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2024



International Industrial Revolution 4.0 Exposition

"INNOVATING IDEAS, TRANSPIRING DREAMS"

ABSTRACT BOOK

Strategic Partners:



Perpustakaan
Sultan Badlishah

Organized By:

**COLLEGE OF COMPUTING, INFORMATICS AND MATHEMATICS,
UNIVERSITI TEKNOLOGI MARA, KEDAH BRANCH**

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UITM Cawangan Kedah Channel

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IREx 2024

The successful inauguration of IR4.0 Exposition IREx 2019 has witnessed ground breaking initiatives, ideas, and innovations materialised into numerous practical devices today. Treading on the same triumph, the College of Computing, Informatics, and Mathematics, UiTM Kedah is thrilled to announce the continuation of said event, IREx 2024 with the theme: *Innovating Ideas, Transpiring Dreams*.

The IREx 2024 aspires to incorporate even more exciting new technologies including, but not limited to, Information & Communication Technology (ICT), Educational Technology & Innovation (ED), Operational Excellence (OE), Internet of Things (IoT), Process Improvement, Ideas & Design, Multimedia, and Electronics that will chart new milestones in human history. This will serve as an excellent platform for scientists and innovators alike to meet the like-minded individuals and showcase inspiring ideas and notable innovations.

PROGRAM SCHEDULE

International Industrial Revolution 4.0 Exposition (IREx 2024)
21ST May 2024 (Tuesday)
Dewan Perdana, UiTM Kedah Branch

TIME	EVENT
8.00 – 9.00 am	Registration & Booth Set Up
9.00 am – 12.00 pm	Exhibition & Judging Session
12.00 pm – 2.00 pm	Obedient Drone Session & Break
2.00 pm – 5.00 pm	Official Closing & Prize Giving Ceremony
5.00 pm	Program Ends

Official Closing Ceremony

International Industrial Revolution 4.0 Exposition (IREx 2024)

TIME	EVENT
2.00 pm	Arrival of Guests and Participants
2.30 pm	Arrival of VVIP
	National anthem - Negaraku And Wawasan Setia Warga
2.40 pm	UiTM
	Welcoming Speech
3.00 pm	Rector's Welcoming Speech
	Officiating Speech
3.10 pm	Gimmick & Montage presentation
3.30 pm	Prize Giving Ceremony
4.00 pm	Photography
5.00 pm	Program Ends

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CATEGORY D

CLOSED-LOOP PID CONTROL SYSTEM FOR ENHANCED PRECISION POSITIONING OF PIEZOELECTRIC ACTUATORS

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ABSTRACT - Precision positioning of piezoelectric actuators is essential for various applications, yet traditional control systems often struggle to overcome hysteresis, leading to inaccuracies. This study addresses this research gap by proposing a Closed-Loop PID Control System to enhance precision positioning capabilities while mitigating the effects of hysteresis. The problem statement revolves around the challenge of hysteresis in achieving desired positioning accuracy, underscoring the need for robust control mechanisms. The objectives are to design a control system capable of compensating for hysteresis and to achieve superior precision positioning. Arduino UNO is utilized for real-time implementation of the PID controller, while Matlab is employed for system modeling, simulation, and tuning, specifically targeting hysteresis compensation. The findings demonstrate that the PID controller effectively reduces the impact of hysteresis, resulting in significantly improved positioning accuracy compared to open-loop systems. Future recommendations include further investigating advanced hysteresis compensation techniques and exploring practical implementation in real-world scenarios. This research contributes to advancing precision control techniques for piezoelectric actuators, with potential applications in areas requiring high accuracy despite hysteresis effects, such as nanopositioning and precision manufacturing.

Keywords: Piezoelectric Actuators, Precision Positioning, Closed-Loop Control, PID Controller, Hysteresis



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