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Voting through Power Line Communication with Biometric Verification

J.Chenguttuvan[1], M.Kumaran[2], R.Srinivas[3]
[1]*Assistant Professor,* [3]*Student, Department of EEE, Sree Sastha College of Engineering*
[2]*Assistant Professor, Department of EEE, Anand Institute of Higher Technology*

Abstract: ***Voting is the most powerful and pivotal process in each country to form the government by the people for their development. Governing constitutions around the world are willing to replace traditional paper based voting schemes. Especially the election commission of India had started to use Electronic Voting Machines (EVM) from 2008. Due to lack of photo clarity in voter identity card, hardware problems in EVM, malfunctioning leads to invalid vote casting. Through this article we would like to propose the method of voting through power line communication and Biometric verification System for voters identification with finger print and Aadhaar number verification which is controlled and commanded by Microcontroller which also leads a path for security enhancement by eradicating frauds and authenticating the exact personnel to vote through EVM and Power Line carrier communication.***

Index terms: EVM, Biometric, PLCC, Communication, Voting

I. INTRODUCTION

India is the world's largest democratic country. It perceived to be charismatic one as it accommodates cultural, regional, economical, social disparities and still able to stand on its own. Electing the right personnel is the main criteria in voting process. Many of the voting schemes have been evolved from the early days like counting by hand, punch cards and Electronic Voting Machines. Technology is playing a prominent role and is well being used in vote casting. E –voting has been a very controversial topics many security flaws were found. In the first step of election process person identification is required for registration and voting casting. And in the second step recording of the votes is in future enquiry and at the third step counting the votes which plays a key role in voting process. This method is completely changed by the electronic voting machine. No more ballot paper, ballot box, stamping, etc. EVM is capable of saving considerable printing stationery and transport large volume of electoral material. Election falsification is one of the biggest problems facing third world countries as well as developed countries with respect to cost and time[1]

II. EXISTING SYSTEM

An EVM consists of two units namely Control Unit and Balloting Unit. The Control Unit is with the Presiding Officer or a Polling Officer and the Ballot Unit is placed inside the voting compartment. Instead of issuing a ballot paper, the Polling Officer in-charge of the Control Unit will press the Ballot Button. This will enable the voter to cast his/her vote by pressing the blue button on the Ballot Unit against the candidate and symbol of his/her choice. The controller used in EVMs has its operating program etched permanently in silicon at the time of manufacturing by the manufacturer. No one (including the manufacturer) can change the program once the controller is manufactured. EVMs can cater to a maximum of 64 contesting candidates[8]. As the process is faster and more reliable, the EVMs save considerable amount of time, money, paper and man power. An electronic voting process involves many steps in the setup, distributing, collecting, and counting of ballots. The main problem of the process is due to lack of photo clarity.

India is the largest Participatory Democracy of the world, with about 850 million registered voters. The Constitutional mandate of superintendence, direction and control of Elections to the Parliament and the State Legislative Assemblies has been conferred on the Election Commission of India. The Commission has successfully used EVMs in conducting 107 General Elections to the State Legislative Assemblies and 3 Lok Sabha Elections over the last 23 years 55.41 crore (554 million) voters exercised their franchise in 2014 Lok Sabha elections using EVMs[10].

People are also not ready to travel for the longer distance to caste their vote. In the present voting due to improper collection of database many voters have been issued with two or more vote slips which leads to cast their vote twice which is illegal. During 2016 elections in India, there were reports allegedly indulged in booth-capturing, proxy voting, missing names from the voter list.

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III. PROPOSED SYSTEM

In the proposed method, disadvantages and drawbacks faced in existing method can be avoided. The system comprises of biometrics connected with embedded web server through power line communication modem to store the data of each and every citizen who cast their votes in election period. The highlighted part of the proposed method is the voter can cast their vote from any nearest booth convenient for them during the Election. Both finger print identification and Aadhaar number verification of the personnel is compared and verified with the data stored by the microcontroller. Due to this, the complexity of voting is reduced, travel expenses is reduced and it`s go easy for the voters. Canvasing the voters at the booth can also be reduced, since the voters will be an unknown person for the Contesting candidates and their parties.We have also introducing the power line carrier communication modem(KQ330 Transceiver), which can avoid traffic congestion of data as well as the data hacking can be avoided and privacy can be maintained.

A. PLC Technology

The basic principle in transmitting data through PLC (power line communication) consists in superimposing a high frequency signal that is message signal (1.6 to 30 MHz) at low energy levels over the 50 Hz electrical signal. This second signal is transmitted via the power infrastructure that can be received and decoded remotely. Thus the transmitted signal is received by any PLC receiver located on the same electrical network. In order to transport the PLC signal on electrical wiring, the line frequency of the electrical circuit is supplemented by a modulated signal of low amplitude around a centre frequency (carrier frequency)[11].

