# Intelligent Gaming Robot: Robotic Solution for the Traditional Sri Lankan Board Game 'Nerenchi'

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Nerenchi, a board game, deeply rooted in Sri Lankan culture, involves strategy and skill, making it a challenging and engaging pastime. Traditionally played with two players, the game is known for its intricate rules and strategic depth. Nerenchi is under the threat of extinction and there is a need for innovative solutions to modernize and preserve these games, making them appealing to contemporary audiences and protecting these cultural games. This paper presents the design and implementation of an Intelligent Gaming Robot, capable of playing the traditional Sri Lankan board game, 'Nerenchi', with a human opponent. A monitoring system, knowledge-based decision-making system, and a robotic system are the 3 main units of this proposed system that can easily identify, make decisions, and act according to the game stage and the opponent's movements. The monitoring system is used to identify the positions of the board and the Nerenchi pieces by image processing techniques and according to that data, the knowledge-based decision-making system with a prolog rule-based engine specially designed to Nerenchi sends instructions to the robotics system, that used to place, remove and replace the Nerenchi pieces using a robotic arm with 4 servo motors. This innovative approach combines advanced robotics and human-computer gaming to preserve and modernize traditional board games, offering a unique blend of heritage and technology. The paper mainly details the hardware architecture and techniques, the computer vision algorithms employed, and rule-based decision-making process, demonstrating the feasibility and effectiveness of the proposed system.

**Keywords**: *human-computer gaming, rule-based gaming systems, Sri Lankan traditional games*