

UNIVERSITY OF SOUTH FLORIDA

Defense of a Master's Thesis

*An Internet of Medical Things (IoMT) Approach for Remote Assessment of
Head and Neck Cancer Patients*

by

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For the MSCS degree in Computer Science

Internet-of-Medical-Things (IoMT) allows for a smart healthcare system to remotely monitor and assess patient's progress at home. Head and neck cancers (HNC) are treated with various treatment options which are associated with significant side effects, mainly shoulder dysfunction, and trismus (spasm of jaw muscles). However, measurement of patient's progress, and side effects while undergoing treatment, is limited to evaluation received based on scheduled appointments. Development of strategies to enhance monitoring during follow-up period is needed for earlier identification of problems such as trismus and shoulder dysfunction. In this interdisciplinary research, for the first time, we develop an IoMT enabling application, namely, Automated Measurement of Trismus and Shoulder Dysfunction (AMTSD), to remotely monitor the recovery. An HNC patient can use AMTSD as a web application frequently (twice/daily) to virtually measure the mouth extension and shoulder range of motion (ROM). The data collected is stored in a database and can be automatically analyzed to assess the progress. Triggers can be set to alert the healthcare team if the patient's condition is regressing. For the trismus, AMTSD measures the distance between the lips while the patient opens the mouth as widely as possible. For shoulder ROM, AMTSD measures the angle of a raised hand with a vertical line passing through the shoulder joint. The virtual measurements are based on the open-source MediaPipe, a cross-platform library from Google. For five simulated patients, AMSTD yielded the average measurement error for mouth extension is 1.69% and shoulder ROM is 3.12%. A clinical study with at least ten recovering HNC patients is underway.

Tuesday, March 8th, 2022

10:00 AM

Online (Teams)

THE PUBLIC IS INVITED

Examining Committee

Srinivas Katkoori, Ph.D., Co-Major Professor

Carmen S. Rodriguez, Ph.D., Co-Major Professor, College of Nursing

Matthew John Mifsud, M.D., College of Medicine

*Robert Bishop, Ph.D.
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*Dwayne Smith, Ph.D.
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