

Server-Based Vending Machine in the context of Nepal

Abstract—This paper aims to propose the concept of a “Server-Based Vending Machine” in the context of Nepal. In this approach, we put forward the design of server based (remote) monitoring of system and product’s data. The server and vending machine are connected via Node MCU and duplex communication is established between them. All the data of ordered items are sent to the server while updated data of product price by owner are sent to a vending machine. According to product data, the product’s cost, quantity, and quality are maintained. When items in the vending machine are going to be out of stock i.e. less than 2 in quantity in the vending machine, it alerts the owner through the server so that owner can restock before time. A customer has the availability of both cash or card as payment methods. As for cash payment, the system uses an IR sensor to detect cash so that cash is pulled inside, and once cash is completely pulled inside Raspberry PI and PI camera performs image processing to detect and validate the amount of cash. If cash is not sufficient system asks to insert more cash. The system showed an confidence level of about 95% to 98% for cash detection while the fps of Raspberry PI was approximate 0.8. And for card payment, an RFID card is used. The system verifies the card tag id and balance in it and deducts the amount from it. Once the whole transaction is completed items are dropped in a container via controlled motorized action. The ultimate goal is to produce a user-friendly vending machine to enhance the customer purchasing experience as well as easily manageable by an owner.

Index Terms—Server-based Monitoring, Cash Payment, Card Payment, Image Processing, Serial Communication, Non-Maximum Suppression(NMS).