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RFID based Electronic Voting System using Raspberry PI

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Abstract: The intent of this paper is to design an efficient and effective a secured voting system which utilizes the RDID technology along with the electronic voting machine to further improve the election process and to avoid fake voting. The system we have developed RFID reader, Raspberry pi , Screen. The voter comes to the polling booth to exercise his franchise, he is directed to scan his voter identity card on a RFID reader. The RFID reader senses the voter ID and sends this information to the Raspberry pi. After receiving the voter ID the Raspberry pi checks whether the received voter ID belongs to the particular polling booth or not. If the voter ID belongs to the particular booth the raspberry pi finds if the voter has voted or not. if not, then it the makes the voting machine ready for voting. This process continues for each voter. After implementing the components on the circuit board and programming the SD card, the system worked as expected.
Keywords: Raspberry pi , RFID reader, RFID cards

I. INTRODUCTION

India is an democratic nation where in the people are directly involved in the electing the candidates for the parliament.

Election is a basic process that occupies a prominent place in any democratic company. Many countries are using technology to effectively conduct elections and to smoothen the process.

Here Radio frequency identification based over voter identification is employed. Elections are backbone of democratic system, therefore it is necessary to employee efficient methods of a conducting elections. Recently a massive general election process concluded in India Electronic voting machine are used effectively in these elections.

Though the election commission took extreme care here and their some rigging and malpractices where reported during this election process. It is difficult task for the polling officials also for identifying the authenticity of the voter and to stop rigging.

In that direction we thought of a system which can identify the voter ID and check the voter for authenticity. The Raspberry pi is provided with the data base of all the voters and their RFID cards. After scanning the card from the RFID reader, the Raspberry pi checks the ID of card.

Radio frequency identification reader queries using RF, ID sends its ID using RF. Competes with bar code, magnetic stripes, magnetic Ink Character Recognition (MICR) on bank checks.

A radio frequency identification reader (RFID Reader) is a device used to gather information from an RFID tag, which is used to track individual objects. Radio waves are used to transfer data from the tag to reader.

RFID is a technology similar in theory to barcodes. However, the RFID tag does not have to be scanned directly, nor does it require line of sight to a reader. The RFID tag it must be within the range of an RFID reader, which ranges from 3 to 300 feet, in order to be read. RFID technology allows several items to be quickly scanned and enables fast identification of a particular product, even when it is surrounded by several other items.

RFID tags have not replaced barcodes because of their cost and the need to individually identify every item.

Radio Frequency identification (RFID) uses electromagnetic fields to   automatically identify and track tags attached to objects. The tags contain electronically stored information. Passive tags collect energy from a nearby RFID reader's. Active tags have a local power source such as a battery and may operate at hundreds of meters from the RFID reader.

RFID is on method for Automatic Identification and Data Capture (AIDC). RFID is the wireless noncontact use of radio frequency waves to transfer the data.RFID tags are used in many industries.

Passive tags collect energy from nearby RFID readers interrogating radio waves. Active tags have a local power source such as a battery and many operate at hundreds of meters from the RFID readers. Unlike the barcode, the tag need not be within the line of sight of the reader, so it may be embedded in the tracked object.

The Raspberry Pi 3 model B is the latest version of the Raspberry Pi computer. The Pi isn't like your typical machine, in its cheapest from it doesn't have a case, and is simply a credit card sized electronic board of the type you might find inside a PC or laptop but much smaller.

The Pi 3 also supports a wireless internet out of the box, with built in Wi-Fi and Bluetooth. Its roughly 50-60 percent better performance in 32 bit mode and 10x faster than other raspberry pi model. The new board is capable of playing 1080p MP4 video at 60 frames per second.

