Vending Machine for Smart Gifting Under-Privileged People

Ayman Alharbi¹

Assistance Professor Computer Engineering & Deputy General Supervisor of Investment Management, Umm Al-Qura University, Kingdom of Saudi Arabia.

Abstract: In this paper, we propose a design and implementation technique for smart gift vending machine using biometricbased authentication. This proposed machine is to facilitate, the process of gifting in publicity or privately without knowing the gift taker or end-user. This process is done automatically, without any extravagance in gifts by the end-user. This proposed model benefits with its systems, methods, construction and designs of Smart-Gifting machines and systems, to provide many products types (like gifts, such as books, snacks, beverage, etc.,) provided to the public or private. It will be taken by the end-user according to a gifting strategy in which a plan to determines the certain quantity of time to be set by the operator, client or the owner of Smart-gifting machines. In such a way that the Smart-Gifting machine will work automatically with gift takers or end-users without gifts at the same time without violating their privacy. The Gifting Machine Captivate Technology is a fingerprint-based full hand detection database created at a certain time. The results meet the IEC 61000-4-6 Class A requirements.

Index Terms: Vending Machine, Smart Gifting Machine, Human-Machine Interaction, Fingerprint feature extraction, minutia; GUI Microcontroller.

I. INTRODUCTION

A vending machine is a robotized machine that gives things, for example, snacks, refreshments, cigarettes and lottery passes to shoppers after cash, a Visa, or an extraordinarily structured payment to serve in customers to an automated system. In Invention of Vending machine system were developed in England was 1880 and it can be used for Postcard department to Split the postal cards in Zip code. In such cases, nowadays vending machines are moreover country available and multi-purpose product delivery for the help of Human Beings. In numerous nations, present and later occasions, specific vending machines that give less normal items contrasted to all smart system and much more convenient to the customers and industrial needs.

II. BIOGRAPHY VENDING MACHINE

The well-known vending machine invented for a designer of Hero of Alexandria, he was one of the famous designers and mathematician in Roman Egypt country. That machine is working metal currency (Coin) is afterwards apportioned blessed water. In such case when the coin was stored, a dish appended to a switch. At the switching mechanism is operated and provides the hot water. In container kept on tilting with the heaviness of the coin until it tumbled off, so, all in all, a stabilizer gobbled the switch up and Closed the water mechanism. The metal-based currency worked and apportioned ahead of schedule as 1615 in the bars the United Kingdom. At convenient and the reference of a book shop, Richard Carlile contrived to paper administering machine and is discovered by 1822. One of the English people namely Simeon Denham to check-in working principle and appointed to enrol patient to collect water in that machine. It was the first tested vending machine in Hospital in 1867.[15]

III. MECHANISMS ON EXISTING SYSTEM

In common Mechanism for vending machine is properly made by metal and some brush & Brushless motors for the important role of the vending machines. The working principle of the existing system is larger, and it can communicate only the onsite operator for the problem defining and rectifying. [15] In such instalment to offered, an item to make end up accessible mechanism discharging gradually, with the goal of every block operates in motor-based mechanism and it can deliver the cup of coffee or hot &cold beverages as well as snacks. A few items should be set up to end up accessible. For instance, a token has printable and cost charged to the persons and the person can collect some variety of options available like espresso. Latte, Green coffee, hot water and milk newly composed. For the smart machines will involve, to entryway naturally comes back to a bolted position. A client could open the container and take every one of the papers or, to serve different clients, leave most of the coffee vending machine as well as the same principles and methods to other machines like paper vending machine food delivery machines, snacks and beverage vending machines.

IV. OVERCOME EXISTING SYSTEM

Like the improvement of conventional cell phones into cell phones, vending machines have likewise logically, however at a much slower pace, advanced into keen vending machines. More up to date advances at a lower cost of reception, for example, the huge computerized contact show, web availability, cameras and different sorts of sensors, more financially savvy installed processing power, computerized signage, different propelled instalment frameworks, and a wide scope of recognizable proof innovation (NFC, RFID, and so on) have added to this improvement. These savvy vending machines empower a progressively intuitive client experience and decrease working expenses to develop effectiveness and smart tasks in wireless communication sensibility insightful to research scientific involvement. Incorporated some advanced technology like sensors, Digi-Cam and Artificial Intelligence

additionally speak to wellspring together information to client socioeconomics, buy patterns, and other area explicit data. It likewise empowers better client commitment for the brands through intelligent interactive media and web-based social networking availability. Keen Smart Machines Insight on towards rundown to absorbed to Statics for 2014. As indicated by statistical surveying by Ice and Sullivan, worldwide to communicate one to one savvy and shipped to estimated stretch to achieve a target for 2018. In such case 3.6 Million Target to place in the future year 2020 for industrials production stage survey.

