

**Centre for Medical Electronics
Anna University, Chennai**

3.3.1 Institution has created an eco system for innovations including Incubation centre and other initiatives for creation and transfer of knowledge

2020-2021

During the period of July 2020 to June 2021 the implementation of the sanctioned projects was continued. The project sanctioned was

S.No	Name of the Project/ Endowments, Chairs	Name of the Principal Investigator/ Co Investigator	Sponsored by	Duration	Sanctioned Amount in lakhs
1.	Machine learning & Deep learning for Gait and task prediction & Adaptation / Synchronization for Exoskeleton control	Dr.S.Poonguzhali (PI) Dr. M. Sasikala (Co-PI),	LSRB-DRDO	2021-2022	35.1

Robotic assistance (Exoskeleton) in several fields is a primary focus in the research community, with medical and defense areas as projected applications. Exoskeletons are wearable robotic devices used mainly in two broad categories - (a) rehabilitation – strengthening the capabilities of a weak or medically unfit human and (b) strength augmentation – augmenting the strength and endurance of healthy people like soldiers as they carry significant payloads for extended periods on difficult terrains and persons working in industries who carry heavy loads for prolonged duration. Exoskeletons open several challenges such as designing the mechanism, selection of actuators, analysis and synthesis of gait, dynamic modeling and finally control of the exoskeleton in accordance with the intention of the human wearing it. This project focused on the task prediction and synchronization of an exoskeleton for its control in accordance with the wearer’s intention. For which three main objectives were carried out using machine learning and deep learning algorithms as follows: static and dynamic

activity classification, gait phase classification and load carrying activity classification. The optimized algorithms were chosen for each objective. These algorithms can be used to control the exoskeleton and can be combined into one algorithm to obtain a combined control.



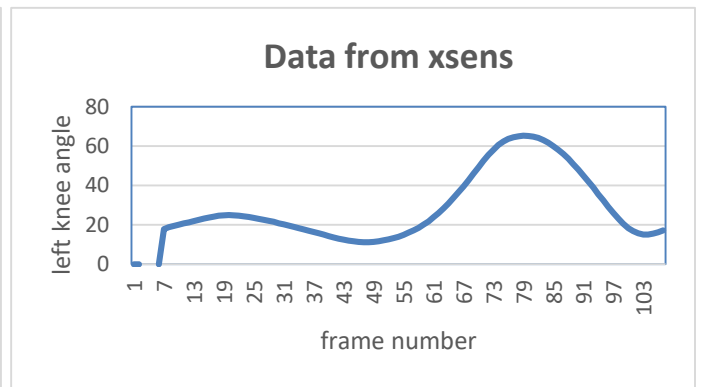
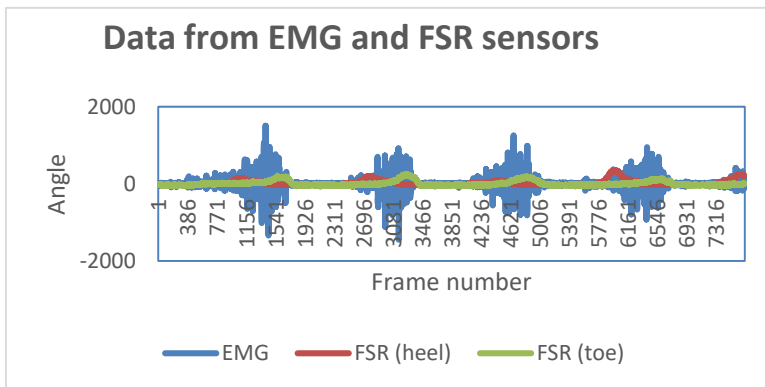
Exoskeleton loading & unloading



Exoskeleton walking



Sensor placement



Raw data from the sensor

- The data collected and analyzed using machine learning algorithms can be used for the control of exoskeletons which can be used in two broad domains, namely, (a) rehabilitation- strengthening the capabilities of a weak or medically unfit humans and (b) strength augmentation- augmenting the strength and endurance of healthy people