The latest board can also boot directly from a USB attached hard drive or pen drive, as well as supporting booting from a network attached file system. The latest version of Raspberry Pi's official OS has the chromium browser that chrome is based on. Its performance is reasonable. It is a 64 bit board. The raspberry pi is made by the Raspberry Pi foundation.
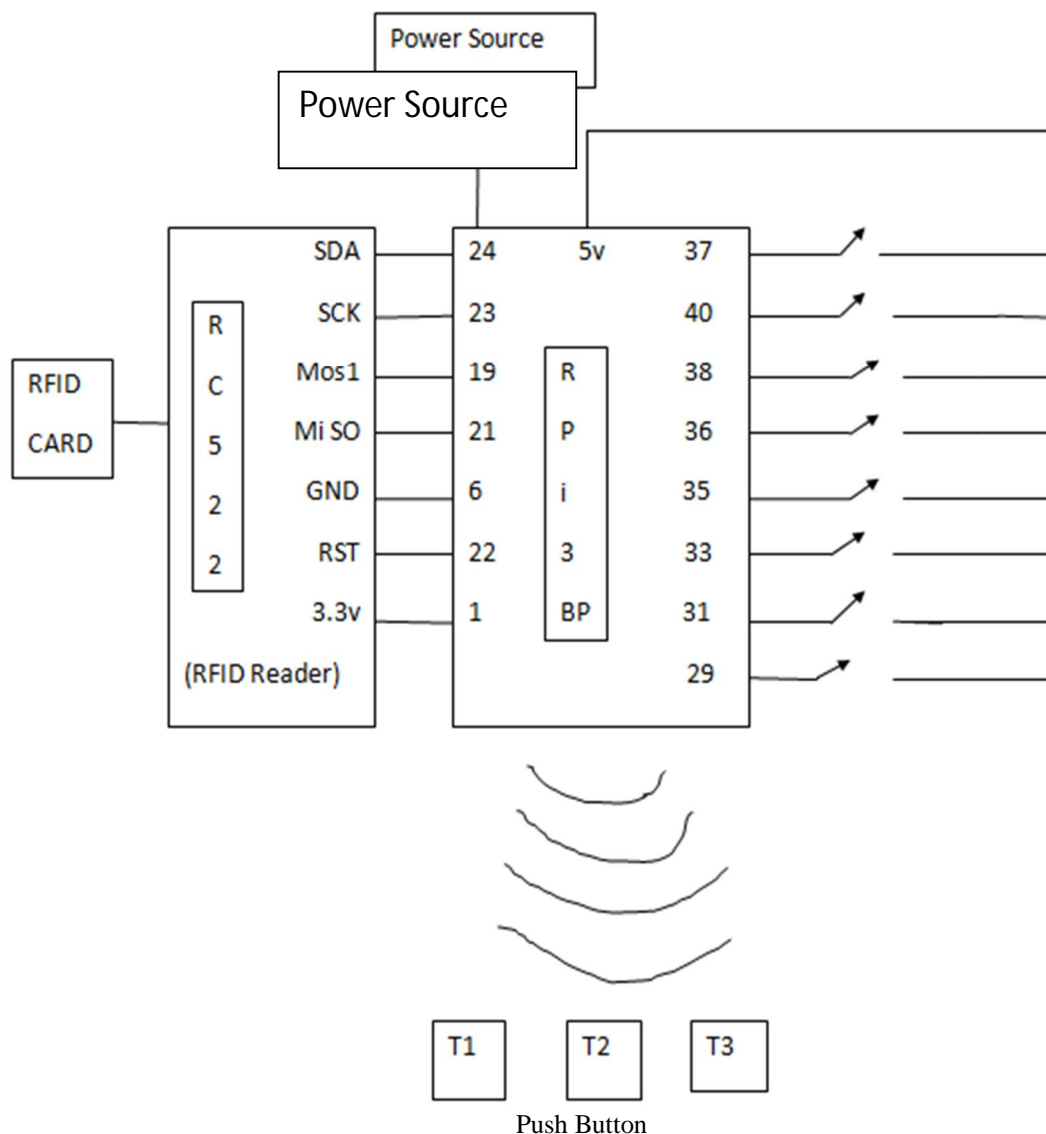
Push Button

A push button or simple button switch mechanism for controlling some aspect of a machine or a process. Buttons are typically made out of hard material, usually plastic or metal.

The surface is usually flat or shaped to accommodate the human finger or hand, as to be easily depressed or pushed. Buttons are most often biased switches, though even many un-biased buttons require a spring to return to their un-pushed state. Different people use different terms for the "pushing" of the button, such as depress, mash, hit, and punch.

