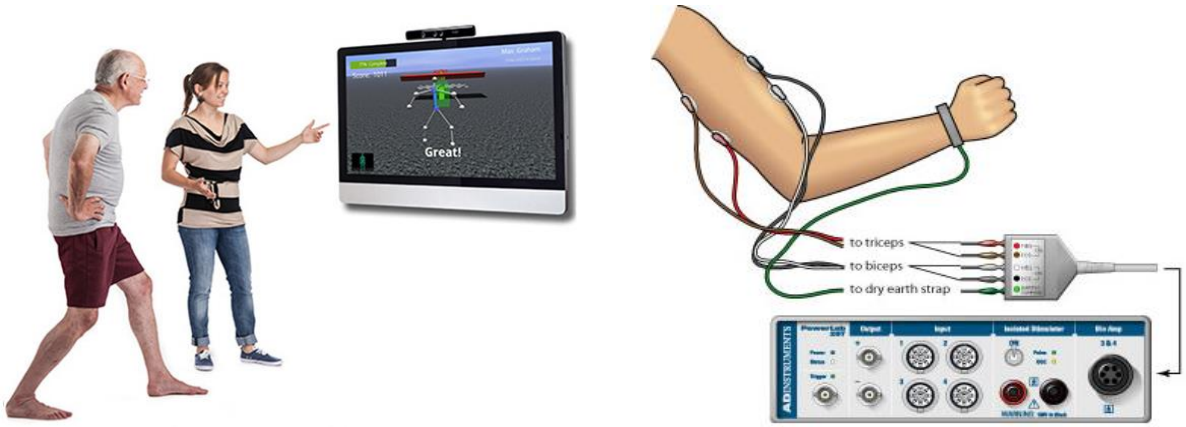
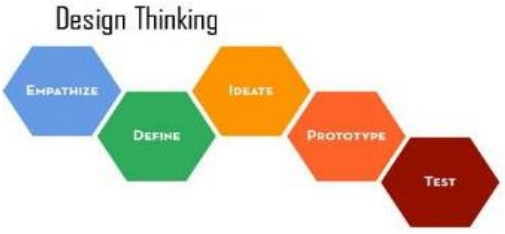
Human Engineering Laboratory

Design and Development of User Centric Products- Workplace Evaluation- Gait Evaluation





Centre of Excellence
In
Industrial and Product Design

PEC University of Technology

Chandigarh, India

The Human Engineering laboratory is well-equipped to carry out experimentation and research work in the areas of ergonomic evaluation of industrial systems and consumer products, gait analysis, whole body and hand arm vibration exposure, anthropometry and seat design. The main equipments in the laboratory include the following:-

- Portable EMG system
- Biopac Mp-45 system for EDA, PPG measurement
- Portable physiological monitoring system
- Kinect V2 IR Cameras
- Whole body and Hand arm vibrations analysis kit
- Pressure mapping system (seat and back)
- Delmia Human software
- EEG-EMG system
- Anthropometric kit
- Portable Metabolic System

1. Portable EMG System

The Portable EMG System is a comprehensive package of EMG sensors and instrumentation for static and dynamic measurements in a clinical setting, a research center, or at any remote location such as a workplace. This system is dedicated to portable EMG measurements and comes with the DataLOG. Management & Analysis software with active EMG sensors and event marker.

2. Biopac Mp-45 for EDA, PPG measurement

This system allows for wired monitoring of EDA & PPG signals. The signals can be analyzed in Acq*Knowledge* software.

3. Portable Bio harness Physiological monitoring system

The Bio Harness System is a remote physiological monitoring system that utilizes Zephyrs patented device. The Bio Harness allows the measurement of heart rate,

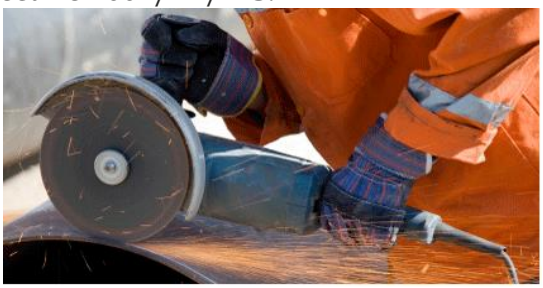
breathing rate, activity level, subject orientation (posture), respiration rate.

4. Kinect V2 IR Camera

The Kinect sensors are motion sensing devices. There are endless possible applications of this device which include pose recognition, estimation of human body or hand articulations and scanning devices for 3 D printing.

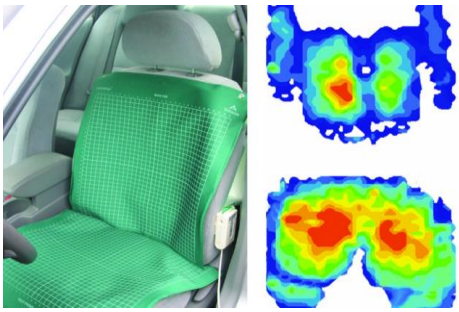
5. Whole body and Hand arm vibrations analysis Kit

Whole body and Hand arm vibration kit provides a simple and convenient way to measure, analyse and assess vibration data in accordance with standards such as ISO 5349 and European Directive 2002/44/EC.



