Sleep Quality Monitoring and Analysis System

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Goal

❑ Using the Pittsburgh Sleep Quality Index (PSQI) model together with environment sensors and Raspberry Pi to evaluate the sleeping quality and provide suggestions about how to improve it.

Motivations and Objectives

❑ Motivations
  • Nowadays, more and more people are facing sleep problems, they need a system to evaluate and analyse their sleeping quality.
  • Only using PSQI model to evaluate sleeping quality is too subjective.

❑ Objectives
  • Using software to implement the PSQI mode and let people evaluate their sleeping quality by themselves, at the same time, we will also monitor the sleeping environment as objective influence factors.

Research Challenges

❑ Challenge 1: Divide each influence factor (temperature, humidity, noise and light) into different value ranges.
❑ Challenge 2: Give corresponding weights to different ranges and different influence factors refer to PSQI.
❑ Challenge 3: Find the main influential factors from the final score. Then give the corresponding suggestions.
❑ Challenge 4: How to measure the sleep latency without asking people to wear some equipment.

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Methodology

❑ Step1: Collecting environment data (temperature, humidity, noise and light) by using different sensors and using ultrasonic distance sensor to monitor sleep latency. Using Raspberry Pi as a processor.
❑ Step2: Programming to implement the PSQI model by software (Python).
❑ Step3: Evaluating sleeping quality refer to the PSQI model together with data from environment sensors and give out a sleeping quality score.
❑ Step4: Finding the main influential factor and give corresponding suggestions to improve the sleep quality.

Results

References

[1] Quantification of Subjective Sleep Quality in Healthy Elderly Men and Women Using the Pittsburgh Sleep Quality Index (PSQI) by Daniel J. Buysse, Charles F. Reynolds III, Timothy H. Monk, Amy L. Yeager and David J. Kupfer.