Design and development of a PLC-based semi-automated *Kottu Roti* preparation machine

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With the rise in demand for automation in the food industry, there is growing interest in developing machines that can maintain the authenticity of traditional cooking while improving efficiency and hygiene. This research focuses on the development of a Smart *Kottu Roti* machine, which automates the process of preparing *Kottu Roti*, a popular Sri Lankan food traditionally made by skilled chefs. The primary aim is to reduce labour and improve consistency without compromising the taste and texture. The machine was developed using a combination of mechanical, electrical, and software subsystems. Stainless steel and food-grade materials were used for all food-contact parts to ensure hygiene. A PLC-based control system integrated with push buttons allow users to interact with the machine, monitor the process, and select batch modes. A stepper motor-driven mixing system and automated feeding units replicate the chopping and mixing techniques typically done manually. The methodology involved field studies of traditional *Kottu Roti* preparation to understand ingredient order, mixing times, and heating stages. This information was then used to programme the machine's operation using a time-based sequence. Trials showed that the system could prepare a portion of *Kottu Roti* in less than five minutes. Feedback from sensory testing with university students confirmed that the machine-produced *Kottu Roti* was comparable in both taste and texture to manually prepared versions. This project demonstrates that it is possible to preserve culinary heritage while applying modern automation for scalability and efficiency. Future improvements will focus on refining ingredient dispensing and integrating an automated cleaning system.

***K*eywords:** *Kottu Roti machine, Food automation, PLC control, Traditional food processing*