Capstone Design Project Information Sheet

Project Title: Virtual physical exam platform

Project Keyword: VIRTUAL PHYSICAL

Recommended Skills/Expertise: coding, signal processing, biosignals, physiology

Project Appropriate for:

X	**BIOE**	X	**ECE**		**MECH**
	GLHT		**MAT SCI**		

Problem:

Many health experts say that the greatest expansion of healthcare in our future will be in the field of virtual medicine. Patients already perceive going to the doctor as challenging. The long delays for an appointment, added to the long waiting times in the lobby, make a telemedicine appointment done from the comfort of their own home while on their smartphone very appealing to patients.

Adoption of telemedicine has been excellent in the primary care fields of internal medicine, family medicine, and pediatrics. However, oftentimes, the visits with these physicians don't necessarily require a reliable physical exam before a physician can make an accurate conclusion on prescribed therapy or further testing. However, with specialty virtual care, things are different. The physical exam is core to the decision-making processes of most specialties in medicine. The ability to touch and feel a body part, listen to the heart and lung sounds, or examine the strength or pulsation in an extremity allows key decisions to be made in fields such as Cardiology, Gastroenterology, and Neurology, amongst many others.

Many companies, such as Tytocare (seen below) have developed tools to help with the virtual physical exam, such as auscultation of heart and lung sounds, or visualization of the ear drum. However, even these tools are only part of the entire relevant physical exam for most specialties in medicine. What is lacking is a complete, head-to-toe, user-friendly platform to deliver a reliable virtual physical exam that is actually relevant to the specialty physician sitting miles away from their patient.

Figure 1. Tytocare Telehealth Exam Kit.

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Overall Goals:

The goal of this project is to develop a software platform that is able to virtually communicate a physical exam that is performed by a non-physician (i.e. medical assistant, nurse practitioner) on a patient, using a variety of tools (i.e. acoustic recorders, single-lead EKG, etc) in addition to well-established physical exam maneuvers (palpation of the abdomen, measurement of strength in the arms and legs, grading of arterial pulses in the hands and feet).

The overall objectives for the platform include:

1. Excellent user interface, allowing ease of data entry and data review
2. Relevant capture of physical exam data based on the initial presenting symptoms and relevant specialty needs
3. Ability to store-forward the data connected to the patient's profile so that the virtual physical exam can be retrieved when the patient has their telemedicine specialty consultation at a later date than their virtual exam.

Project Mentors:

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Some suggested resources and reference information:

1. https://hbr.org/2022/05/the-telehealth-era-is-just-beginning

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