

Organised by :



RICAEN
Research Industry Community
Alumni Entrepreneurship Network

Programme by :

INSPIRED 2024
IPOH INTERNATIONAL SUMMIT ON
PROFESSIONALISM, RESEARCH & EDUCATION

In Collaboration With :

BITCOM
BUSINESS INNOVATION & TECHNOLOGY COMMERCIALIZATION CENTRE

MRM
MAJLIS REKABENTUK MALAYSIA

MDECTM



13TH INDES 2024
ENVIRONMENTAL • SOCIAL • GOVERNANCE

THE 13TH INTERNATIONAL INNOVATION, INVENTION & DESIGN COMPETITION 2024

EXTENDED ABSTRACTS

e-BOOK

EXTENDED ABSTRACTS e-BOOK

THE 13th INTERNATIONAL
INNOVATION, INVENTION &
DESIGN COMPETITION 2024



Organized by:
Office Of Research, Industry,
Community & Alumni Network
UiTM Perak Branch

© Unit Penerbitan UiTM Perak, 2024

All rights reserved. No part of this publication may be reproduced, copied, stored in any retrieval system or transmitted in any form or by any means; electronic, mechanical, photocopying, recording or otherwise; without permission on writing from the director of Unit Penerbitan UiTM Perak, Universiti Teknologi MARA, Perak Branch, 32610 Seri Iskandar Perak, Malaysia.

Perpustakaan Negara Malaysia

Cataloguing in Publication Data

No e- ISBN: 978-967-2776-31-4

Cover Design: Dr. Mohd Khairulnizam Ramlie
Typesetting : Zarinatun Ilyani Abdul Rahman

EDITORIAL BOARD

Editor-in-Chief

ZARINATUN ILYANI ABDUL RAHMAN

Managing Editors

NUR FATIMA WAHIDA MOHD NASIR

SYAZA KAMARUDIN

Copy Editors

ZARLINA MOHD ZAMARI

DR NURAMIRA ANUAR

NORLINDA ALANG

DHAYAPARI PERUMAL

WAN FARIDATUL AKMA WAN MOHD RASHIDI

HALIMATUSSAADIAH IKSAN

NURDIYANA MOHAMAD YUSOF

ONG ELLY

NURSHAHIRAH AZMAN

MUHD SYAHIR ABDUL RANI

DR PAUL GNANASELVAM A/L PAKIRNATHAN

AMIRUL FARHAN AHMAD TARMIZI

SYAREIN NAZRIQ MARIZAM SHAHRULNIZAM

NAZIRUL MUBIN MOHD NOOR

NOR NAJIAH NORAFAND

INTAN NOORAZLINA ABDUL RAHIM

AZIE AZLINA AZMI

NOORAILEEN IBRAHIM

IZA FARADIBA MOHD PATEL

SWITCHLINK: SMART IOT PLUG CONTROL AND MONITORING SYSTEM

Hasnul Harith, Danish Hakimi, Zarul Airil, Nasraan Shah Nasser & Hanafiah Yusoff

Kolej Vokasional Lebuh Cator, Lebuh Cator, 30450 Ipoh, Perak

g-71189291@moe-dl.edu.my

ABSTRACT

SwitchLink is pioneering an IoT-based switching system that focuses exclusively on the seamless remote control of electrical devices. By leveraging IoT technology, SwitchLink revolutionises the management of plugs and offers unprecedented convenience in the operation of plugs. Although its main function is switching, SwitchLink indirectly contributes to ESG goals. From an environmental perspective, its remote switching function can reduce energy waste by allowing users to turn off appliances when not in use, indirectly minimising the carbon footprint. In addition, SwitchLink promotes social responsibility through its convenience and accessibility by providing equal access to socket control for people with different needs. In terms of corporate governance, SwitchLink places great emphasis on data security and user privacy to uphold ethical standards and ensure trust in the company. While SwitchLink focuses primarily on switching functionality, its user-friendly interface and IoT integration also indirectly support ESG goals by promoting energy savings, inclusion, and ethical governance practices in the management of electrical outlets.

Keyword: IoT-based switching system, ESG goals, energy savings, data security & social responsibility

1. INTRODUCTION

The emergence of Internet of Things (IoT) technologies has catalysed innovation across various sectors, including the management of electrical devices. In this context, SwitchLink, a pioneer in IoT-based switching systems, presents a significant advancement in the remote control and management of electrical plugs. Unlike conventional switching systems, SwitchLink offers seamless remote access to plug operations, thereby enhancing convenience and efficiency for users. At its core, SwitchLink's functionality enables users to remotely control electrical devices, empowering them to turn off appliances when not in use. This feature not only enhances user convenience but also aligns with broader environmental, social, and governance (ESG) goals by minimising energy waste and promoting energy efficiency, thus addressing pressing environmental concerns.

