### iOS User Interface Design

Most mobile apps such as Sleepbot [71] and Sleepcycle [72] only provide an interface that allows users to view their sleep quality data. Our mobile application aims to provide a simple and clear interface so that it is intuitive enough for the users to learn to control the various hardware that are linked to the system, as well as to view the data after using it once. Therefore, it has a minimalistic design with a login page, and other main pages as follows:

*(1) Login, Logout:* The user would first be prompted to the login page of the mobile application upon launch. Navigations to the ‘registration page’ and the ‘forget password’ page are present for the user to register an account without having the need to access the website, enhancing the user experience when using our system. Upon successful logging-in, the user will be prompted to a tab bar controller consisting of four tabs – a control tab, a reminder tab, a data tab and a logout tab. Upon successful logging-out, the user will be prompted back to the login page, which is where the application was first launched.

*(2) Control of HomeKit products*: The control page consists of a table view where connected HomeKit devices, including the Eve energy and Eve room, are displayed. It is in a “top down” hierarchy structure, which has the advantage of reducing distraction or information overload to the user [73]. The list of homes is first listed, the user can choose to view the different accessories in each home and to change the configuration of each accessory.

*(3) Data collection*: The data page is the main page of the mobile application. It is where the user sends data to the server, view the real-time room and body temperature and the target body temperature for sleep optimisation.

The user can choose to start to commence data recording from the *Microsoft* band and *Eve Room* when the user is about to sleep, and to stop when the user wakes up. Throughout the period when the user is asleep, data will be uploaded to the web server every 10 minutes, to classify the sleeping quality using machine learning.

Feedback from the server, consisting of the target body temperature and sleeping quality, are received in real time and displayed on the user interface. To show the user what’s going on, an output console at the bottom of the screen is there to keep the user informed during the data collection process, increasing the user satisfaction with the system [74]. In case the user does not want to follow the target body temperature generated by the machine learning algorithm, the user can choose to override the desired room temperature using a circular slider, which has higher efficiency compared to other input mechanism[74]. This circular slider also increases the user interaction and make the user feel that he/she is in control which makes it more enjoyable. Lastly, the user can input whether he/she has had a good night, for record and also further machine learning purposes.