B. Power Line Communication Bands

1) *A Band:* 3-95 kHz, For energy suppliers in the medium voltage networks;
2) *B Band:* 95-125 kHz, Available for low voltage consumers;
3) *C Band:* 125-140 kHz; To consumers for media access protocols only;
4) *D Band:* 140-148.5 kHz; To consumers with no restrictions.

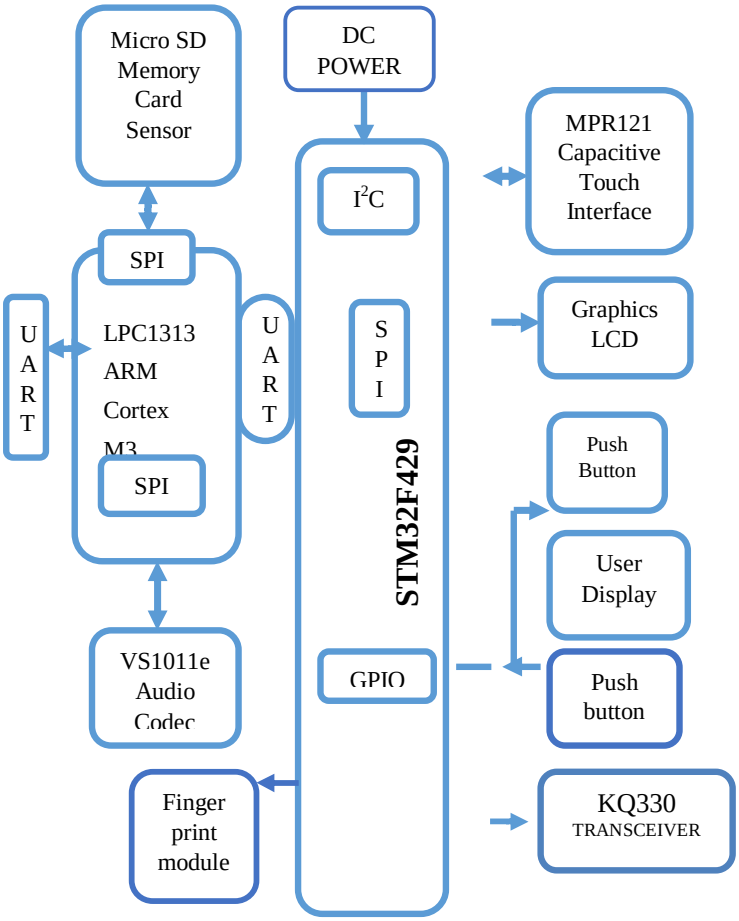

Fig.1 : Block diagram of the proposed system

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IV. HARDWARE REQUIREMENT

A. STM32F429

STM32 is a family of 32bit microcontroller intergrated circuit by ST microelectronic the STM 32 chips are grouped into related series that are based around the same 32 bit ARM processor core, such as cortex M7 cortex M4. Internally each microcontroller consists of the processor code, static RAM memory, flash memory, debugging interface and various peripheral. Static RAM memory consists of upto 192kb general purpose, 64kb core coupled memory, 4kb battery backed, flash memory consists of 512kb, 1024kb, 2048kb general purpose, 30kb system boot

Fig.2: STM32F429

B. ARM Cortex M3

The ARM Cortex M3 is a group of 32 bit RISC ARM processor core licensed by ARM holdings for microcontroller use.

1) Key Features of the Cortex M3:

ARM 7 M architecture
A 3 Stage pipelining
Instructions set 32-bit hardware integer multiply with 32 or 64 bit result, signed or unsigned, add or subtract after the multiply.

Fig.3: ARM Cortex M3

C. Finger Print Module

A fingerprint in its narrow sense impression left by the friction ridges of a human finger. The recovery of fingerprint from a crime sense is a important method of forensic science. Fingerprints are easily deposited on suitable surface. Human fingerprints are detailed nearly unit difficult to alter and durable over the life of the individual, making them suitable as long term markers of human identity

D. Capacitive Touch Screen

The MPR121 is the second generation capacitive touch sensor controller after the initial release of the MPR03X series device. The MPR121 features increased internal intelligence, some of the major addition includes an increased electrode count, a hardware configurable I^2c address, an expanded filtering system with debounce, and completely independent electrodes with auto-configuration built in.

1) Features of MPR121

Low power operation
12 capacitance sensing inputs

Complete touch detection
I^2c interface, with interrupt output

Fig.4: MPR121

E. KQ330F PLC Module

Fig.5: KQ330F PLC MODULE

1) Functions of KQ330F:

a) Intergrate the KQ-330F module and the external circuit carrier wave board without other coupled components, directly connected to the 220V AC.

b) The max length of 1 frame continuous transmission ≤252 bytes, user can set from 1 to 252, and the module does not send redundant date

c) *Power Frequency Insulating Withstand Voltage:* 3000V 1min testing with AC and GND no breakdown, no leakage current.

d) *Anti-Lightning:* Inner panel TVS tube protection, not only the PCB circuit layout material selection but also the components selection are according to wide temperature, high withstand voltage and anti high pressure shock design.

