IMPACT OF ELECTRONIC VOTING IN INDIA

Anumoom

Assistant Professor, Political Science Department, Lyallpur Khalsa College Jalandhar

ABSTRACT

India is a largest democratic country in the world. Elections in India are conducted by using electronic voting machines which developed over the past two decades by a pair of government-owned companies. These devices, known as EVMs.It are ease of use, and reliability, but recently they have also been criticized following widespread reports of election irregularities. Despite this criticism, many details of the machines' design have never been publicly disclosed, and they have not been subjected to a rigorous, independent security evaluation. In this paper, presents the importance of EVM in India and also presents what are the Challenges for Electronic Voting in India. We conclude that in spite of the machines' simplicity and minimal software trusted computing base, they are vulnerable to serious attacks that can alter election results and violate the secrecy of the ballot. We demonstrate the attacks, implemented using custom hardware, which could be carried out by dishonest election insiders or other criminals with only brief physical access to the machines. This case study carries important lessons for Indian elections and for electronic voting security more generally.

*Keywords***: *Democracy, Election, EVM, Voting machine*

I. OBJECTIVES

1. To study the awareness level of EVM.

2. To study the importance of EVM in democratic country.

3. To study the impact of EVM on Indian society.

II. DATA AND METHODOLOGY

The proposed study mainly is descriptive in nature. It solemnly based on secondary data and information which is collected from the concerned sources as per need of the research. The relevant books, articles, papers and web-sites.

III. WHAT IS EVM?

EVM or Electronic Voting Machines are used to cast vote without revealing your identity. It is used in Indian General and State Elections. It has replaced paper ballots in local, state and general (parliamentary) elections in India. EC has announced that all ensuing elections will be held with the Voters Verifiable Paper Audit Trail (VVPAT) enabled EVM. EC has sanctioned Rs 3,174 crore for the purchase of 16, 15,000 VVPATs. Here's a look at the life cycle and the security features of the machine.

IV. HOW DOES THE MACHINE WORK?

EVM has two parts; it consists of a 'control unit' and a 'balloting unit', connected by a 5-metre cable. The control unit is with the Election Commission-appointed polling officer; the balloting unit is in the voting compartment into which the voter enters to cast the vote in secret by pressing the button against the name and symbol of the candidate of her choice. The control unit is the EVM's 'brain' — the balloting unit is turned on only after the polling officer presses the 'Ballot' button on it. The EVM runs on a 6 volt single alkaline battery fitted in the control unit, and can even be used in areas that have no electricity. The use of EVM started back in 1982 Kerala Assembly elections. Prior to this only ballot papers and ballot boxes were allowed.

V. EVMS IN INDIA

Background India is a federal parliamentary republic, and the world's largest democracy by population. Its electoral system closely mirrors that of Britain, with single-member districts whose members are elected using a first-past-the-post system. The directly elected lower house of national parliament, the Lok Sabha, contains 543 single member districts, each with a population of approximately two million, while state Vidhan Sabha districts are smaller. Since only the lower house of the legislature is directly elected and national, state and local elections are on different cycles, in most cases Indian voters only vote in one race in any given election. State and national elections in India are administered by an independent national body, the Election Commission of India (ECI), which is granted wide powers over the bureaucracy and police during the election period. The ECI also supervises the creation of a register of eligible voters, enrollment in which is automatic. The commission is widely regarded as politically neutral and relatively efficient and takes extensive measures (not all of which can be discussed here) to guarantee the security of voters and the neutrality of the process. Prior to 1998, all elections in India used paper ballots, with the names of the candidates and the symbols of their parties printed on the ballots. The voters marked the square 10 next to the symbol of their preferred candidate and folded the ballot first vertically and then horizontally before putting it in the ballot box. The ballots were then counted in the presence of ECI officials and the parties, with "invalid votes" being those where no candidate preference could be assigned. Voters were not allowed to write in candidate names, or vote for a "none of the above" option. There were two main concerns with the use of traditional paper ballots in India.

Firstly, a large portion of the electorate in India is not literate–48% of adults in 1991, and 35% in 2001. Despite extensive information campaigns by the ECI and the parties, India's very simple ballot structure, and the heavy use of party symbols, illiterate voters may sometimes have found it difficult to navigate and mark written ballots. This may plausibly have increased the likelihood to invalid or residual votes, especially among the very poor.