We have 5 buttons to select the preferred candidate during voting

A. *Buzzer*

A buzzer or beeper is an audio signaling device, which may be mechanical, electromechanical, or piezoelectric. Typical uses of buzzers and beepers include alarms devices, timers, and confirmation of user input such as a mouse click or keystroke.

The electric buzzer was invented in 1831th by Joseph Henry. They were mainly used in early doorbells. Until they were phased out in early 1930's in favor of musical chimes, which had a softer tone.

While technological advancements have caused buzzers to be impractical and undesirable, there are still instances in which buzzers and similar circuits may be used.

B. *Telegram(Software)*

Telegram is a cloud based instant messaging and voice over IP service developed by Telegram Messenger LLP, a privately held company registered in London, United Kingdom, founded by the Russian entrepreneur PavelDurov and his brother Nikolai. Telegram client apps are available for Android, iOStelephone were, Windows phone, Windows NT, macOS and Linux. Users can send messages and exchange photos, videos, stickers, audio and file of any type.

A telegram is a written message transmitted by using an electric device. Telegram were very widely used, because private not usual.

C. *Python*

Python is an interpreted, high-level, general purpose programming language. Created by Guido van Rossum and first released in 1991, python has a design philosophy that emphasizes code readability, notably using significant whitespace. It provides constructs that enable clear programming on both small and large scale.

Python features a dynamic type system and automatic memory management. It supports multiple programming paradigms, including object-oriented, imperative, functional and procedural. It also has a comprehensive standard library.

Python interpreters are available for many operating systems. The reference implementation of Python, is open source software and has a community-based development model, as do nearly all of pythons other implementations. Python and CPython are managed by the non-profit Python Software Foundation.

Python has consistently ranked in the top ten most popular programming language.Python can serve as a scripting language for web applications. Python as a pretty printer to show complex structure sushas ac++ containers. Python as the best choice for writing scripts. It has also been used in several video games. Python is commonly used in artificial intelligence projects with the help of libraries.

Raspberry Pi 3 GPIO Header

Pin#	NAME			NAME	Pin#
01	3.3v DC Power			DC Power 5v	02
03	GPIO02 (SDA1 , I²C)			DC Power 5v	04
05	GPIO03 (SCL1 , I²C)			Ground	06
07	GPIO04 (GPIO_GCLK)			(TXD0) GPIO14	08
09	Ground			(RXD0) GPIO15	10
11	GPIO17 (GPIO_GEN0)			(GPIO_GEN1) GPIO18	12
13	GPIO27 (GPIO_GEN2)			Ground	14
15	GPIO22 (GPIO_GEN3)			(GPIO_GEN4) GPIO23	16
17	3.3v DC Power			(GPIO_GEN5) GPIO24	18
19	GPIO10 (SPI_MOSI)			Ground	20
21	GPIO09 (SPI_MISO)			(GPIO_GEN6) GPIO25	22
23	GPIO11 (SPI_CLK)			(SPI_CE0_N) GPIO08	24
25	Ground			(SPI_CE1_N) GPIO07	26
27	ID_SD (I²C ID EEPROM)			(I²C ID EEPROM) ID_SC	28
29	GPIO05			Ground	30
31	GPIO06			GPIO12	32
33	GPIO13			Ground	34
35	GPIO19			GPIO16	36
37	GPIO26			GPIO20	38
39	Ground			GPIO21	40

Rev. 2
29/02/2016   www.element14.com/RaspberryPi

D. Pin Description

| SR NO.	PIN GROUP	PIN NAME	DESCEIPTION
1.	Power source	+5v,+3.3v,GND and Vin UART interface (RXD,TXD) [(GPIO15,GPIO14)]	+5v-power output +3.3v-power GND - Ground pin UART(Universal asynchronous Receiver Transmitter) used for interfacing sensors and other devices.
2.	Communication interface	SPI interface(MOSI,MISO,CLK,CE)X2 [SPIO-(GPIO10,GPIO9,GPIO11, GPIO8)] [SPI1-(GPIO20,GPIO19,GPIO21, GPIO07)] TWI Interface(SDA,SCL)*2[(GPIO2, GPIO3)] [(ID-SD,ID-SC)]	SPI(Serial peripheral interface)used for communicating with other boards or peripherals. TWI (Two wire interface) interface can be used to connect peripherals.
3.	Input output pins	26 I/O	Although these some pins have multiple functions they can be considered as a I/O pins.
4.	PWM	Hardware PWM available on GPIO12,GPIO13,GPIO18, GPIO19	These 4 channels can provide PWM(pulse width modulation) Outputs. *software PWM available on all pins
5.	External interrupts	All I/O	In the board all I/O pins can be used as interrupts.

