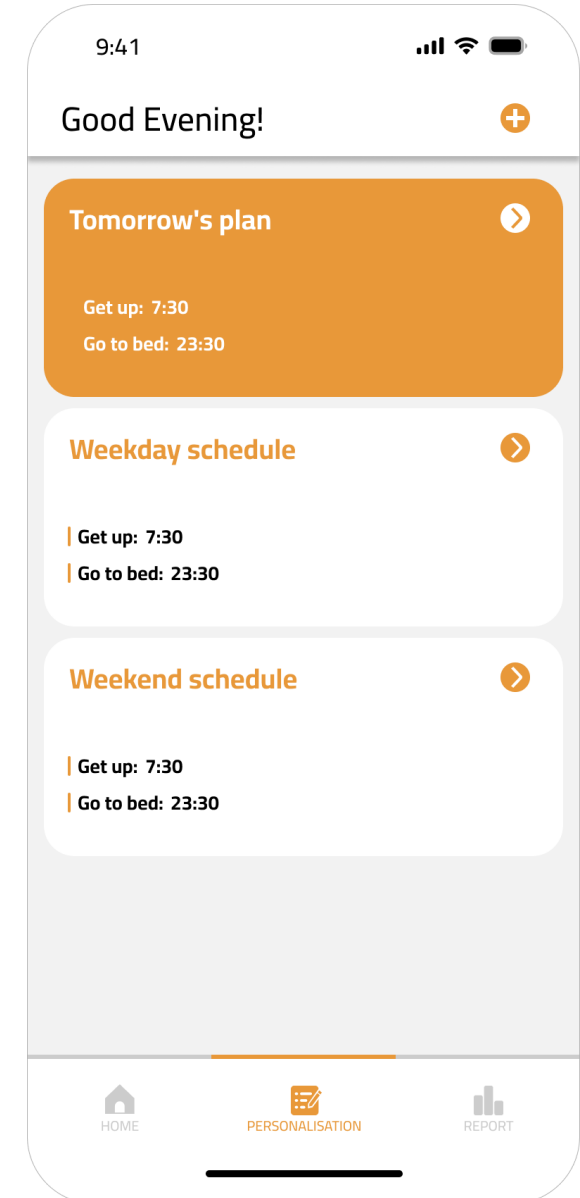
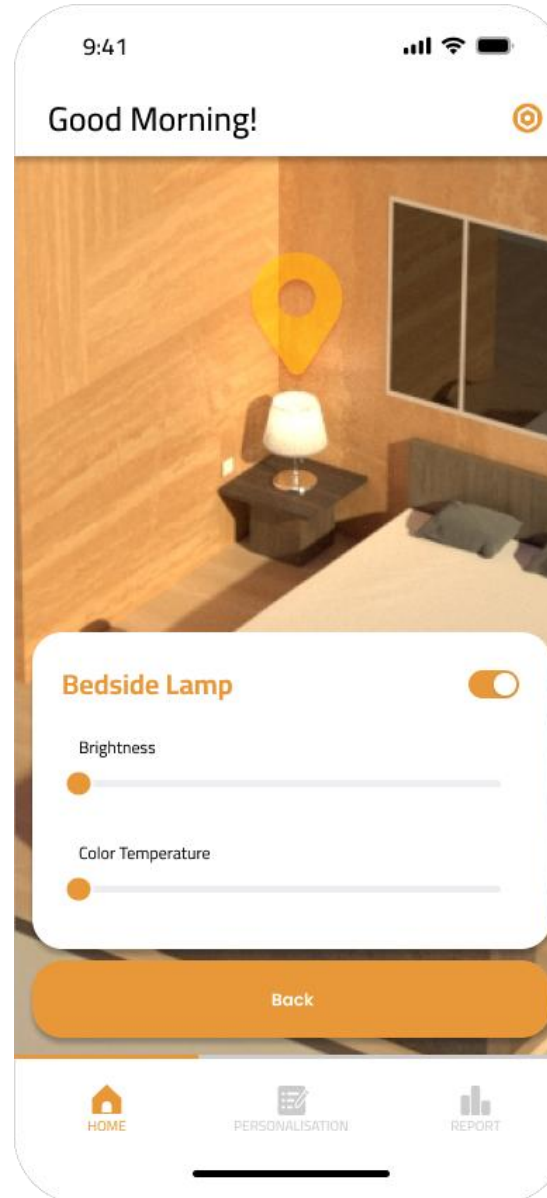
Gentle wake-up

Determine the appropriate wake-up time and duration by the combination of the user's timing and sleep model

