**The approach towards meditation state recognition based on proxy mental states**

The real-time meditation state recognition system is a core component of our product, which should be able to detect a user’s meditation states based on the biometric measurement and context factors, so that the product could provide the guidance to remain the user’s mind in mindfulness. The system should be able to tell whether the state of mind is under the scattering or sinking state to allow a delivery of the antidote in correct direction.

To develop a real-time AI system to recognizing which state of mind a user is settled in, we need to establish a predictive model based on a reasonable amount of dataset for the biometric measurement and the associated known state of mind. How to elicit the three meditation states from human subject is our first challenge. Particularly, the scattering and sinking states are not uniformly defined and could include a variety of sub state of different nature.

In order to maximumly utilizing the knowledge from the research literature, we propose an approach to utilizing a series of well-studied proxy mental states, each of which represents a sub state of the scattering and sinking states. In this way, we are able to perform data collection following well established experiment paradigms. These proxy mental states are assumed to be associated with the physiological response that are similar to a subset of predefined meditation states. The following shows examples of the mapping from the meditation states to the proxy mental states. We are growing the identified proxy mental states, such that the overall of the identified proxy mental states are as exhaustive as possible to represent the associated meditation state.

Scattering

1. Active cognitive activity
   1. mind wondering (MW)
   2. heavy cognitive workload
2. emotional activation
   1. high arousal / stress(?)
3. body motion activation
   1. head/arm movement

Mindfulness

1. light cognitive workload
   1. counting the breath

Sinking

1. drowsiness/fatigue

experiment - participants will be seated comfortably in an environment with low lighting and warm ambient temperatures and asked to count the number of times a specific sound is heard.

To summary, our main effort at this stage includes:

1. Define the proxy mental states, as exhaustive as possible, to maximumly represent different meditation states.
2. Determine the uncomplicated and effective experiment stimuli to elicit subject into the defined proxy mental states for data collection.