Raspberry Pi 3 Technical Specifications

Microprocessor	Broadcom BCM2827 64 bit Quad Core Processor
Processor operating voltages	3.3v
Raw voltage input	5v,2A power source
Maximum current through each I/O pin	16mA
Maximum total current drawn from all I/O pins	54mA
Flash memory(operating system)	16Gbytes SSD memory card
Internal RAM	1Gbytes DDR2
Clock frequency	1.2GHz
GPU	Dual core video core iv multimedia Co-Processor provides open GLES 2.0,Hardware-accelerated open VG, and 1080p30H.264 High profile decode.
Ethernet	10/100 Ethernet
Wireless connectivity	BCM43143(802.11 b/g/n wireless LAN and Bluetooth 4.1)
Operating Temperature	-40c to+85c
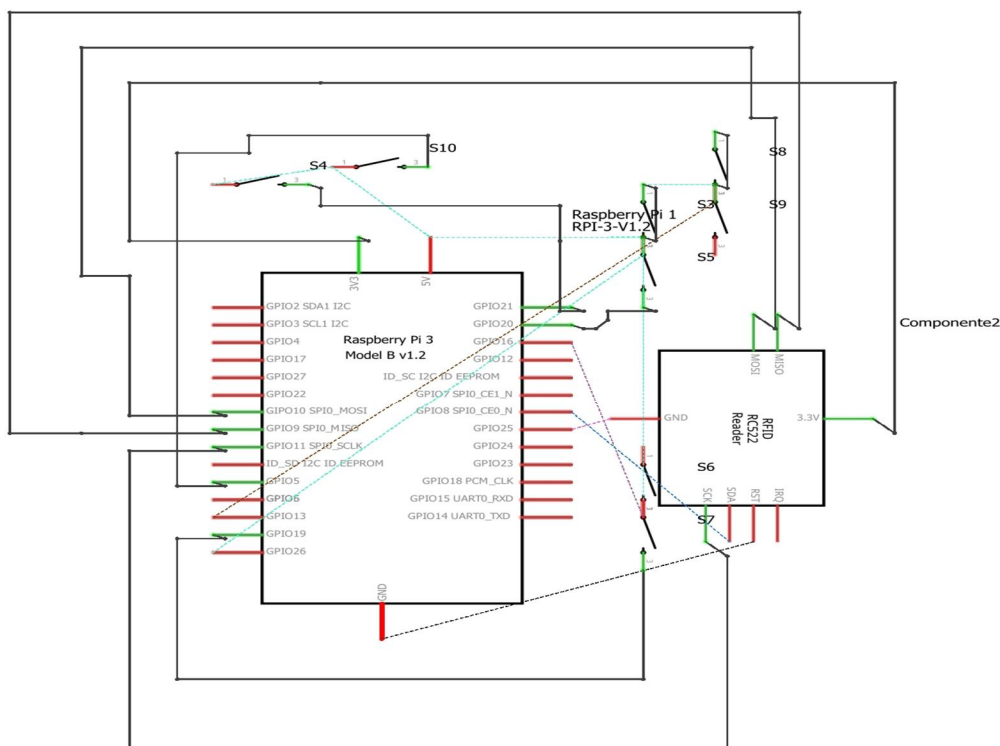
Fig 3-Interfacing of RFID reader
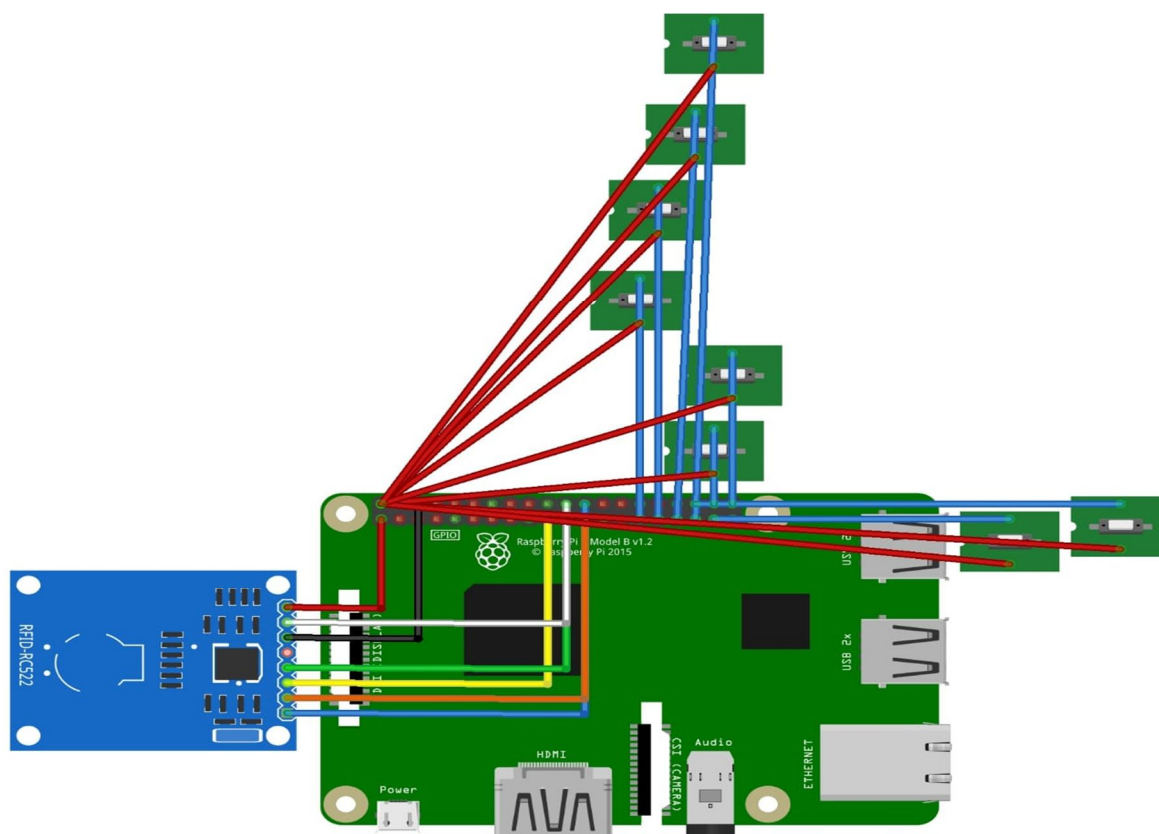
Fig 4-Interfacing of Raspberry pi