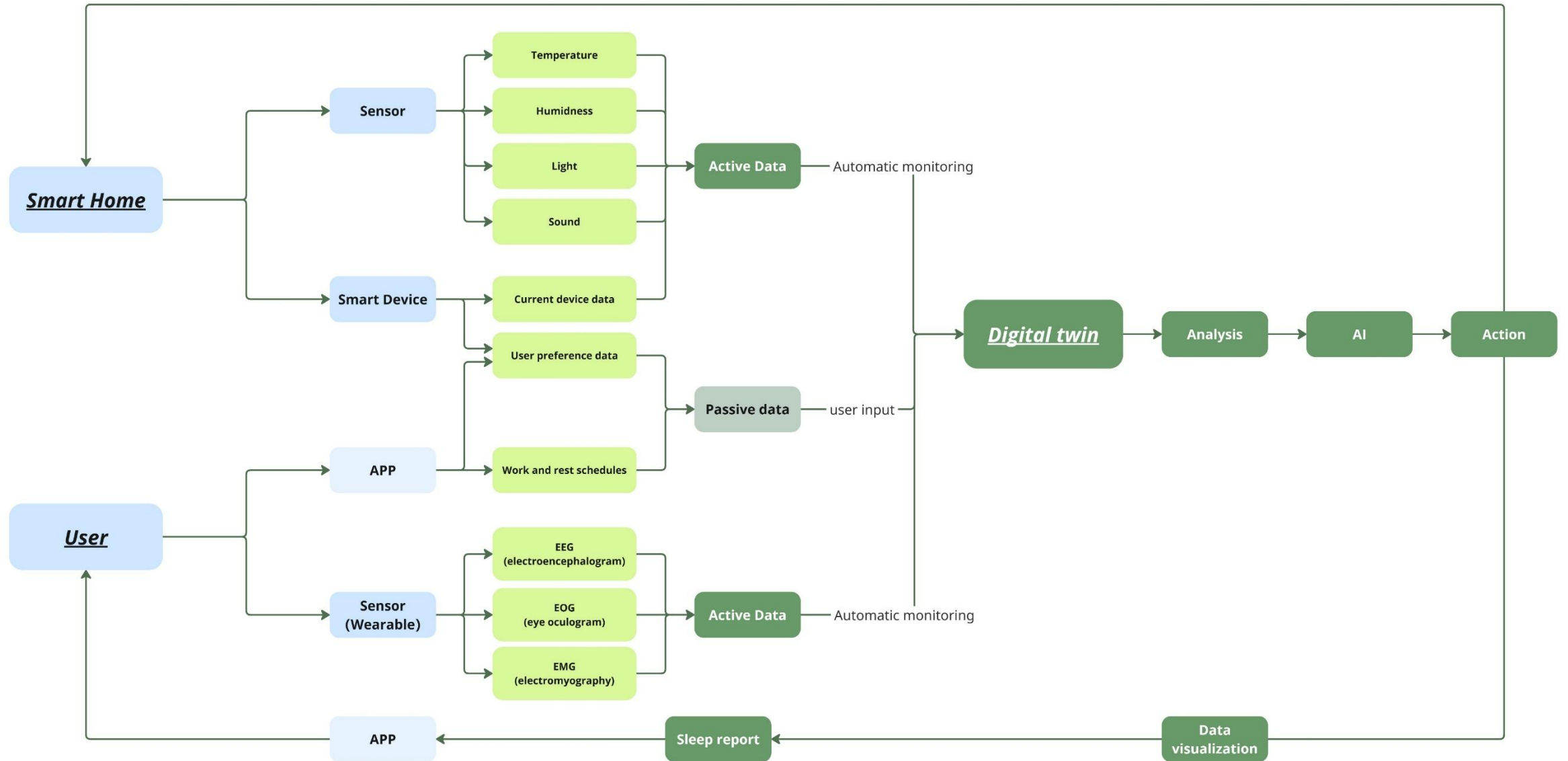
User sleep and rest analysis report
(Long-term sleep habit model)

Generate a personalised routine optimisation plan based on long-term data analysis

User incentives (sharing, ranking, etc.)



