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(57) Abstract :

The present invention relates to a smart trolley self-checkout system for automated retail transactions. The system integrates RFID-based product identification, LiDAR-based physical presence verification, and weight-based validation using load cells to enable multi-layer verification of products placed in a shopping trolley. An embedded control unit cross-verifies product identity, presence, and weight to prevent unauthorized addition, removal, or substitution of items. Verified products are displayed on a user interface and billed automatically, with payment completed directly at the trolley through digital payment modes. The system further synchronizes verified transactions with a backend inventory platform, thereby reducing checkout time, minimizing fraud, improving inventory accuracy, and enhancing overall retail efficiency.

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