6. Pressure mapping system (Seat and Back)

Pressure mapping systems measure interface pressure between two surfaces, utilizing thin and flexible sensors. The resulting data and analysis tools offer insights which can be used for improving product design.



7. Delmia Human Software

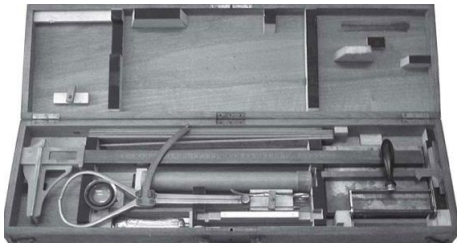
This software provide an interface for creation of a CAD model of the workstation. Manikins can be imported and process simulation as well as ergonomic evaluation can be carried out.

8. EEG-EMG System

Biopac MP150 data acquisition and analysis systems with Acq*Knowledge* software provide a flexible tool for recording and analysis of EEG-EMG-ECG-EOG data. The sensors connect wirelessly to data acquisition workstations which can be connected to computer through Ethernet cable.

9. Anthropometric Kit

The Kit includes anthropometer, spreading caliper, small height rod, sliding caliper. The equipment can be used for measuring the static anthropometry data of an individual.

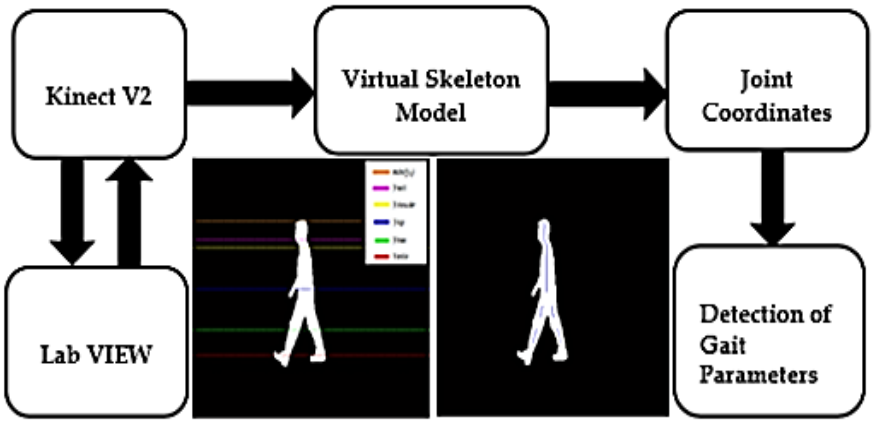


10. Fitmate Pro Cardio Pulmonary Exercise Testing

This desktop system provides for easy and accurate Cardio Pulmonary Exercise Testing which is affordable and portable. Fitmate Pro allows the measurement of VO2 for resting & exercise testing, VO2max & sub-max V02 and resting energy expenditure (REE, RMR).