Data flow



Prototype

Room's physical models and digital twin

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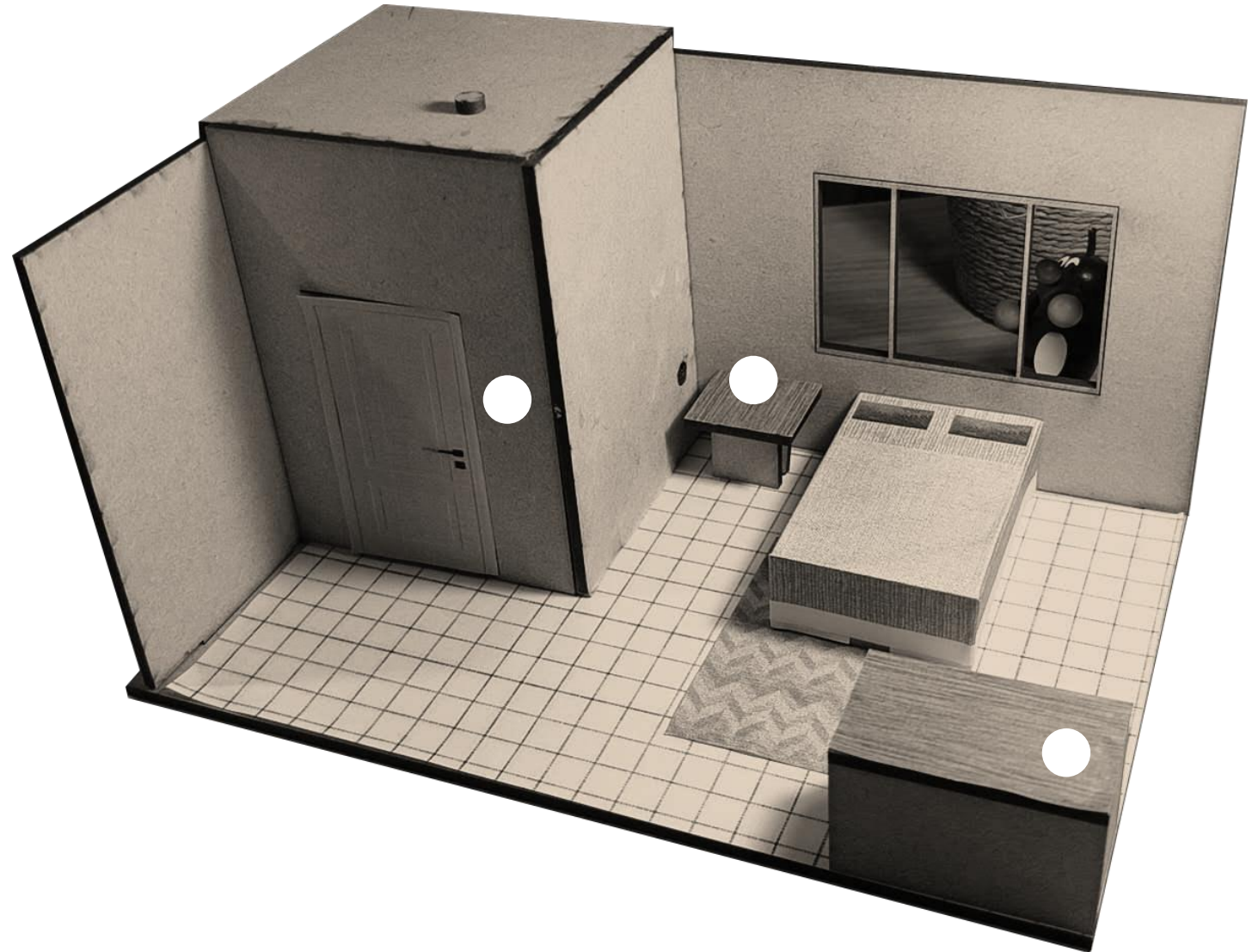
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