V. LITERATURE SURVEY

The nourishing nature of nourishment and refreshment items to delivery and involved at a part of the contribution element for improvement to nourishment condition. whenever exhaustive, dependable, furthermore, substantial is the present appraisal devices for vending machines to help or discredit these cases? A methodical audit was directed to outline, look at, and assess the present procedures and accessible devices smart evaluation technology.[1] For some number of pertinent to do Research & Review concentrates distributed to the consideration for the result of the survey. The implementation factors evaluated examination incorporate evaluation apparatus type, study area, machine openness, item accessibility, invigorating effect criteria, partition size, value, item advancement, and nature of logical pieces of training.[2] Some dynamic varieties of profundity appraisal systems, item restorative effect measures to be used some investigated examines. In audited examines, 39% Smart Vending Machines availability assessed, 91% item accessibility assessed, 96% built-up invigorating effect criteria, 70% assessed segment size, 48% assessed cost, 52% assessed item advancement and 22% assessed the nature of the logical practice. Of all investigated articles, 87% arrived at resolutions that gave knowledge into the empowerment of distributed items or potentially vending condition. [1,3] Item refreshment criteria and multifaceted nature for bite and drink items were likewise seen as a factor between the investigated considers. These discoveries make it hard to think about results between ponders. An all-inclusive, substantial, and dependable vending machine appraisal apparatus that is thorough however easy to use is prescribed. [4,5]

Vending machines in IoT based smart dispense coffee beverage to the people. About this product provides refreshment e.g. titbits, Cooldrinks beverage, hot coffee and tea, espresso, latte, etc. [8] In the Existing frameworks is worked various types of currency for payment mode of working principles, Existing product exhibits a framework for not works to currency it can be work only an RFID based Smart cards. In that framework provide an operation to the client to the main that is Radio Frequency Identifier to evolve the process to read the card identification. After identifying the RFID then the cost and the product [9] As we describe the problem faces in this system is to be easily anyone can Fix the RFID number and it can be misused and too RFID card Reader is not working if any magnetize materialism to be present in near. The small chip & Reader is placed to the smart system. [12] Our framework is online-based cost transaction-based coffee vending machine. As indicated by estimation, the quantities of cups every day according to the customer's necessity are customized.[11] At that point, a representative demonstrates the system operation for every setting for beverage administered. In any case, when a representative needs a bigger number of espressos a fixed number, that individual is taken into consideration that, yet that work needs to pay for additional cups and sum is cut from the compensation account.

VI. OBJECTIVES

- Proposed Vending Machine is based on consumer product which provides the gift for peoples.
- Gift product is based on enrolling & Storing Fingerprint-based Gift Disposing Vending Machine.
- Vending Machine is pre-defined programmed for timing to gifting options for people which if they can get an only certain period (24 Hours) per one gift.
- Our product is connected for one to one data sharing via network and combined data system to dispose of gift and analyzing data for gift buyer information.

VII. METHODOLOGY

Our Gifting Smart Vending Machine (GSVM) is a Smart Automation System, it can access to personal identification to provide gift and create the database for the daily report. And it can be providing different types of Foods and Cold & Hot drinks as well as some usable needs (Books, Clothes). Our Product Does not require any manpower to operate and its fully automated microcontroller-based Smart Gifting Machine and it's enabled with IoT to monitor and it can access via control station. Two essentials role that is offered by a vending machine which is product and services. The main functionality of the vending machine relies on delivering the product with different cost and price. After Placed fingerprint, a product may get to be distinctly accessible by the machine dispose gift it at the base of the vending machine. In the process, it will create the database for every person to identify and if the same person is again placed fingerprint it cannot provide a gift and gives alert sound.

VIII. HARDWARE ARCHITECTURE

In fig.1 is shown the architecture for SGVM. It has two important roles for namely control circuit and motor drive. A Control circuit, its control and execute the process with the help of microcontroller.