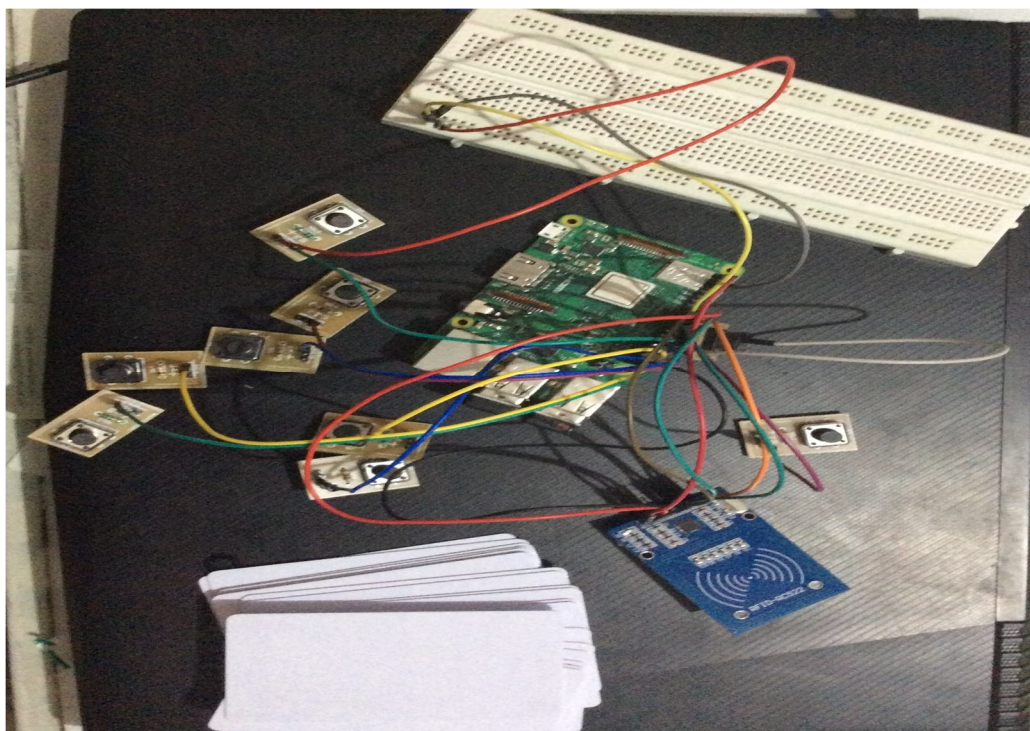## IV. HARDWARE IMPLEMENTATION
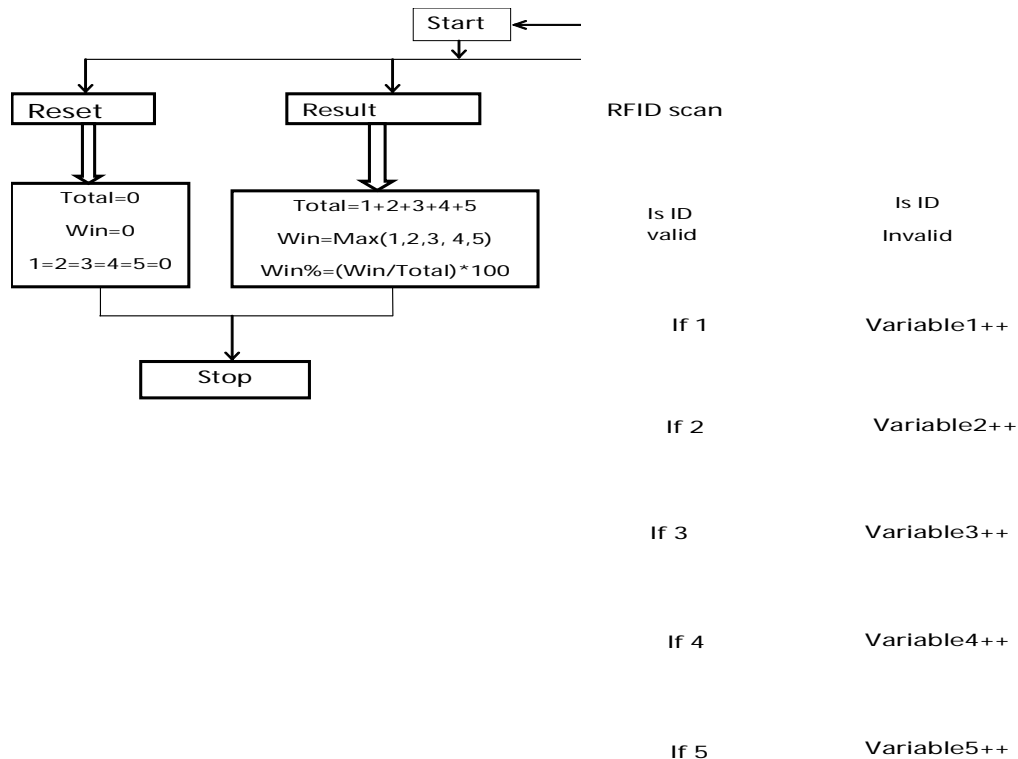

