StethoDoc: Screening for Lung Disorders with an Augmented Reality Guided Smart Stethoscope

Vikram, Aria (School: National Public School, Indiranagar)

More than 1 billion people worldwide suffer from lung diseases. The magnitude of this public health burden has been further escalated by the COVID-19 pandemic. Conventionally, lung disorders can be detected with the help of a stethoscope operated by trained medical professionals. However, reliable pulmonary screening is inaccessible to many demographics. My invention - StethoDoc is an augmented reality guided smart stethoscope system. It allows non-medical laypersons to perform accurate pulmonary screening at a fraction of the traditional cost, thus reducing the pressure on the overburdened healthcare system. StethoDoc has two main components in the form of a smartphone app - an interactive augmented reality frontend which guides the user in placing the stethoscope at the correct sites and an artificial intelligence backend for identifying pulmonary disorders. The app is connected to a generic stethoscope via a microphone. The algorithm used for guiding the user in placing the stethoscope on the body was able to map auscultation sites with 96% accuracy. The lung disorder detection model was validated on 2070 publicly-available respiratory sound recordings where it showed an accuracy of 81%, suggesting that this system is viable as an accurate screening tool. StethoDoc can be used in rural areas with limited access to healthcare, in pandemic situations and during healthcare drives. Thus, StethoDoc has the potential to democratise healthcare so that a person in a remote village can access the same quality screening as a privileged city dweller.

Awards Won:

U.S. Agency for International Development: Third Award Global Health

Third Award of $1,000