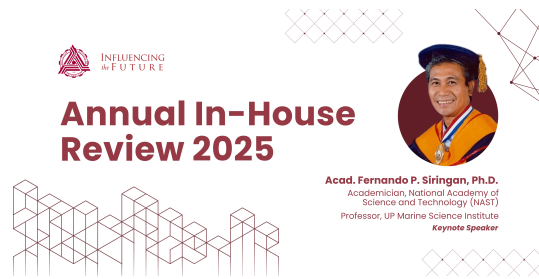


23rd MSU-IIT Annual In-House Review of Research and Development Projects



Contribution ID: 37

Type: not specified

Portable PLC Based Automatic ABACA Fiber Extraction Machine using Decortication Method

Monday, October 20, 2025 1:00 PM (4 hours)

Abstract: Abaca fibers are highly valued for their renewable, biodegradable, sustainable, and eco-friendly qualities, making them an excellent alternative to synthetic fibers. However, the conventional extraction process remains labor-intensive and hazardous. This study presents the development of a PLC-based automatic abaca fiber extraction machine using the decortication method. The prototype was designed, fabricated, and evaluated based on its efficiency, performance, and operational safety. Key components of the machine include a Programmable Logic Controller (PLC) for automation, a Variable Frequency Drive (VFD) for motor speed control, and a Human-Machine Interface (HMI) for real-time monitoring. Developed at Mindanao State University –Iligan Institute of Technology, the prototype underwent multiple test runs to assess its repeatability, efficiency, and capacity. The machine achieved a decortication efficiency of 72.34%, with processing capacities of 3.67 g/hr. It also attained a 100% success rate (519.4 g output), demonstrating strong functional reliability in extracting abaca fibers. Additionally, performance evaluations conducted with 25 abaca farmers indicated generally positive feedback, particularly highlighting the machine's potential to enhance safety and productivity. The results suggest that the proposed design offers a viable solution to the challenges associated with traditional abaca fiber extraction.

Key Words: programmable logic controller (plc), decortication method, human machine interface (HMI), automated system, abaca extraction

Authors: JACO, Leah Nicole (Department of Computer Engineering and Mechatronics); ALASAGAS, Victor (Department of Computer Engineering and Mechatronics); ACAL, John Christian (Department of Computer Engineering and Mechatronics); ORIBE, Mark Brylle (Department of Computer Engineering and Mechatronics); CABAUG, Glenn Mark (Department of Computer Engineering and Mechatronics); PACQUAIO, Benjamin Jr. (Department of Computer Engineering and Mechatronics); NADAYAG, Praise (Department of Computer Engineering and Mechatronics); BALDONADO, Faith (Department of Computer Engineering and Mechatronics); MARAJAS, Erman (Department of Computer Engineering and Mechatronics); REQUINO, Roque (Department of Technology Teacher Education, College of Education); MASCARDO, Ivan Michael (Department of Computer Engineering and Mechatronics); BOTE, Riza Mae (Department of Computer Engineering and Mechatronics); LIBRADO, Lester (Department of Computer Engineering and Mechatronics)

Presenter: LIBRADO, Lester (Department of Computer Engineering and Mechatronics)

Session Classification: Poster Presentations

Track Classification: Ongoing Projects: Business, Engineering, and Technology