Fig- Hardware Implementation

V. SOFTWARE DESIGN

Fig 5 - Flowchart

In this flowchart three parts are given. They are RFID scan, Result, Reset. We take 20 cards for voting. Card is scanned on RFID scan if card is valid it goes to further process and voting is done. If one button is pressed many times then this votes are stored in variable blocks. If card is invalid is it goes to start block. Second part is result, in this total no. of voters are counted and winner is declared. Also winner candidate percentage are declared. Third part is reset. If we go to this part all data are reset and all data is cleared.

A. Result after Implementation
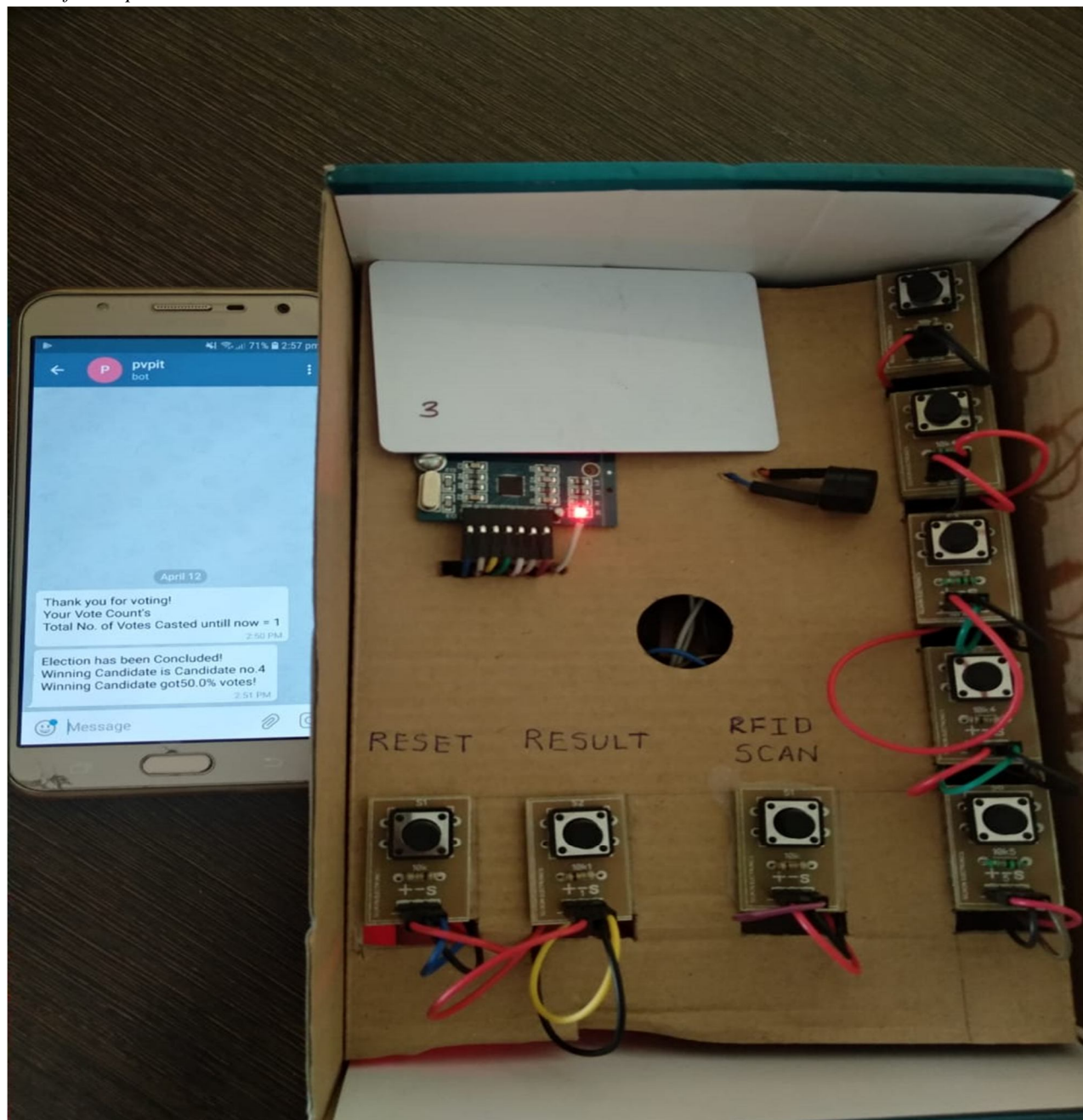
VI.   CONCLUSION

In this project we have shown the implementation of a system that minimizes the possibility of rigging in elections and eliminates the need to do manual work. Cost of the system is low and the system is convenient to use. It reduces the burden of the polling officials the voting.

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