Touchless Thermal Respiratory Monitor

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The ability to track a person's respiratory rate is a vital technology that has applications in medical procedures, sleep studies, and patient monitoring. Safety devices used to track breathing today, however, often require the use of wires and sensors that can create obvious restrictions in the patient's motion, ability to maneuver, or even sleep. The long-term objective of this research project is to build a system that can monitor breathing without coming into contact with the patient. The Touchless Respiratory Thermal Monitor will be built using a 1 pixel thermal sensor, 3-D printed parts, and a laser. The thermal sensor will be programmed to simply read temperature. In a later project improvements will be made to look for a temperature differential between the air that has been exhaled by the patient and the room temperature while the laser allows for proper alignment on the upper lip of the subject. A lack of this temperature difference would indicate that the patient has stopped breathing. Though the design is rather simple, complications are expected on replicating the respiratory pattern of a human. This design will incorporate a 3-D printed mouth and nose attached to a ventilator, a flow rate monitor, and a temperature-controlled bucket of water kept at 100°F. This will be compared to a human's respiratory pattern to ensure proper replication.