Secondly, despite the ECI's best efforts, post-independence India was no stranger to electoral fraud. While registration of nonexistent voters and vote buying has also been prominent, the most flagrant technique was the "capture" of polling booths. Armed operatives from one of the political parties would seize control of a polling station, intimidating officials, poll watchers and police, and stuff the ballot box with ballots favoring their

candidate, sometimes modifying the officials' copy of the electoral register so that the turnout figures matched the number of ballots cast. This capture might last all day, but the stuffing process only required a few minutes, and the party operatives would often cast all possible votes and leave before the ECI and police had time to respond.

VI. ELECTRONIC VOTING IN INDIA

EVMs were first introduced in India in 1998 in a small number of constituencies in state assembly elections. Because of the success of this pilot program the ECI decided to implement the use of EVMs in the 1999 national elections. Forty five constituencies were selected in 17 states and 3 union territories. Importantly, these constituencies were not randomly selected. In general, they appear to have been more urban and wealthy than the country as a whole. The treated constituencies included all constituencies in Delhi, all but one constituency in Mumbai, and the larger cities in many other states, while not including any constituencies in the often unstable North-Eastern region of the country. All other constituencies continued to use paper ballots. 5 "None of the above" (NOTA) became an option on Indian ballots in 2013. Because of the perceived success of EVMs in this larger scale election, the ECI decided to use EVMs nationwide from 2004 onwards. In this paper will be focusing on three elections: 1998, 1999 and 2004. To review, in 1998 none of the parliamentary constituencies (PCs) had EVMs, in 1999 only 45 PCs did, and in 2004 all PCs used EVMs. The EVM adopted in India is manufactured by two government owned companies, Electronics Corporation of India (ECIL) and Bharat Electronics Limited (BEL). It differs considerably from the electronic voting machines in use in the United States, having a much simpler design, with only a basic set of programming instructions hardwired into the circuit board. The units are portable, can operate on battery power, and are (at approximately US $200 a unit) relatively cheap (Wolchok et al., 2010). The basic design of the machine includes two main parts, a control unit and a ballot unit. By pressing a button on the control unit, the returning officer authorizes one vote from a particular ballot unit. The voter then presses the button on the ballot unit next to the symbol of their preferred candidate. This choice is then transmitted back to the control unit, where it is stored before the total votes for each booth are read out during the counting process. There is space for 16 candidates on each ballot unit. If, for any constituency, there are more than 16 candidates, additional ballot units are linked together. Each polling booth can hold four ballot units and so up to 64 candidates can be accommodated. If there are more than 64 candidates, (a very rare event) then paper ballots are used. Wolchok et al. (2010) suggest that Indian EVMs, like EVMs elsewhere in the world, suffer from security issues, and that a technically sophisticated group with access to the machines could modify the hardware in such a way as to produce desired results. These theoretical concerns parallel widespread rumors about attempts by the parties to modify the machines (Wolchok et al., 2010), and occasional reports of technical problems. Wolchok et al. (2010) are also critical of the ECI's procedures surrounding the storage of the machines, and skeptical that certain ECI security procedures (the random assignment of machines to booths and the conduct of mock elections with machines before polling) address these concerns. It should be noted, however that even if EVMs are vulnerable to a fraud, this does not mean that they are less vulnerable than alternative technologies. After all, a fraudster with access to stored boxes

of paper ballots could produce a fraudulent result with considerably less effort and technical knowledge than that necessary to manipulate stored EVMs. For this reason, we will treat the security merits or demerits of EVMs as an open empirical question.

VII. ADVANTAGES

- **EVMs reduce the time** -The EVMs reduce the time in both casting a vote and declaring the results compared to the old paper ballot system.

- **Bogus voting** -Bogus voting and booth capturing can be greatly reduced by the use of EVMs.

- **Easier** -Illiterate people find EVMs easier than ballot paper system. They are easier to transport the EVMs compared to ballot boxes.

- **Election Officer**-If an EVM goes out-of-order then, the Election Officer, in-charge of the polling booth, can replace the defunct EVM with a spare EVM. The votes recorded until the stage when the EVM went out of order remain safe in the memory of the Control Unit and it is not necessary to start the poll from the beginning.

- **Environmental effects of EVMs**: For each national election alone it is estimated that about 10,000 tons of ballot paper (roughly 200,000 trees) would be saved.

VIII. CHALLENGES FOR ELECTRONIC VOTING IN INDIA

Indian voting machines must be designed to function under more challenging environmental conditions and operational constraints than other electronic voting systems studied in previous security reviews. These requirements have influenced the simple design of the current machines and impact our security analysis. Among the challenges are:

Cost – cost is the important challenge of EVM .With well over a million EVMs in use, the cost of the system is a major concern. The current EVMs are built from inexpensive commodity parts and cost approximately $200 for each set of units, far less than many DREs used in the U.S., which cost several thousand dollars.