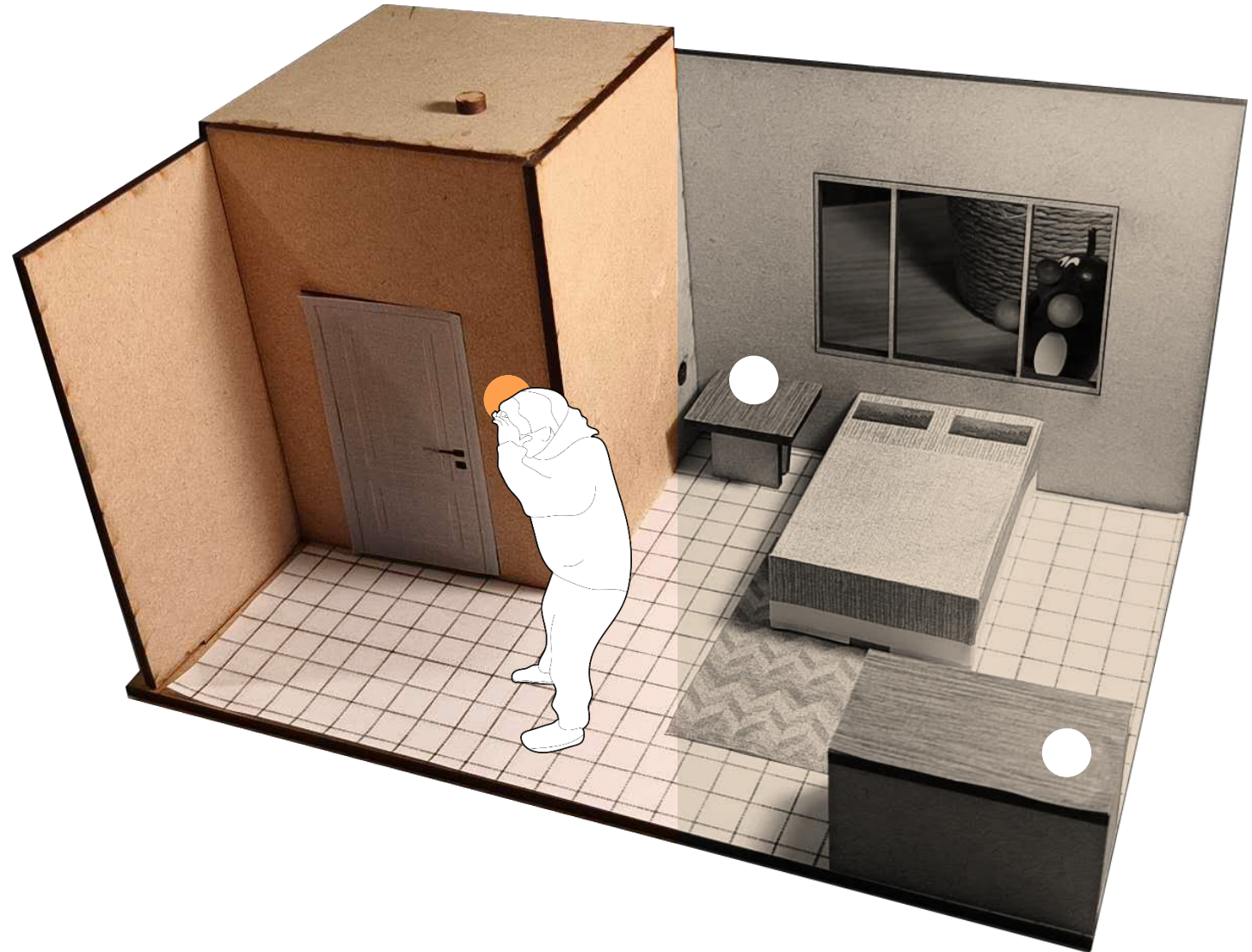
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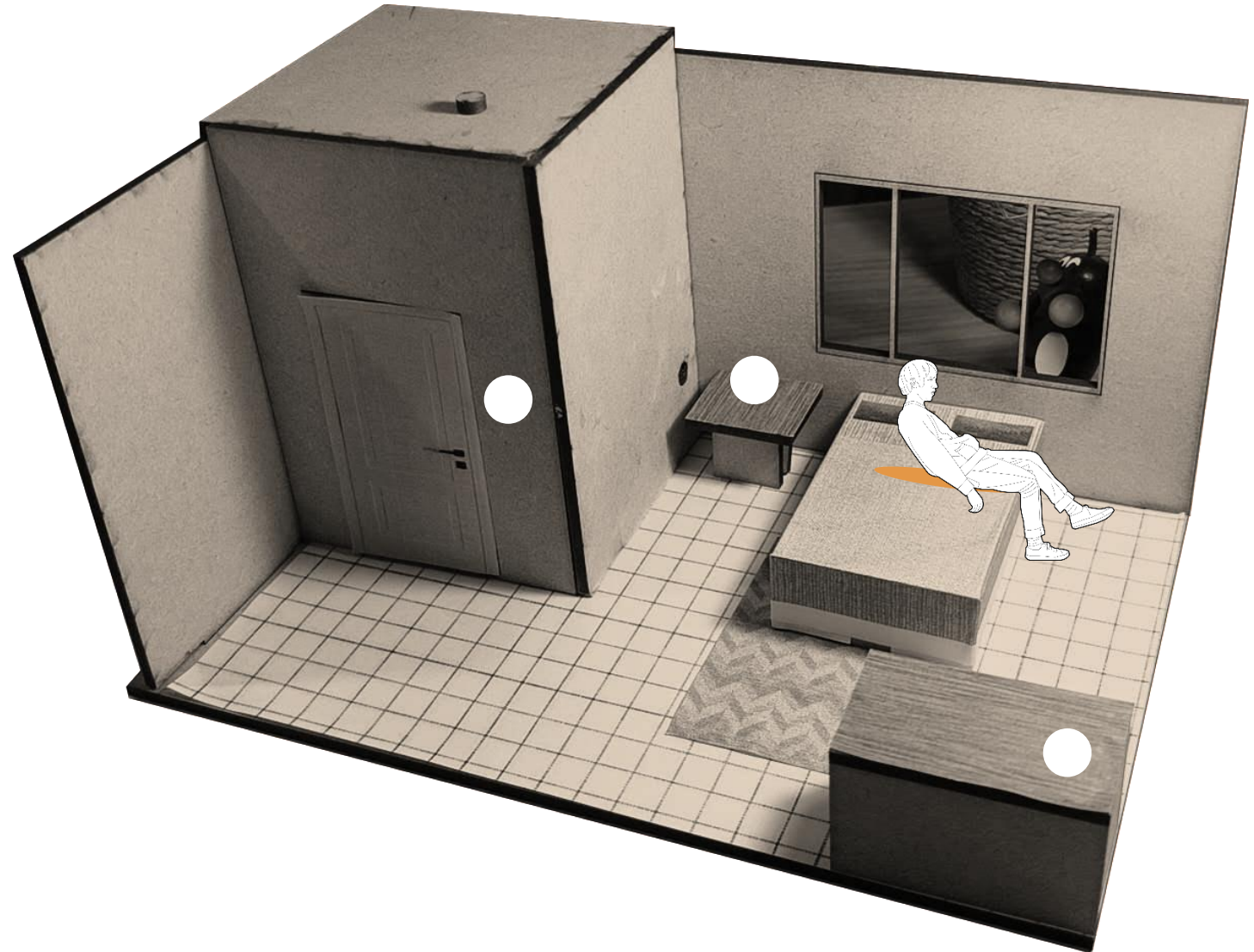
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