Fig. 1 Hardware Architecture

The Motor driver is driving the motors for movements of rack and optimize the position of delivery. Additional features for the cooling system for a long-time running process to cool the temperature for the help of a fan.

a. HARDWARE DESIGN Integrated Hand Module Design:



- In hardware design, we use the controller of MSP430 32-bit Microcontroller.
- The MSP430FR2633 is an ultra-low-power, FRAM-based MSP430 MCU featuring Captivate Technology.
- Fig 2 shows a structured hypothesis behind the schematic and format of each PCB examined in this area. Fruitful capacitive contact detecting structures start with well-planned equipment.
- The Fingerprint interfaces the microcontroller to MIMO process.
- The Fingerprint sensor module is to detect and send the data to the microcontroller and it saves the data backup to the storage device.

IX. SOFTWARE ARCHITECTURE:



- 1. When the user put his finger in the module will capture the fingerprint template
- 2. The FP module will compare that captured FP with the database, then next will happen step by step as shown in fig 3:
- a. If that captured FP not existing, then the module will return that present fingerprint does not exist in the module. Then the controller will issue a command to register it with an automatic ID and keep the present time as the counted record in separate registration time database. Thus, the registration process completes automatically for the user who uses the machine for the first time in a predefined time limit. The machine will dispense the user snack according to the option of the product he/she selected and shows him "This your first snack ".
- b. If that captured FP already exists, then the FP module will return the registered ID of the fingerprint. The controller will compare the current time with the 24hours/N periods, where is N is the number of periods per day:
- i. If the verified ID is in the current period (this means the user has taken his snack in this period); and the machine will not give anything and shows "please try next period".
- ii. If the verified ID is not in the current period (this means the user have to take his snack in this period); and the machine gives a snack and shows "please take your snack number N"; this "N period" determined by the server administrator.
- c. The controller will erase all the registered fingerprint template from the database if the present time equal to 24:00 midnight, (Here the time 24 hours is a variable and can be changeable as per the user) then the controller will start the process again from point a.

X. SGVM DESIGN:

1. Fig.4 shows the sample design for Smart Gifting Machine Body with guidelines.



Fig.4 Sample Design SGVM

- 2. Biometrics Scanner / Reader
- 3. User's Help Panel.



- Fig.5 Model Diagram SGVM
- 4. A glass door with a screen or without a screen showing the user the gifts available.
- 5. Fig 5 shows the detect and Opening of gifts options like A
- 6. Opening of gifts B
- 7. Communication screen with client and user
- 8. Tools for selection and interaction with end-users and customer
- 9. End-user or the gift taker
- 10. Customer, Owner or Machine Operator
- 11. Fig 6 is the raw data for Biometric characteristics data read.
- 12. The raw data shows that the measurements disrupted in wider bands around the four scan Frequencies than in the untouched case.
- 13. Characteristics database of biometrics record during for the process.
- 14. Gifts dispensed a product which can be a gift all kind of foods, snacks, drinks or books..., etc.
- 15. After dispensed and time slot over a period then database erased outside the period and processed data.
- 16. End-user or the gift taker
- 17. Client, Owner or Machine Operator



Touched, Raw Data (Count vs Time)

Fig.6 Raw Data output

XI. RESULT

- Data from the sensors on the touch panel collected using the Captivate Design Centre.
- The measurements continuously recorded while a frequency sweep performed on the noise across the range of 300 kHz to 80 MHz, during the test, no false touches recorded on any of the buttons.
- The first four peaks can identify as points when the noise coupled with the power supply was at a fundamental scan frequency.



Fig.7 SGVM physical Structure

- The software correctly identified a touch for the entire duration of the test.
- Fig 7 is a physical structure for smart gifting vending machine [SGVM].

XII. FUTURE ENHANCEMENT

- However, the filtered output of the Captivate Technology is consistently in the touch range as expected.
- Some noise appears in the filtered output when it stressed to this degree, but the performance of the interface is not impacted. We can short out and improved filter capability.
- We can implement IOT based individual Automation gifting Machine.
- We can link to Identity proof (Government & Private) for Gift Receiving.
- Online based Stock Check and Alert message to Service center.
- Can be added three-step verification for person identification and receiving gift validity check.
- Can be added solar-based vending machine for unmanned coverage area.

XIII. CONCLUSION

A wide scope of appraisal instruments and systems were right now accessible to gauge and assess various parts of the vending machine condition. Nonetheless, the significant inconstancy in procedures and built up fortification criteria make it hard to think about outcomes between considers.

This Exploration Task centres around programmed Gifting vending machine for needy individuals' utilizing the Propelled equipment design with redesigned controller and Unique mark based autodetecting individual for gifting keen framework which is the utilization of item and diminish the misuse of the item in low spending plan and furthermore gives the recorded information in EPROM. The advancement of an all-inclusive, substantial, and solid vending machine appraisal device that is both complete and easy to understand is prescribed. The advancement of such a device would support and execute general wellbeing strategies and ecological changes that could improve sound nourishment and refreshment access and accessibility in vending machines.

