The key to the SleepKit is the two independent methods of alert when sleepwalking is detected. The SleepAlarm door alarm will emit an audible tone when the sleepwalker walks near the SleepAlarm. The SleepApps communicate to alert the parent/guardian when sleepwalking is suspected.

- Design and develop a device that is no bigger than the size of a watch and weight of a smartphone that will monitor the sleepwalker’s motion at night and alert the caregiver when sleepwalking is suspected
- Able to identify between sleepwalking and normal nighttime activity, e.g. getting water, using the restroom
- Versatile, so the system can be used at home but also while traveling and in various settings
- Door alarms work regardless of the status of the sleepwalker’s phone

Sleepwalking is a sleep disorder where an individual walks while they are still in the state of sleep(1). Sleepwalking is especially a concern for parents because sleepwalking children can unknowingly place themselves in harm’s way. Current solutions available to parents are simplistic and can not specify between a sleepwalking child and an awake child. These include pressure sensing mats, door handle buzzers, or hanging bells from doors. Other solutions are unsafe such as locking the child’s door from the outside. Estimates say up to 40% of children will sleepwalk at some point and 2-3% of children sleepwalk more than once a month(2). There is a large market for a system that can give parents an effective and unobtrusive way to monitor their sleepwalking child.

Design

- The SleepBand operates by monitoring the angle the child makes with their iBeacon protocol or Google and their Eddystone protocol(3). This allows the SleepBand to communicate with both the SleepAlarm and the SleepApps simultaneously.
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Conclusion

We were successful in creating an ecosystem of devices and phone applications that communicate via Bluetooth Low Energy in a broadcast manner to assist parents with sleepwalking children. Further developments to consider with this system include increasing battery life, adding functionality so that more than one child can be monitored at a time, increasing the volume of the door alarm, and creating a log so that sleepwalking occurrences can be tracked over time. Upon further development and with some changes we believe this system would also be useful for hospitals and long term care facilities for patient tracking.

Acknowledgements

We would like to thank our sponsor, Dr. Rennaker and the Texas Biomedical Device Center team for funding the project and providing their expert knowledge on making this project successful. Along with Dr. Pacheco and Dr. Hart for motivating us to challenge ourselves further. Finally, we would like to express our utmost gratitude for Dr. Polk for his continuous support, pushing us to go the extra mile and finding treating us like real engineers so that we can provide our expert knowledge on making this project successful. Along with Dr. Pacheco and Dr. Hart for motivating us to challenge ourselves further. Finally, we would like to express our utmost gratitude for Dr. Polk for his continuous support, pushing us to go the extra mile and finding treating us like real engineers so that we can be prepared for the real world.

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References