2) Features of KQ330F :

a) *Receiver Sensitivity* : ≤1mV
b) *Out-of-Band Inhibition Ability* : ≥ 60 dB
c) *Bandwidth* : ≤10 KHZ
d) *Insulation Resistance* : 500V ≥500MΩ
e) *Power Supply* : DC +5V
f) *Reception* : ≤11mA
g) *Sent* : ≤230mA
h) *Working Frequency* : 120 to 135KHZ
i) *Interface Baud Rate* : 9600bps
j) *Actual Baud Rate* : 100bps
k) *Working Temperature* : -25℃ to 70℃
l) *Humidity* : ≤ 90%

V. CONCLUSION

Through this article we had proposed the power line communication and Biometric verification System integrated with Electronics Voting Machines which modernizes the election process through internet connectivity, reduces travel expenses of people, Prohibits illegal voting, User friendly and reduces the usage of papers and simple to operate. By extending this concept, In future the

proposed system can also be applied for Pass Port Verifications in all countries in addition with eye retina scanning, face detection identity which may prohibit the illegal entry globally and each country can keep track of the foreigners, in which the global database management and each citizens privacy is a considerable factor.

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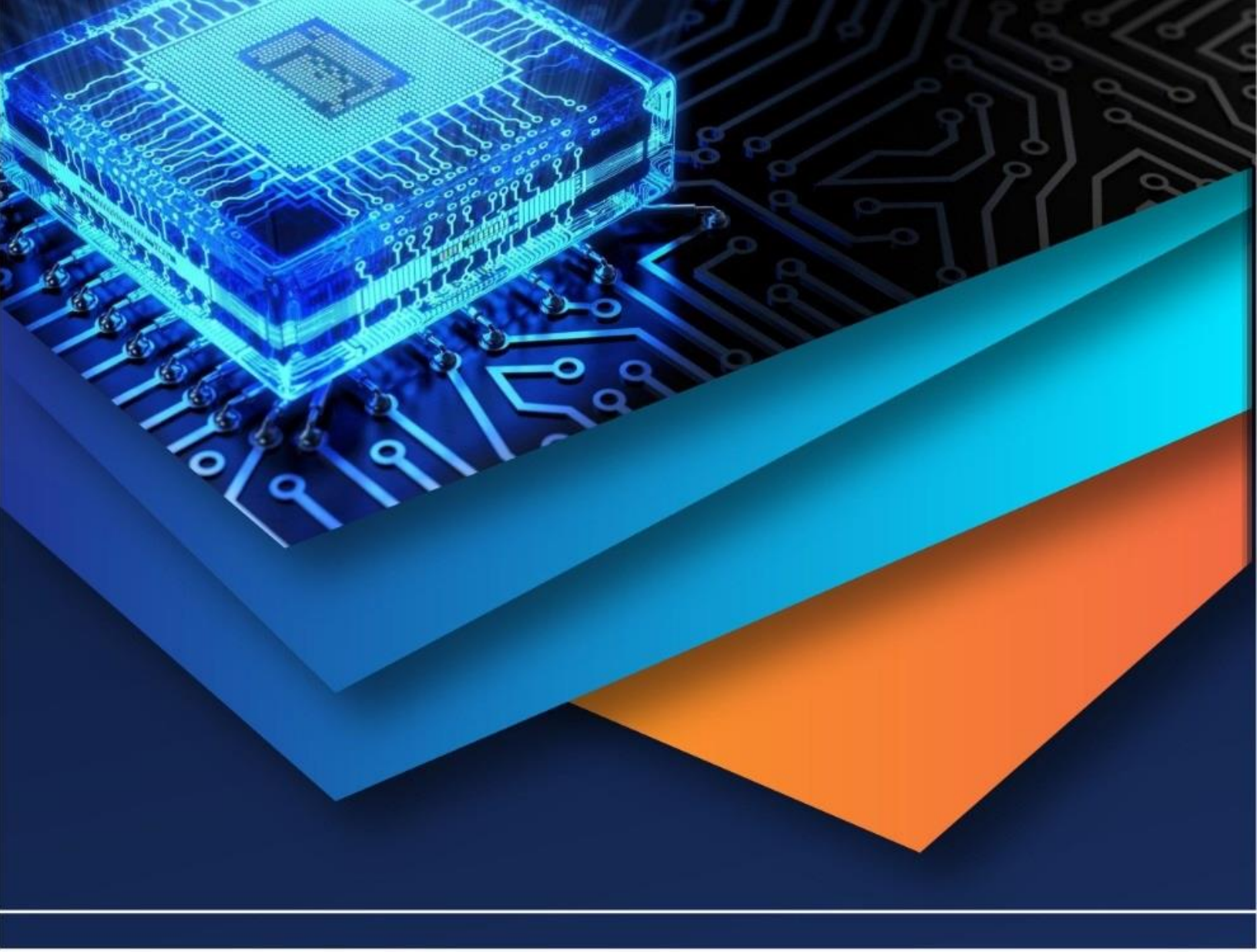

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