20th ISME CONFERENCE

ON

ADVANCES IN MECHANICAL ENGINEERING

(19th- 21st May 2022)

Organized by

Department of Mechanical Engineering
Indian Institute of Technology Ropar
Rupnagar, Punjab-140001, India

In association with

ISME

Indian Society of Mechanical Engineers

(ISME)

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DAY – 2 (20/05/2022)						
Technical Session –II						
8:40 AM - 8:55 AM	**Morning Tea**					
8:55 AM - 9:00 AM	**Welcome address by the organizing secretary**					
Time	**HALL – I (Machine Design)**		**HALL – II (Machine Design)**		**HALL – IV (Materials Manufacturing and Industrial Engineering)**	
	Session Chair **Dr. Navin Kumar** **Dr. Pramod Kushwaha**		**Session Chair** **Dr. Sachin Kumar** **Prof. Manu Sharma**		**Session Chair** **Dr. Anupam Agrawal** **To be announced**	
	Volunteer Shreyas Maheshkumar Patel		Volunteer Sudhanshu Sharma		Volunteer Akshay Sharma	
	Paper ID	**Speaker**	**Paper ID**	**Speaker**	**Paper ID**	**Speaker**
9:00 AM - 9:30 AM	Keynote Address by Prof. S. P. Singh, (Professor, Department of Mechanical Engineering, IIT Delhi)					
9:30 AM - 9:45 AM	472 (Online)	Dr. Anirban Sur	3978 (Online)	Advait Deshmukh	2933 (Online)	LOKESH RAJ
10:00 AM - 10:15 AM	658 (Online)	Chetan Patil	4391 (Online)	Kirtan Kumar Sahu	3617 (Online)	RAUNAQUE PARAVEEN
10:15 AM - 10:30 AM	692 (Online)	Ayush Awasthi	4596 (Online)	K.SUSHEELA	3625 (Online)	VEERAMANI J

10:30 AM - 10:45 AM	733 (Online)	Rishikant Sahani	5021 (Online)	Dr. Govind N. Sahu	3653 (Online)	VEERAMANI J
10:45 AM - 11:00 AM	1366 (Online)	Vivek Joshi	5059 (Online)	Akash prasad sahoo	3792 (Online)	Rishabh kumar verma
11:00 AM - 11:15 AM	Tea Break					
11:15 AM - 11:30 AM	1580 (Online)	Akshay Vitthal Bharati / Prafull Pandharinath Bhalke	5387 (Online)	ARIJIT CHANDA	3923 (Online)	Ankit kumar
11:30 AM - 11:45 AM	2076 (Online)	Shashank Amuluru	5469 (Online)	NARENDRA KUMAR	5013 (Online)	Vipul vijay anantwar
11:45 AM - 12:00 PM	3108 (Online)	Rajeev Kumar	5566 (Online)	Shivam Kumar Dubey	5019 (Online)	Suman saha
12:00 PM - 12:15 PM	3311 (Online)	Dr. Pankaj Sharma	5568 (Online)	Abhijeet Kumar	5290 (Online)	Suresh kumar chintam
12:15 PM - 12:30 PM	3484 (Online)	Tanuj Joshi	5656 (Online)	TAUFEEQ AHMAD	5455 (Online)	Subhankar Dey
12:30 PM - 12:45 PM	3502 (Online)	Abhishek Dewangan	6063 (Online)	Himanshu verma	5850 (Online)	Shivi Kesarwani
12:45 PM - 01:00 PM	3508 (Online)	Pranjali Sunil Phirke	6115 (Online)	ASHISH KUMAR SRIVASTAVA	5872 (Online)	Dr. Phanibhushana M V
01:00 PM - 02:00 PM	Lunch Break (Venue: S. Radhakrishnan Block)					

Robot-Assisted Gait Therapy: a review

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Abstract - Gait therapy has become imperative for motor dysfunction patients, and the robot assisted training through their subjective motion intent, comparing to passive training, is more encouraging to rehabilitation. In this review, the author gives a brief note of robot-assisted gait therapy, as an imminent emerging domain in rehabilitation. Application of robots in gait therapy can augment rehabilitation, but it requires to be used according to well-defined scientific protocols. The domain of robot-assisted gait therapy brings challenges to both engineering and clinical practice.

Keywords: Robot-assisted gait therapy, Gait disorders, Gait analysis, Software.

INTRODUCTION

For some people spontaneous body movement occurs while initiating a walk. But for others, generally due to illness, developing old or injury that consequences in a terrible gait, walking can be very difficult. As for example, an erroneous gait tends to pose the body off-balance, making it difficult to keep one foot in the front of any other and move effectively. In turn, this will become more difficult to go from one vicinity to another barring regular tripping, stumbling and so on. Furthermore, due to lack of one's confidence to navigate rough terrain, mobility is impaired.
Normal gait requires strength, balance, sensation and coordination [1-5]. Human gaits coordinate several muscles acting on various joints [6-8], which are monitored and controlled by cortical and sub-cortical brain structures within the gait network [9]. Gait disorders often cause serious alarms in humans suffering from brain injuries or neurological diseases [5, 10, 11]. Common symptoms for gait disorders are shorter step-lengths [23, 33, 34], much slower walking speeds [12,16] resulting out of disorientated gait variability [13-15, 29,35].