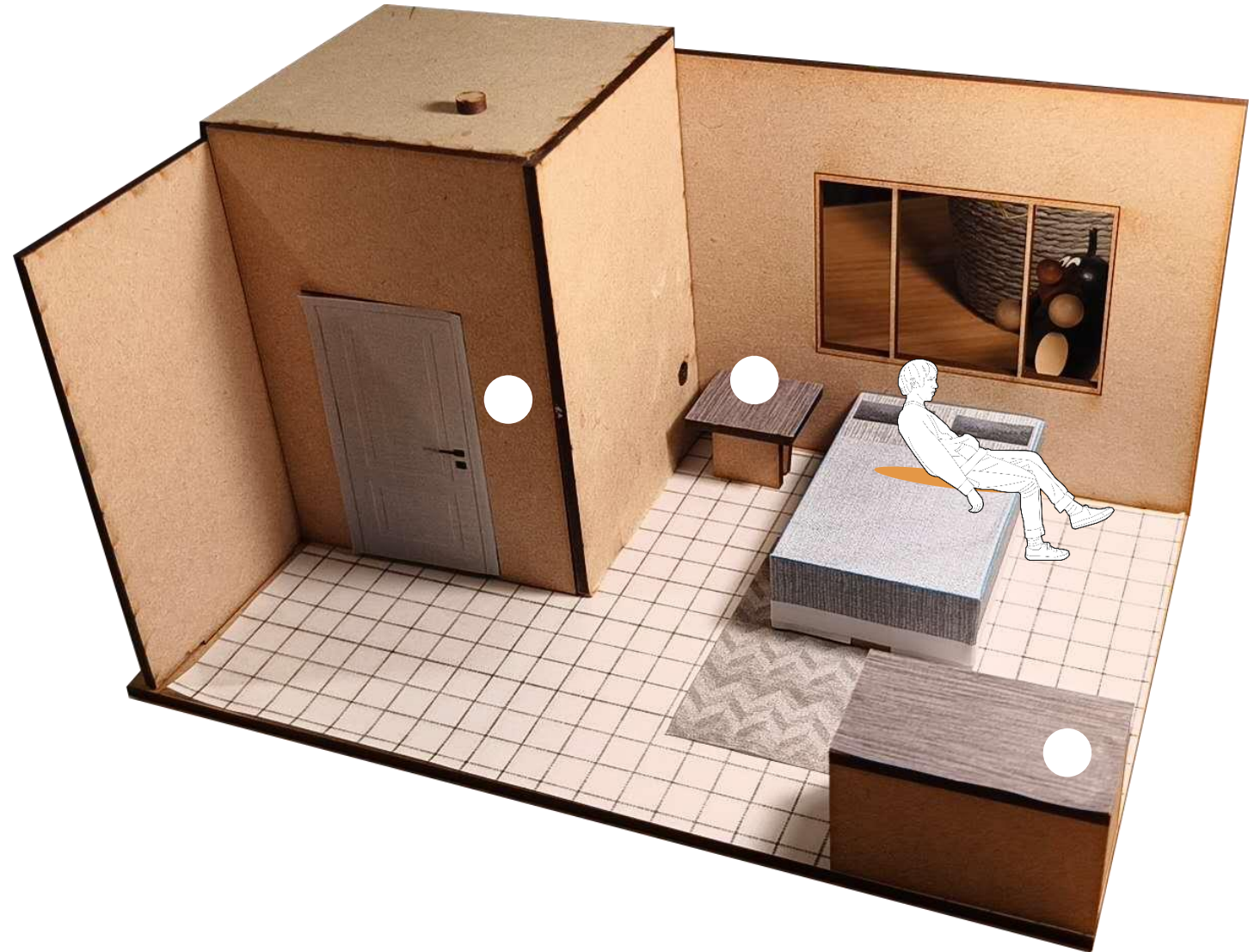
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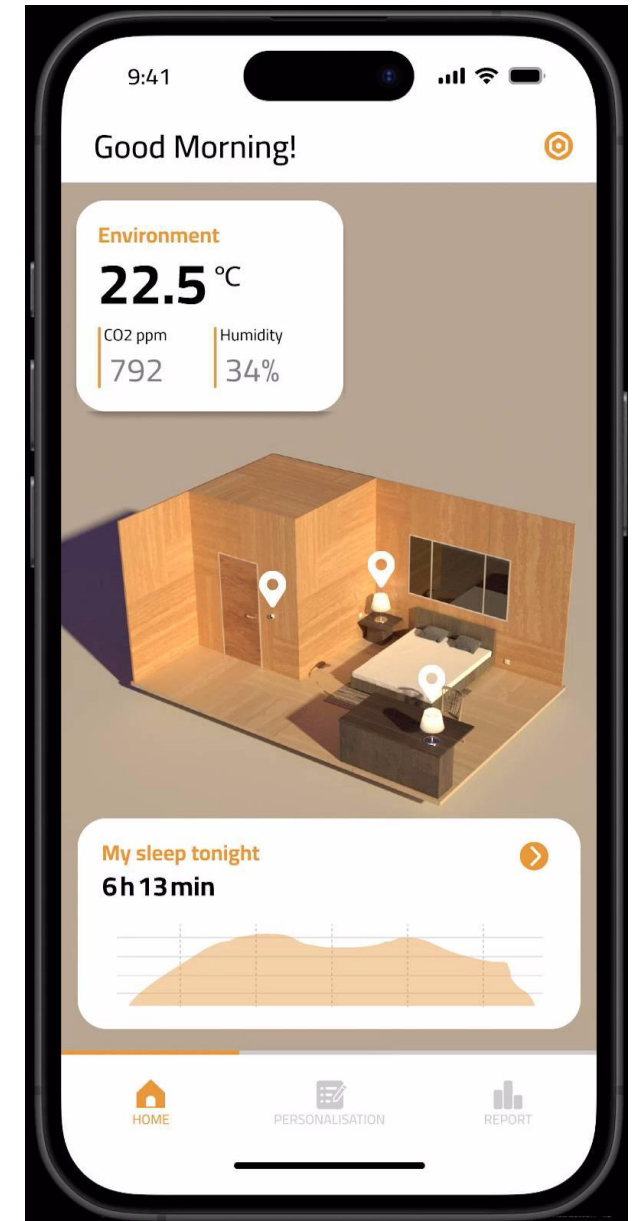
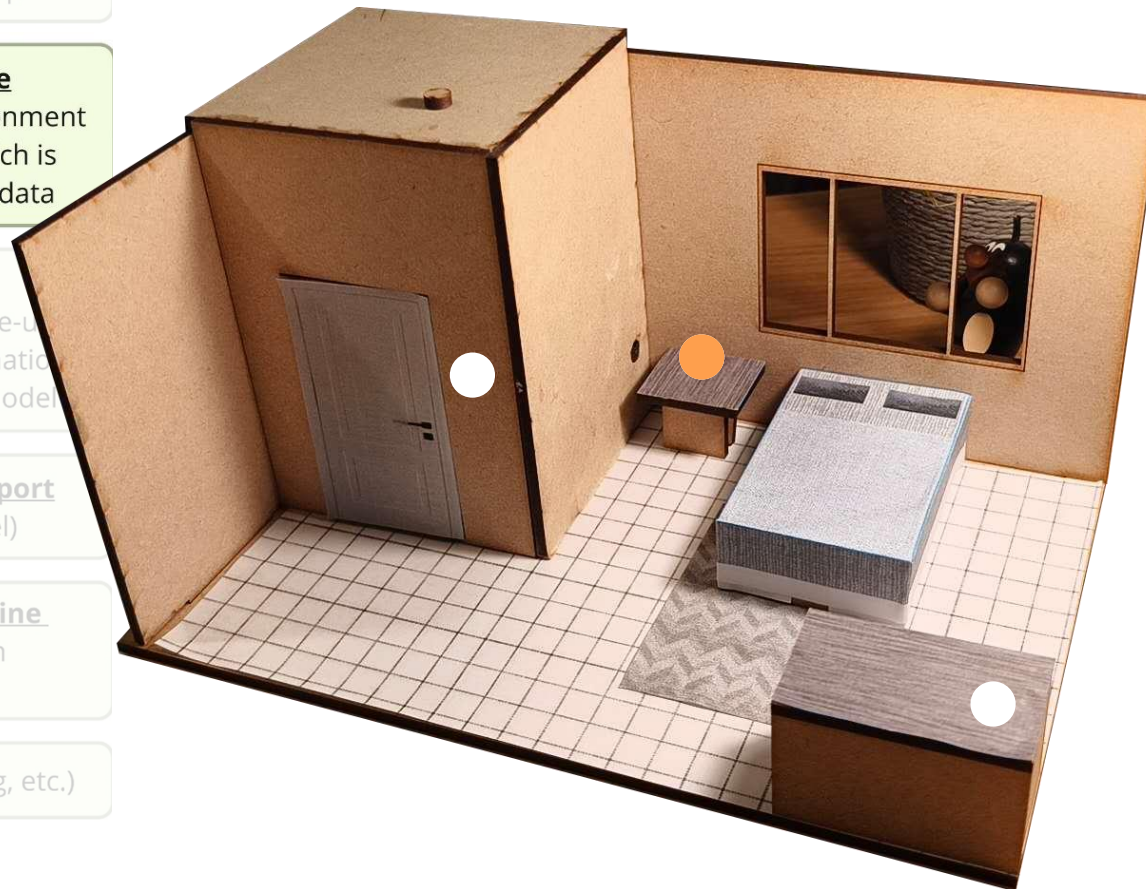
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