The Diagnosis: Disease Identification of Airborne Pathogens Using Mobile Non-Invasive Techniques

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The purpose of this project is to detect a disease by breaking down the components of breath. The goal is to develop a process which captures air, breaks down the components into a format that can be photographed or measured by a camera and analyzed. The research and analysis determines, develops and tests methods for categorizing and identifying the components as either diseased or non-harmful. If a mobile system can break down breath into components that can be measured, those components can be computationally analyzed and identified as airborne pathogens. I selected, researched, analyzed and obtained seven airborne pathogens' slide images. I developed a set of baseline characteristics which I used to develop conceptual algorithms. I compared my conceptual algorithms to available image processing techniques and implemented my design in a computational system. The computational system compares a sample image to baseline images, processes the image content and provides a prediction whether the sample matches one of the seven baseline pathogens. During the analysis of the data, I observed many characteristics overlapping all of the pathogens. Mathematical techniques can provide the ability to predict the presence of a pathogen from an image resulting in three major outcomes. I created the conceptual design of a device which could capture, break down and perform analysis of an image. I established the design of a reference for pathogen detection techniques. Most importantly, I developed and implemented a conceptual algorithm to detect and identify airborne pathogens through processing characteristics of a sample image.

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