

Automatic Chapati Making Machine Model

An Arduino-controlled demonstration machine that presses dough balls into flat discs and bakes them on a thermostat-controlled hot plate.

1. Introduction / Background

Mechanising flatbread production is a staple of food-process automation: sheeting, portioning and thermal treatment must run in sequence with consistent timing.

This project builds a working demonstration model of that sequence: a dough hopper feeds balls to pressing rollers, the pressed discs transfer to a hot plate whose temperature is held by a thermostat, and a servo ejects the finished chapati to a tray.

2. Problem Statement

Manual chapati making is repetitive and inconsistent in thickness and baking time. The automation challenge — uniform pressing, timed transfer, temperature-controlled baking — is a compact sequencing problem with mechanical, thermal and control content, which this model demonstrates at bench scale.

3. Objectives

- Feed dough balls from a hopper and press them to uniform discs with adjustable rollers.
- Transfer each pressed disc to a thermostat-controlled hot plate for timed baking.
- Sequence the full cycle under Arduino control with start/stop, cycle counter and safety cutoff.

4. Proposed Methodology

An Arduino Nano sequences the cycle: the hopper release drops one dough ball between the rollers, which press it to the set thickness; the disc is transferred to the hot plate; the plate temperature is held near the setpoint by a thermostat loop using thermocouple feedback; after the timed bake, a servo arm pushes the chapati to the collection tray and the counter increments.

5. System Architecture / Working

- Mechanical: dough hopper, pressing rollers with adjustable gap, transfer arm, hot plate with thermocouple, servo ejector.
- Control: Arduino Nano sequencing with thermostatic temperature loop; start/stop push-buttons; cycle counter.
- Safety: over-temperature cutoff at the design limit; cycle interrupt on stop.

6. Hardware / Software Requirements

- Arduino Nano, DC/gear motors, servo, K-type thermocouple, thermostat/relay for hot plate, pressing rollers, stainless hot plate, cycle counter, push-buttons.

- Arduino IDE (C/C++); mains-powered hot plate with isolated control relay.

7. Expected Outcomes

- A working cycle demonstration producing pressed, baked chapatis at bench scale.
- Buyer-adjustable roller gap, bake time and temperature setpoint.
- A complete report, PPT and viva Q&A; on sequencing, thermostatic control and food-machine design.

8. Applications

- Food-process automation teaching.
- Canteen/kitchen equipment design study.
- Sequencing-control demonstration.

9. Future Scope

- Automatic dough balling from bulk dough.
- Dual-side baking with flip mechanism.
- Humidity and thickness closed-loop control.

10. Conclusion

The model demonstrates the complete make-cycle — feed, press, bake, eject — in one honest bench build, scoped plainly as a demonstration rather than a commercial food machine.