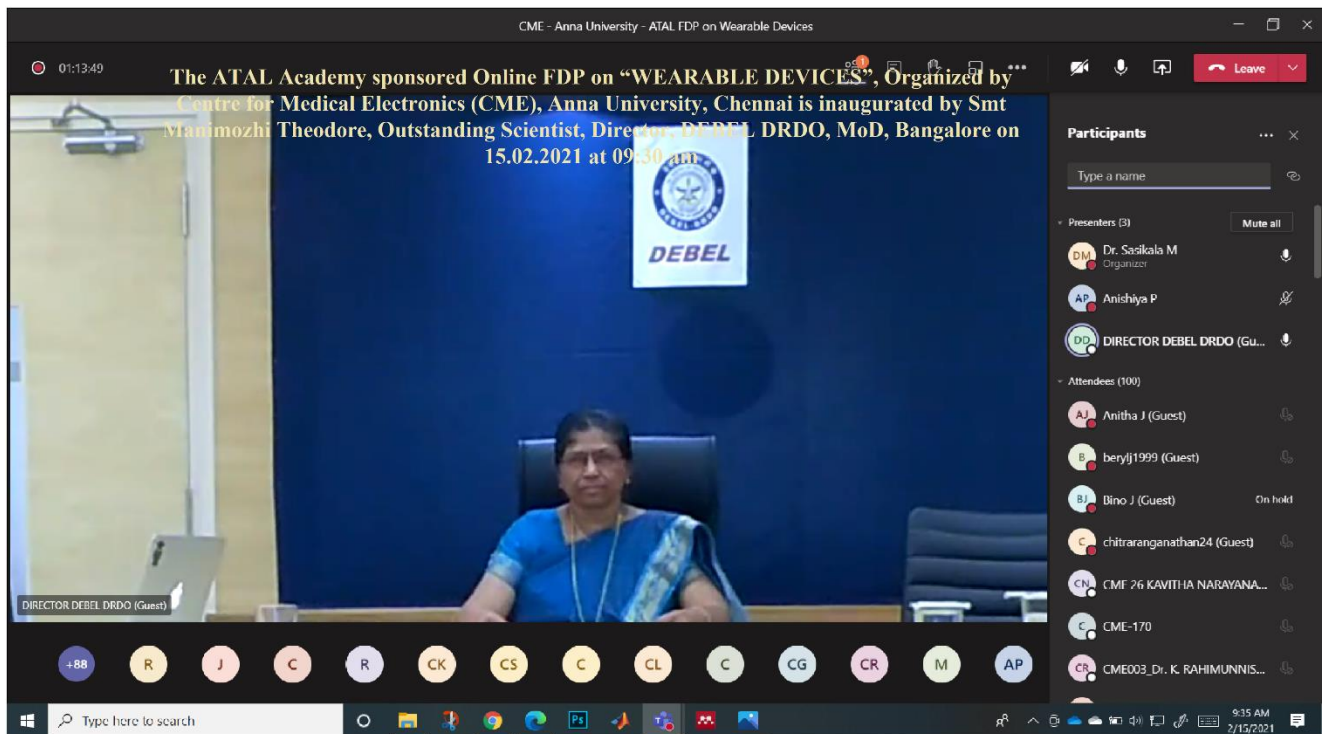
like soldiers as they carry significant payloads for extended periods on difficult terrains and factory workers who carry heavy loads.

- This data can also be used for gait analysis of persons

Workshop organized during this period

S.No	Workshop Title	Name of the Coordinators	Date	No of participants
1.	AICTE Training and Learning (ATAL-) Academy sponsored Online FDP on Wearable devices	Dr. M. Sasikala Dr.S.Poonguzhali	15 th -19 th February 2021	200

The workshop AICTE Training and Learning (ATAL-) Academy sponsored Online FDP on Wearable devices is conducted in online mode in MS Teams for 5 days.



Expert Member Smt. Manimozhi Theodar outstanding scientist, Director, DRDO-DEBEL session in the ATAL workshop Wearable Devices.



Expert Member Dr. Thurmon Lockhart, Arizon State University, USA presented the topic “Sensors for Gait and Posture foe Fall Risk Prediction” in the ATAL workshop Wearable Devices.