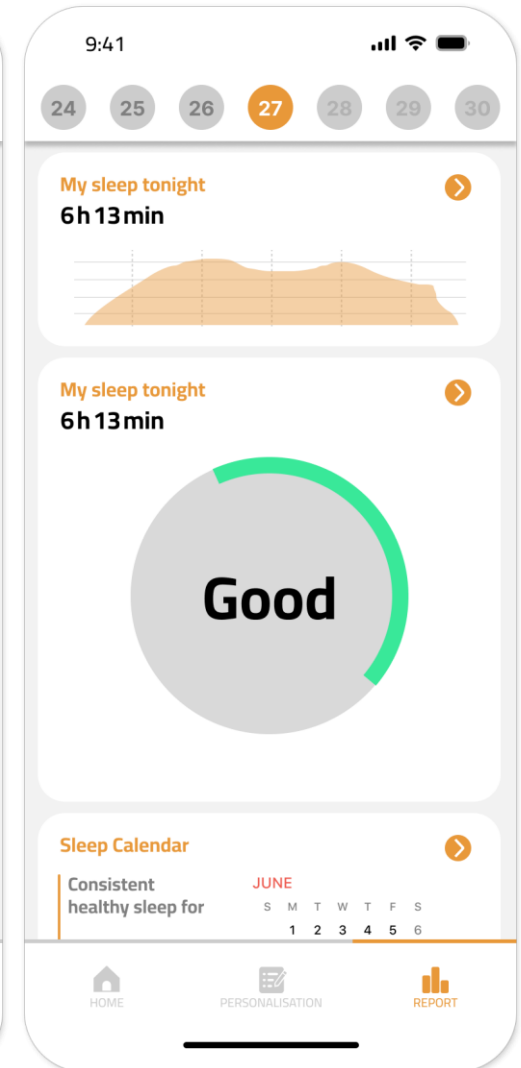
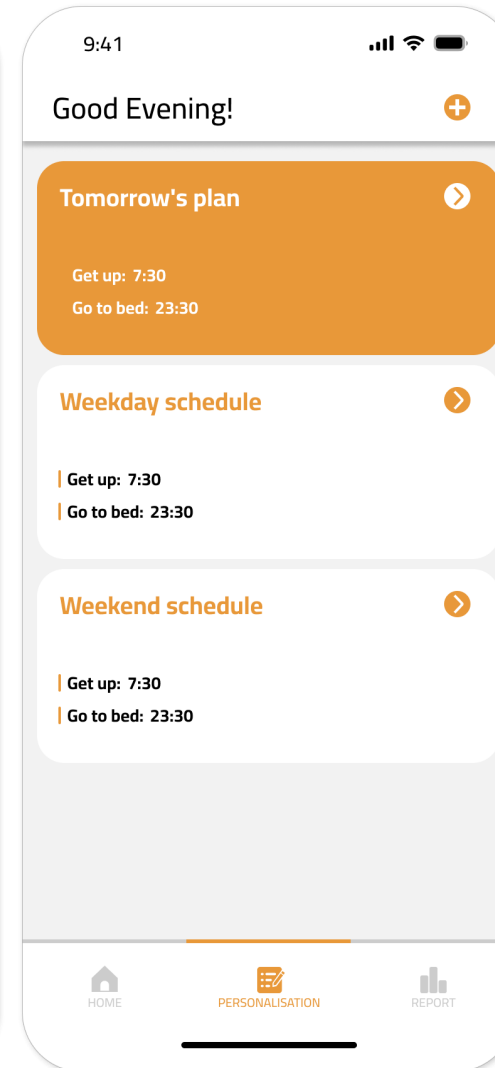
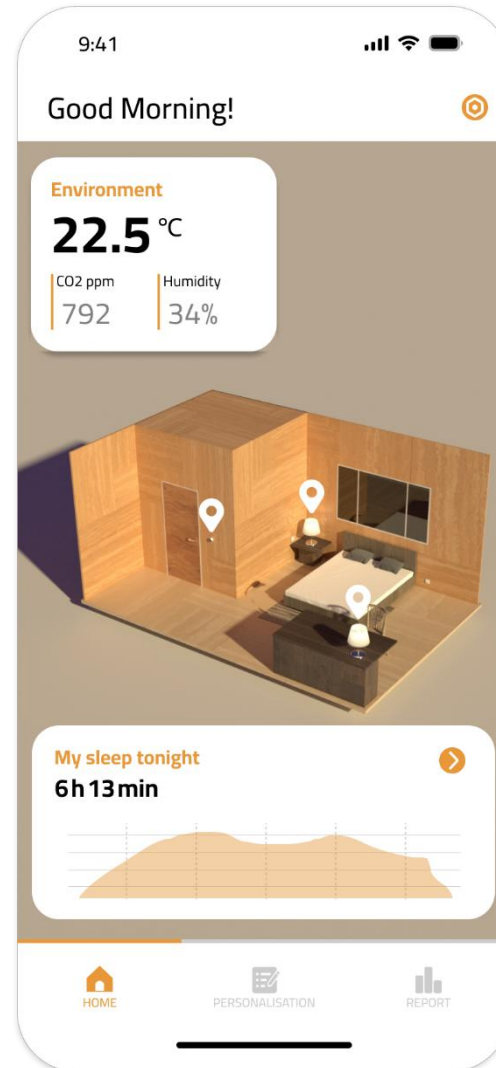
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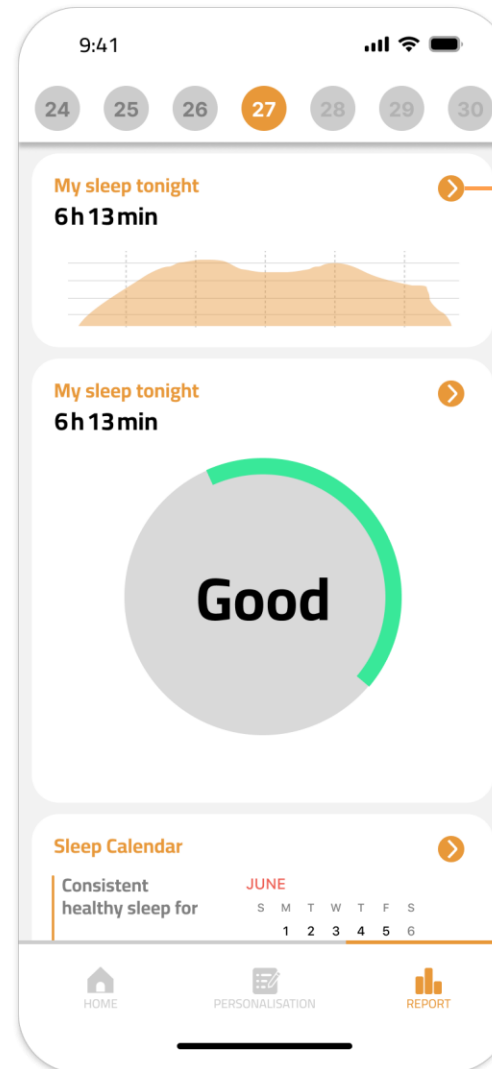