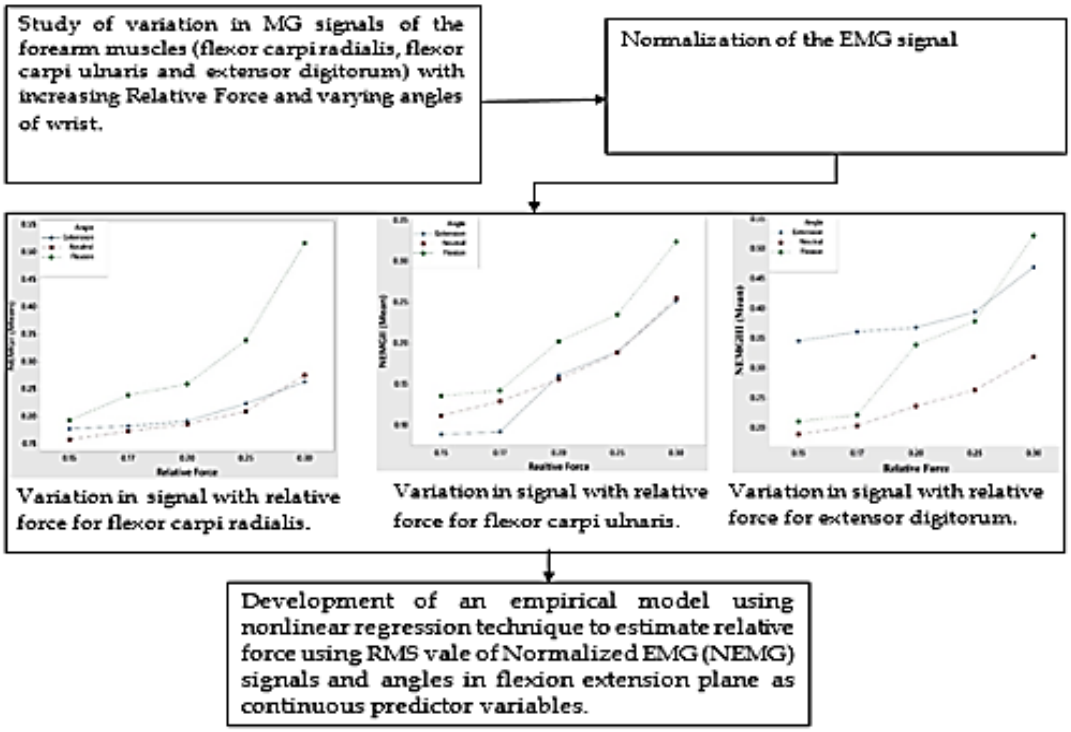
Projects undertaken

- Detection of Gait parameters using KinectV2 and LabVIEW



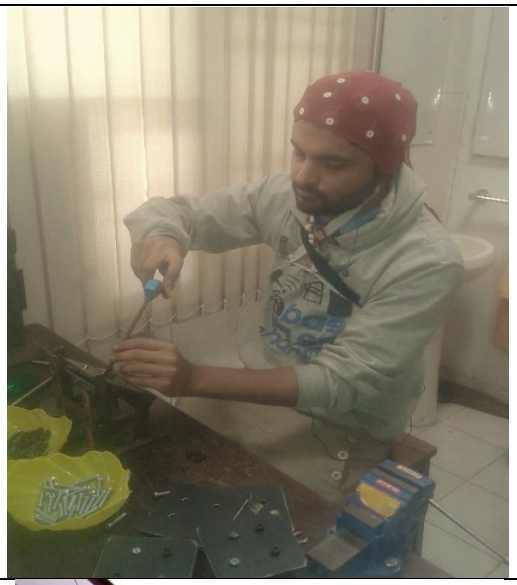
Team:
Dr. Parveen Kalra, PEC, Chandigarh
Dr. Rauf Iqbal, NITIE, Mumbai
Mr. Ishant Gupta, PEC, Chandigarh

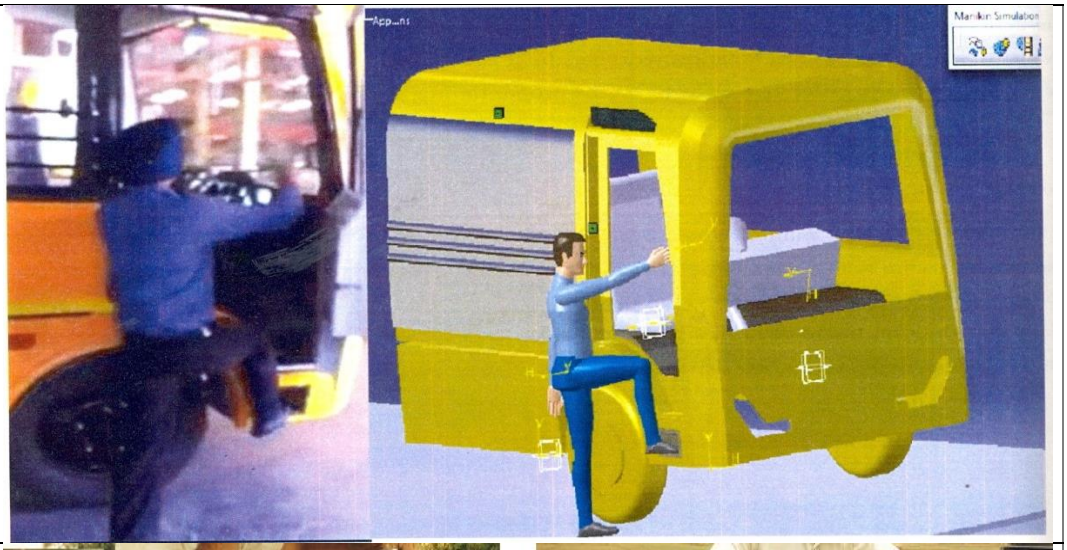
- Estimation of Grip force using Surface Electromyography



Team:
Dr. Parveen Kalra, PEC, Chandigarh
Mr. Sorabh Thakur, PEC, Chandigarh

Other Projects Undertaken / Ongoing

1.	Study of Hand Arm Vibration Exposure of Indian Male Workers		
2.	Physiological Evaluation of Manual Handling of Low Loads at High Frequency		
3.	An Ergonomic Evaluation of Ingress and Egress Motion of Users of Chandigarh Transport Undertaking (CTU) Buses (DST, Chandigarh)		

4.	Ergonomic Evaluation of Ingress/Egress Activity of Bus Driver	
5.	Study of Whole Body Vibration Exposure of Tractor Operators	 

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