Seizure Monitor: Entrepreneurial Project

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Team 23

Katie Cooney
Adam Herman
Adam Markman
OVERVIEW

- Problem Statement
- Background
- Existing Products
- Seizure Monitor Design
  - Components of the Watch
  - Components of the Alarm Clock
  - LabVIEW
- Budget
- Future Work
- Conclusion
- Acknowledgements
- Questions
PROBLEM STATEMENT

- To create a device that is capable of accurately monitoring and detecting seizures in a nonintrusive way.

Who will benefit?
- Patients
  - Better Sleep
  - Logistics
- Caregivers
  - Less Stress
- Physicians
  - More Information
BACKGROUND: SEIZURES

- Prevalence
- Course
  - Aura
  - Tonic Phase
  - Clonic Phase
- Outcome

How can the characteristics of seizures be utilized in enhancing our design?
ACM data from Tonic and Clonic Phases

Tonic Phase

Clonic Phase
CURRENT PRODUCTS

- Medpage ST-2.
  - Dual detection functionality
  - Monitored by the ST-2 microprocessor
  - Prolonged irregular movements result in an alarm being generated by the monitor with a signal transmitted to the alarm pager

- MP5 - Complete System - Bed Motion Alarm for convulsive movement such as Epilepsy Seizures.
  - Not effective for patients under 56 lbs
  - Large bed or heavy mattress requires two sensors
  - Aural detection via microphone

- Another product is the Emfit Nocturnal Tonic-Clonic Seizure Monitor.
  - Best option for small children and small seizures
Advantages of our design over current models

Expected obstacles in implementing this design

Intended solutions to obstacles
SEIZURE MONITOR- WRIST WATCH

Features:
- Velcro strap
- Digital Time Display
- Reasonable Size
- Wireless Communication
- Cheap Manufacturability
- Water Resistance -> Waterproof
WRIST WATCH: WHAT’S BEEN DONE

- Visio Drawings
- Accelerometer signal research
- Dismantled existing watch for parts
Wrist Watch: What we plan to do

- Begin testing of accelerometer
- Gather extensive data on output signals for various motions of the accelerometer
- Design filter appropriately
- Learn to apply surface-mount technology to PCB
Seizure Monitor - Alarm Clock

Features:

- Digital Time Display
- Snooze Button
- Flashing LED Lights
- Speakers
- LED ‘Power’ and ‘battery warning’ Indicators
- Battery Power & Wall Outlet
- Small Size -> Portability
- Wireless Communication
ALARM CLOCK: WHAT’S BEEN DONE

- Visio Drawings
- Parts Ordered
- Bluetooth Communication Research
- Microcontroller Programming Research
ALARM CLOCK: FUTURE WORK

- Dismantle ordered alarm clock
- Program microcontroller
- Design appropriate circuit for placement in alarm component
SEIZURE MONITOR- LabVIEW

- A LabVIEW program will retrieve data about the seizure from the alarm clock
  - The program will log data from the seizure including the date, time duration and severity of the seizure
- The data from the LabVIEW program can be saved and sent to a doctor’s office, PDA, or other mobile device
LabVIEW - What's been Done

- LabVIEW Interface
- Working on the LabVIEW code to read data from a Bluetooth Device and display the desired outputs

LabVIEW - Future Work

- Continue to code the LabVIEW data
  - Create code to read the Bluetooth Device
Future Work

- Focus on completing the watch assembly
  - Install accelerometer
  - Install Surface Mount Bluetooth
  - Install casings if needed
  - Learn C to program the microcontroller
## Budget

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CONCLUSION

- The group is currently focusing on completing the watch
  - Need to figure out how to calibrate the accelerometer to detect a seizure
  - Code the microcontroller to relay information from the accelerometer to the alarm clock via Bluetooth
REFERENCES


ACKNOWLEDGMENTS

- Dr. John Bennett
- Dr. Enderle
- Dave Kaputa
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- Marek Wartenberg
- Dr. Peterson
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Questions?