In the present time of COVID-19 pandemic, human lives have been drastically affected due to imposed restrictions such as social distancing, curfews and travel restrictions. This situation has had considerable impact on people having gait related problems. Robot assisted gait therapy at the patient's home can be considered viable options capable of promoting care delivery while adhering to physical distancing measures and reducing the potential exposure to the infectious virus alongside with defending inclined stroke survivors [17-20]. Based on the prognosis, robot assisted gait therapy could be by using either stationary or motion-based robots or, exoskeletons for people suffering from stroke [21, 22], multiple sclerosis [23-26], Parkinson's disease [27, 28], traumatic brain injury [29], spinal cord injury [30-32] or hemiparesis [51]. It was observed that the disability is becoming more and more worrying for people working below the age of 65 [52].

But the results of researchers are hard to summarize because of dearth of uniformity in protocols, settings of robot-assisted gait therapies (e.g., amplitude and frequency of therapeutic sittings, type of robotic assistance) and shady knowledge about impact on brain reorganization, gait recovery [36, 37]. Thus, it's a challenging task to formulate and standardise long-term protocols for robot-assisted gait therapy [22, 36,37,38, 40,41].
Robotic assisted rehabilitation therapy is becoming more popular [53]. Though it was investigated that robotic therapy was not proved to be superior to the conventional therapy especially for the ambulatory stroke survivors [54]. The main reason for that might be the control scheme. To overcome this problem researchers suggested that robots should be used as when required by the patient to be assisted, and for other times the robot would not oppose the normal intended motion of the patient [55, 56, 57]. Similar types of patient-robot cooperative control strategy were tested by researches on LOCOMAT robot [58, 59]. However, it was studied by Krishnan et. al that cooperative control robots can substantially improve the gait movement of the patient whereas none can be found with conventional robotic rehabilitation [60].
Direct influence of robotic assistance on bio-mechanised gaits in healthy persons was studied by past researchers [39, 42,43,44]. Robot-assisted walking was compared with unassisted walking and altered gait patterns [44,48,49] were reported as in higher muscle activity in quadriceps and reduced lower-exoskeletal joint angles for medial-lateral hip

CFP

20th ISME: 20th ISME Conference on Advances in Mechanical Engineering

IIT Ropar

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Conference website	https://sites.google.com/iitrpr.ac.in/isme20/home
Submission link	https://easychair.org/conferences/?conf=20thismeadvancesinme

Topics: machine design | materials manufacturing and industrial engineering | thermal engineering

Present ISME Conference on Mechanical Engineering is the 20th in the series of conferences organized by Indian Society of Mechanical Engineers (ISME). The conference will be held during (19th-21st May, 2022) at Indian Institute of Technology Ropar, Rupnagar, Punjab. To keep abreast of latest developments in the industry, a platform is set-up under the aegis of ISME to organize conferences. The purpose of this conference is to bring together the Mechanical Engineering community to explore, disseminate and strengthen initiatives in new directions under the broad areas of Machine Design, Materials, Manufacturing and Industrial Engineering, and Thermal Engineering. The Conference is aimed at new technological advancements through cutting-edge technologies of Mechanical Engineering.

Submission Guidelines

The organizers invite papers from students, scientists and researchers in academia and industry to present the results of their research and development efforts in Mechanical Engineering. Papers must report original academic or industrial research in any of the following topics, not limited to, but relevant to the conference.

THE LAST DATE OF ABSTRACT SUBMISSION HAS BEEN EXTENDED TO 25th March 2022.

List of Topics

- **Track 1: *Machine Design***

  • Bond Graph Modeling
  •CAD/CAE/FEM/ Modelling and Simulation
  •Fatigue, Fracture and Failure Analysis

- Vibrations/ Condition Monitoring
- Internet of Things (IoT)/ AI / ML
- Product Design and Development
- Design of Mechanical Systems
- Multi-body Dynamics
- Tribology
- Robotics and Mechatronics
- Rotor Dynamics

- **Track 2:** ***Materials, Manufacturing and Industrial Engineering***

- Additive Manufacturing/ Rapid Prototyping
- Micro and Nano Manufacturing
  - Advances in Welding/ Casting/ Forming Processes
  - Conventional/ Unconventional Machining
  - Advanced Manufacturing Processes
  - CIM/CAM/ Modeling and Simulation of Manufacturing systems
  - Composite Materials
  - Powder Metallurgy
  - Non-destructive Testing
  - Supply Chain Management
  - Reliability Engineering/ Quality Engineering Design and Analysis of Experiments
  - Entrepreneurship Development
  - Soft Computing Techniques
  - Lean Manufacturing
  - Product Life Cycle Management/ manufacturing Management

- **Track 3:** ***Thermal Engineering***

- Multi-phase Flow
- Alternative Fuels
- Fluid Mechanics/CFD
- Combustion and IC Engines
- Fluid Machinery
- Heat and Mass Transfer
- Refrigeration and Air-conditioning
- Renewable Sources of Energy
- Thermal Systems Simulation

Committees

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Publication

The presenters should submit an abstract of approximately 300 words with Times New Roman, 12 point fonts in Windows-based Microsoft Word (.doc/.docx) document by attaching an e-mail to isme20@iitrpr.ac.in by mentioning the Track No. in the mail subject with other relevant details. The submission shall be reviewed by a peer committee. Selected manuscripts will be accepted for oral presentation. All the templates and detailed guidelines will be available at our website. Selected Papers of 20th ISME conference will be published in ISME journals (Journal of Mechanics and Design, Journal of Thermo fluids, Journal of Manufacturing Sciences) /sci/scopus indexed after conducting the review process of these journals.

Venue

The conference will be held in HYBRID MODE and will be hosted by IIT Ropar.

Contact

All questions about submissions should be emailed to ...

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