SUBJECT: **SECP1513-01 TEKNOLOGI DAN SISTEM MAKLUMAT (TECHNOLOGY AND INFORMATION SYSTEM)**

SESSION/SEM: **2023/2024 SEMESTER 1**

TITLE: **DREAM DRIFT**

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3.0 BRIEF PROBLEM DESCRIPTION

Poor sleep quality can show through difficulty of falling asleep, waking up frequently during the night or waking up too early and feeling tired. Disrupted sleep patterns can be caused by stress, anxiety, caffeine consumption, excessive computer time before bed, an uncomfortable mattress or pillow, or even certain medical disorders. Poor sleep quality can have an influence on mood, cognitive function, and general health. Creating a comfortable sleep environment, establishing a nighttime ritual, and treating underlying reasons such as stress or health concerns can all greatly enhance sleep quality.

4.0 PROPOSED SOLUTION

To combat the poor sleep quality people receive, we decided to fix the problem by remedying one of the major contributors to sleep quality --- the sleep environment. By developing an IoT device that can interact with the users' surroundings alongside an application with predictive technology that leverages machine learning techniques, we aim to create a system which is able to tweak the users' sleep environment based on their sleep trends and patterns.

The IoT device is a device fitted with various sensors that will be able to interact with the environment to collect a stream of information about the environment. Receivers and transmitters fitted into the device will be able to interact with the vicinity to transform the sleep environment.

The application, on the other hand, will build a personal profile of the users' sleep quality and how it differs in different environments. Predictive techniques can be used to gauge what tweaks should be made to the sleep environment to improve sleep quality. The device, along with the application, will fully automate the process of creating the most optimum sleeping environment.

5.0 EXISTING TANGIBLE NON-TANGIBLE PRODUCTS ON MARKET

Current efforts to improve sleep quality include interventions by the tech industry by providing wearables such as Fitbit, Apple watch and Galaxy wearables and mobile applications such as Goggle Fit and Samsung Health that aim to track and record sleep quality. These technologies provide comprehensive analyses of the end users' sleep stages and sleep quality by collecting data such as the users' movement during sleep, heart rate and sleep sounds. Given the ease of use and portability, sleep trackers such as Sleep as Android apps are popular among the health conscious and those who experience restless nights. However, it still requires manual interaction on the users' part to tweak their surroundings for a better sleep environment, which might prove difficult while they are asleep.

6.0 DIFFERENCE OR UNIQUENESS OF PRODUCT FROM THE ONES IN THE MARKET

The current market for sleep aid products leaves much to be desired. Although there is an abundance of apps and devices that can measure your sleep quality to a certain degree of accuracy, none of them provide the ease of automatically creating adjustments to your environment to further improve your sleep quality. By combining the technology of these trackers and leveraging predictive technologies, this product proves to be unique and different from existing ones in the market.

The table below illustrates these differences:

Criterion	Wearables (e.g. Fitbit, Apple watch, Galaxy Wearables)	Health apps (Google Fit, Samsung Health)	Sleep tracking apps (Sleep as Android)	SlumberSync
Sleep quality score	✅	✅	✅	✅
Heart rate	✅	✅ (Only through connecting with wearable)	✅ (Only through connecting with wearable)	✅ (Only through connecting with wearable)
Blood oxygen	Depends	Depends	Depends	Depends
Light intensity	❌	❌	❌	✅
Surrounding temperature	❌	❌	❌	✅
Humidity	❌	❌	❌	✅
Sleep sounds	❌	❌	✅	✅
Sleep movement	✅	❌	✅	✅
Smart alarm	❌	❌	✅	✅
Ability to interact with environment	❌	❌	✅ (To a certain extent only)	✅
Music	❌	❌	✅	✅