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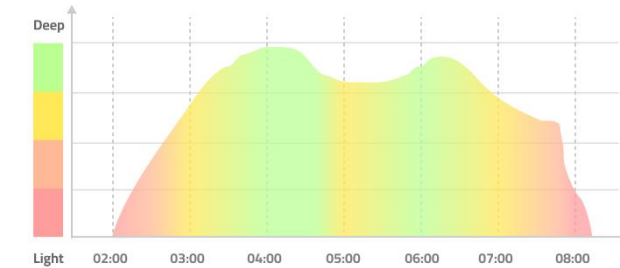
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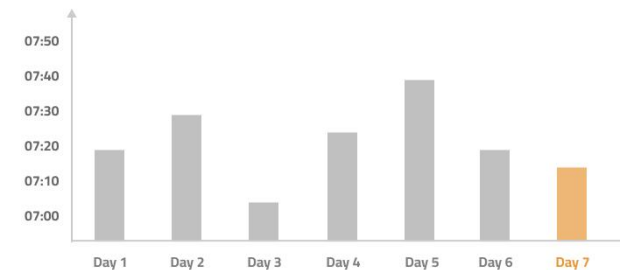
My Sleeping Data

6h 13min

02/04/2025



Daily wake up time



-
-
-

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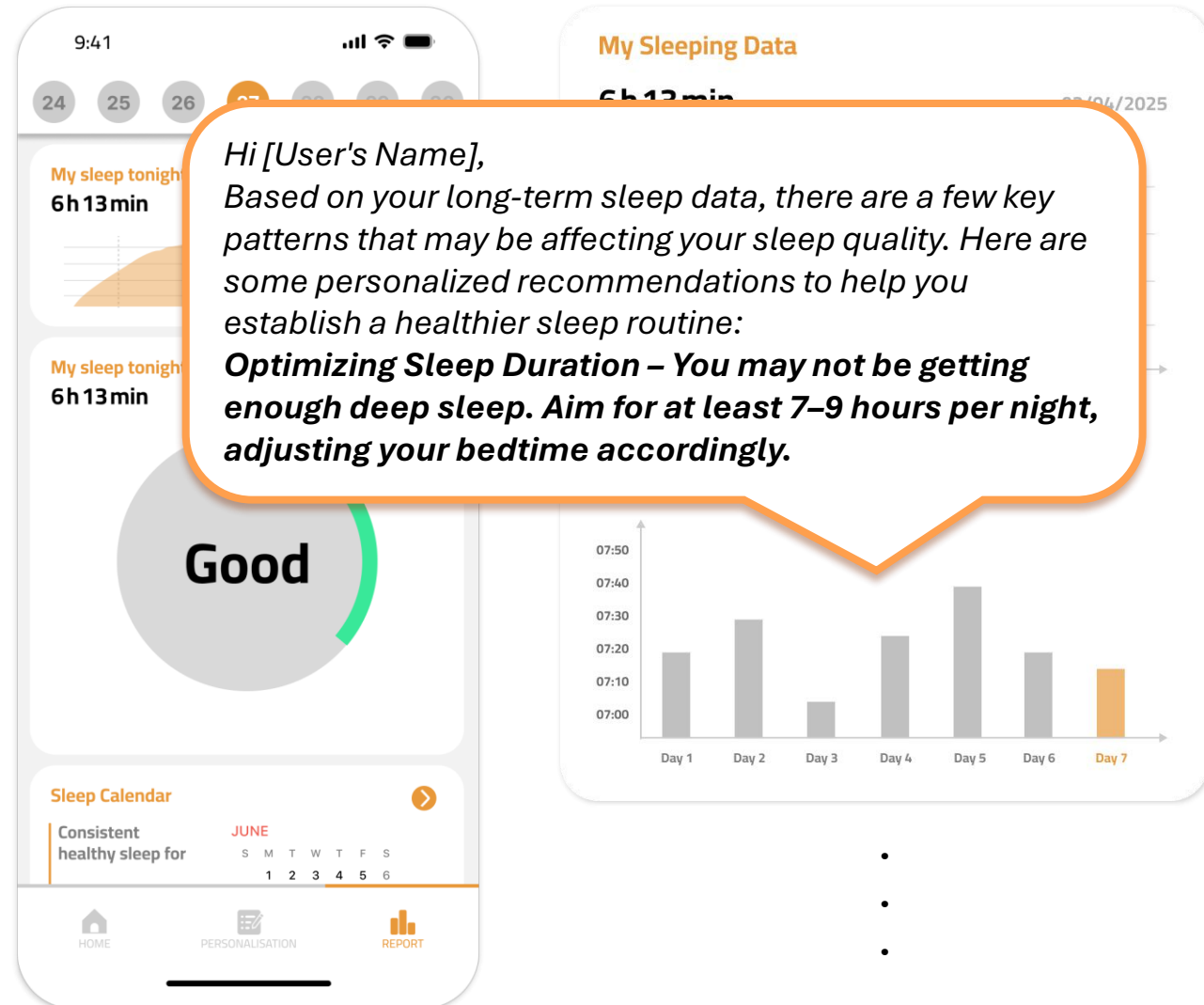
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Thanks!