REFERENCES

- [1] Vending machine assessment methodology. A systematic review "Melissa A. Matthews, Tanya M. Horacek "Syracuse University, Syracuse, NY, USA. Published "ELSEVIER Appetite 90 (2015) 176-186.
- [2] Aljadir, L. P., Biggs, W. M., & Misko, J. A. (1981). Consumption of foods from vending machines at the University of Delaware. Journal of the American College Health Association, 30(3), 149–150.
- [3] New, S. A., & Livingstone, M. B. (2003). An investigation of the association between vending machine confectionery purchase frequency by schoolchildren in the UK and other dietary and lifestyle factors. Public Health Nutrition, 6, 497–504.
- [4] Nguyen, N. T., Nguyen, X. M. T., Lane, J., & Wang, P. (2011). Relationship between obesity and diabetes in a US adult population. Findings from the National Health and Nutrition Examination Survey, 1999–2006. Obesity Surgery, 21, 351–355.
- [5] Ogden, C. L., Carroll, M. D., Kit, B. K., & Flegal, K. M. (2014). Prevalence of childhood and adult obesity in the United States, 2011–2012. Journal of the American Medical Association, 311(8), 806–814.
- [6] Park, S., Sappenfield, W. M., Huang, Y., Sherry, B., & Bensyl, D. M. (2010). The impact of the availability of school vending machines on eating behaviour during lunch. The youth physical activity and nutrition survey. Journal of the American Dietetic Association, 110(10), 1532–1536.
- [7] Pasch, K. E., Lytle, L. A., Samuelson, A. C., Farbakhsh, K., Kubik, M. Y., & Patnode, C. D. (2011). Are school vending machines loaded with calories and fat? An assessment of 106 middle and high schools. Journal of School Health, 81(4), 212–218.
- [8] Saydah, S., McKeever Bullard, K., Cheng, Y., Ali, M. K., Gregg, E. W., Geiss, L., et al. (2014). Trends in cardiovascular disease risk factors by obesity level in adults in the United States, NHANES 1999–2010. Obesity, 22, 1888–1895.

- [9] Smart Coffee Vending Machine Using RFID by "Rahul Jadhav, Mrunali Jejurkar, Pranita Kave & Prof. H.P. Chaudhari" Instrumentation Engineering department, AISSM'S IOIT, Pune, Maharashtra-411001, India. Published "Advances in Wireless and Mobile Communications. ISSN 0973-6972 Volume 10, Number 4 (2017), pp. 793-800 © Research India Publications".
- [10] Yuvraju.M, Pranesh K.A. "Fair price shop automated vending machine design using RFID and GSM communication technology" International journal for research in applied science and engineering technology(IJRASET) volume4 Issue VI, June 2016, www.ijraset.com.
- [11] ryoheikondo, uruoharashima; daigosunouchi, all of Gunma, japan "Automatic coffee vending machine being able to serve a straight coffee and a blended coffee selectively".
- [12] Feng-Cheng Lin a, Hsin-Wen Yu a, Chih-Hao Hsu a, Tzu-Chun Wengb "Recommendation system for localized products in vending machines".
- [13] [4] K.R. Nimisha¹, K. Indumathi², R. Divyamani³, R. Kavya⁴, K. Gowrimanokari⁵ "Smart Newspaper Vending Machine"
- [14] Asian Journal of Applied Science and Technology (AJAST) Volume 1, Issue 1, Pages 131-136, February 2017
- [15] "Vending machine"- Wikipedia "https://en.wikipedia.org/wiki/Vending machine".
- [16] Rovner, A. J., Nansel, T. R., Wang, J., & Iannotti, R. J. (2011). Food sold in school vending machines is associated with overall student dietary intake. Journal of Adolescent Health, 48, 13–19.
- [17] United States Department of Agriculture (2013). National school lunch program. http://www.fns.usda.gov/nslp/national-school-lunch-program-nslp Last accessed 16.07.13.
- [18] United States Department of Agriculture (n.d.). State competitive foods policies. http://www.fns.usda.gov/tags/competitive-foods> Last accessed 16.07.13.
- [19] United States Department of Agriculture and United States Department of Health and Human Services (2010). Dietary Guidelines for Americans in 2010. Last accessed 18.07.14">http://www.cnpp.usda.gov/DietaryGuidelines>Last accessed 18.07.14.