Physiological Monitoring for Childhood Asthma

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ABSTRACT

• Create a wearable device to connect patient’s physiological response and the environment
• Accomplished by creating a Human-in-the-loop Cyber Physical System (HiLCPS)
• Determine how multiple devices’ position and distance correlate
• Integrated health care device enables patients to identify stressors and manage treatment
• Data enables correlation of symptoms with environmental markers
• Treatment plan tracked and optimized

PROBLEM STATEMENT

The goal of this project is to create a Human-in-the-loop Cyber Physical System (HiLCPS) that would combine environment and physiologically data to provide continuous patient-specific data to user and healthcare provider. The data will be crowd-sourced to generate a high-resolution pollutant map. STEM learning and environmental consciousness will be gained through pilot studies with K-12 students.

RESULTS AND DISCUSSION

A.) 4 Device Dust Distance Experiment
• Battery packs
• Distances of 100cm, 200cm, 300cm, 400cm, 500cm, 700cm, 900cm, 1100cm, 1300cm
• At a marked distance a person with powered chalk on hands, clapped rapidly three times.
• 3 trials at each distance
• 1 minute increments of rest were taken between each rapid clap

B.) Distance Sensitivity Experiment
• Battery packs
• Distances of 100cm, 200cm, 300cm, 400cm, 500cm, 700cm, 900cm, 1100cm, 1300cm
• At a marked distance a person with powered chalk on hands, clapped rapidly three times.
• 1 trial at each distance
• 4 minute increments of rest were taken between each rapid clap

C.) Shuffle Sensitivity Experiment
• 2 devices powered by battery packs
• 10 meter distance measured
• 50cm increments marked (0m-10m)
• Point source at 5m
• Person with 1 device at opposite end of marked 10m
• Every 60s person moved to mark towards point source
• Devices cross paths at 5m and continued to opposite end of measured 10m

REFERENCES

• Texas Instruments, “LM05 Precision Centigrade Temperature Sensors,” SN95159G dataset, August 1999 [Revised August 2016].

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