Sleep Guard

Introduction
Most of the Dartmouth students are living with their roommate. Sometimes our sleep would be disturbed by our roommate. For example, when you try to have a good sleep, your roommate may be doing something noisy. You want to remind your roommate, but sometimes you just don’t want to talk to your roommate directly about that. Or sometimes, you are sleeping deeply, while your roommate starts to do something noisy, you may be waked up by the noise.

Problem
The problem is how to prevent such embarrassing situation from happening. Is it possible to leverage the mobile technology to build an application that can identify such situation and deliver prompts to your roommate? Or, on the contrary, when you are making noise while your roommate is sleeping, you will receive prompts from your roommate’s smartphone.

Objective
Our goal is to design a smartphone application with the following functions,
1. identify the sleep status of the user
2. identify the noisy environment
3. estimate the distance between you and your roommate
4. real time communication between smartphones

Implementation
Information from multiple sensors can be analyzed to detect user’s sleep status. The application should be able to analyze information of GPS, light, location, phone usage and accelerometer to predict if the user is sleeping.
The information from GPS is also used to estimate the distance between user and user’s roommate. The distance is an important indicator to show if roommates will disturb sleep.
Microphone will be used to estimate the level of noise, if the noise exceeds the threshold, roommate will receive reminder to quiet down.
We also need to find a way to communicate from two smartphone in real-time.