Furthermore, SwitchLink embodies principles of social responsibility by ensuring accessibility and inclusivity in socket control. By providing equal access to plug management for individuals with diverse needs, SwitchLink promotes social equity and inclusion within its user base. In addition, SwitchLink places a strong emphasis on corporate governance by prioritising data security and user privacy, thereby upholding ethical standards and fostering trust among its users. These attributes underscore SwitchLink's significance in not only advancing switching functionality but also in indirectly supporting broader ESG goals by promoting energy savings, inclusion, and ethical governance practices in the management of electrical outlets.

2. METHODOLOGY

In implementing the Closed Loop Diagram and Automation Paradigm Model for SwitchLink, as shown in Figure 1, the methodology unfolds in three distinct phases. The first phase, "Sense," encompasses the deployment of sensor technology to perceive and collect data from the surrounding environment. Sensors are strategically placed to capture relevant parameters such as electrical usage patterns, temperature variations, and occupancy statuses. This initial step forms the foundation of the closed loop, facilitating the continuous acquisition of real-time data essential for informed decision-making within the system.

Subsequently, in the "Think" phase, SwitchLink assumes a pivotal role as the central processing unit. Leveraging the data gathered by the sensors, SwitchLink engages in sophisticated analysis and decision-making processes. It evaluates the incoming data against predefined criteria or user-defined preferences to determine appropriate actions. This intelligent processing enables SwitchLink to adapt dynamically to changing environmental conditions and user requirements, optimising the efficiency and effectiveness of its operations. Finally, in the "Act" phase, the IoT system interfaces with electrical devices and plugs to execute the actions dictated by SwitchLink. Through seamless integration and automation, the IoT system implements the desired adjustments, such as remotely turning appliances on or off, based on the insights derived from the preceding phases. This iterative process forms a closed loop, ensuring continuous monitoring, analysis, and action within the SwitchLink ecosystem, thereby enhancing its functionality and user experience.

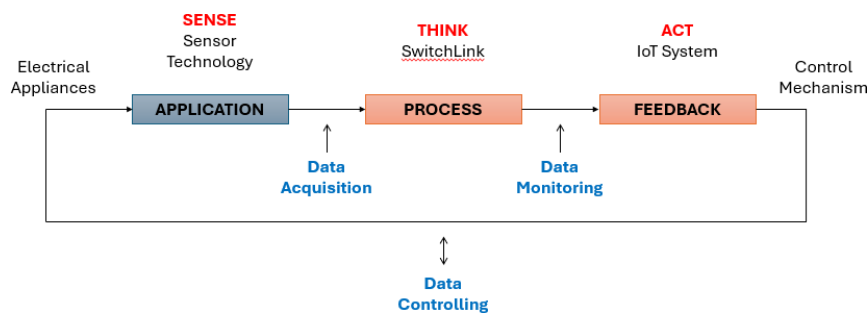


Figure 1 Closed Loop System and Automation Paradigm Model

3. FINDINGS

The findings from the data collected as shown in Table 1, including voltage, current, power, energy, and frequency measurements of both the refrigerator and stand fan, revealed significant insights into the operational characteristics of these electrical devices within the SwitchLink system. Analysis of the data showcased variations in energy consumption patterns and power usage profiles, shedding light on opportunities for optimising energy efficiency and reducing overall consumption. Furthermore, the visual representation of the SwitchLink system connected with the refrigerator and stand fan as shown in Figure 2 provides a clear illustration of the integration and functionality of the IoT-based switching system, highlighting its potential for remote control and management of electrical devices. These findings underscore the efficacy of SwitchLink in facilitating informed decision-making, enhancing user control over energy usage, ultimately contributing to sustainability efforts, and promoting efficient resource management.

Surat kami : 700-KPK (PRP.UP.1/20/1)

Tarikh : 20 Januari 2023

Prof. Madya Dr. Nur Hisham Ibrahim
Rektor
Universiti Teknologi MARA
Cawangan Perak



Tuan,

**PERMOHONAN KELULUSAN MEMUAT NAIK PENERBITAN UiTM CAWANGAN PERAK
MELALUI REPOSITORI INSTITUSI UiTM (IR)**

Perkara di atas adalah dirujuk.

2. Adalah dimaklumkan bahawa pihak kami ingin memohon kelulusan tuan untuk mengimbas (*digitize*) dan memuat naik semua jenis penerbitan di bawah UiTM Cawangan Perak melalui Repositori Institusi UiTM, PTAR.

3. Tujuan permohonan ini adalah bagi membolehkan akses yang lebih meluas oleh pengguna perpustakaan terhadap semua maklumat yang terkandung di dalam penerbitan melalui laman Web PTAR UiTM Cawangan Perak.

Kelulusan daripada pihak tuan dalam perkara ini amat dihargai.

Sekian, terima kasih.

“BERKHIDMAT UNTUK NEGARA”

Saya yang menjalankan amanah,

SITI BASRIYAH SHAIK BAHARUDIN
Timbalan Ketua Pustakawan

nar

Setuju.

27.1.2023

PROF. MADYA DR. NUR HISHAM IBRAHIM
REKTOR
UNIVERSITI TEKNOLOGI MARA
CAWANGAN PERAK
KAMPUS SERI ISKANDAR