Power - Many polling places are located in areas that lack electricity service or have only intermittent service so that inadequate electricity now become a problem for EVM . Thus, the EVMs operate entirely from battery power, rather than merely using a battery as a backup.

Natural Hazards - India's varied climate has great extremes of temperature, as well as other environmental hazards such as dust and pollution. EVMs must be operated under these adverse conditions and must be stored for long periods in facilities that lack climate control. An Election Commission report cites further dangers from "attack by vermin, rats, fungus or due to mechanical danger, [that might cause] malfunction"

Illiteracy -Though many Indian voters are well educated, many others are illiterate. The country's literacy rate in 2007 was 66%, and only about 55% among women, so handling illiterate voters must be the rule rather than the exception. Thus, ballots feature graphical party symbols as well as candidate names, and the machines are designed to be used without written instructions.

Unfamiliarity with Technology - Some voters in India have very little experience with technology and may be intimidated by electronic voting. Some people scared of the EVM on account of Unfamiliarity with

Technology .For example, "Fifty-year-old Nirmal Ho, "a tribal and a marginal farmhand in the Chatarpur block of Palamau district," said he was "more scared of the EVMs than the Maoists" on account of his unfamiliarity with technology. To avoid further intimidating voters like these, India's EVMs require the voter to press only a single button.

Booth Capture - A serious threat against paper voting before the introduction of EVMs was booth capture, a less-than-subtle type of electoral fraud found primarily in India, wherein party loyalists would take over a polling station by force and stuff the ballot box. Better policing makes such attacks less of a threat today, but the EVMs have also been designed to discourage them by limiting the rate of vote casting to five per minute.

IX. IS EVM HACKING PEOPLE'S FAITH IN INDIAN DEMOCRACY?

The Indian democracy is strongly founded on the fair electoral practices, so even if one Indian doubts its credibility, then the use of EVM is to be reconsidered. The question of tampering with EVM was an issue discussed quietly in the political circles after the earlier Assembly elections and now after the Parliamentary elections.

It is good to know the historic developments of controversies regarding the use of EVMs. The reliability of the Electronic Voting Machine became an issue of serious concerns worldwide with the United States' year 2000 contentious presidential election where the disputes reached the Supreme Court. As follow up of this many countries including US abandoned the use of electronic machine in voting. The process of voting is very simple and practical in all sense possible. It is to be noted that ever since India introduced EVM in 50 constituencies of Parur Assembly Constituency in Kerala in 1982, the legal battle against these machines reached Supreme Court. The SC ruled in 1984 that there is no legal sanctioning to conduct voting through EVMs therefore in 1989 section 61-A has been inserted in the Representation of the People Act, 1951 empowering the Commission to use voting machines too.

In 1990 the reliability of the EVM was questioned by majority of the political parties. Therefore the Parliament appointed Electoral Reforms Committee, which studied technicalities of EVM and cleared way for the use of EVM in elections. After this, the fundamental question of tampering with EVM machines reached the High Courts of Madras, Karnataka, Kerala and Delhi and the matter also came up in Supreme Court but after getting details from the designers and technicians of EVM, the Courts dismissed the petitions.

The recently concluded general elections have presented many miracles such as parties like BSP, DMK and Congress party failing to open account almost in seven states, the poor performance of parties like Communist parties, JDU, YSR, RJD etc. and the extreme performance of AIDMK, TMC, BJD, LJP and BJP are some of them. There are also many media reports regarding the malfunctioning of EVMs.

We do not know whether there is an iota of truth in the doubts of people but as long as people believe that technology can be manipulated so long as the use of technology in voting will always remain a big question mark against the Indian democracy. Therefore we need to re-introduce the paper ballet voting systems. People around the world believe that it is fair, free and transparent. Transparency is maintained, any possible dispute regarding even a single vote can be sorted out immediately to the utmost satisfaction of the voter and political

parties. Each action of a poll duty officer can be monitored by the other officer. The observers can detect and report any error. This level of transparency and errorlessness is arguably as high in paper ballet voting. It is sure that it takes time for counting and transportation ballets or its preservation after counting but can we not develop technologies for the same? The strength of the democracy lays in the faith of people from its very process, so we need to seriously think of paper ballet voting once again for strengthening our democracy.

X. CONCLUSION

Despite elaborate safeguards, India's EVMs are vulnerable to serious attacks. Dishonest insiders or other criminals with physical access to the machines can insert malicious hardware that can steal votes for the lifetime of the machines. Attackers with physical access between voting and counting can arbitrarily change vote totals and can learn which candidate each voter selected. These problems are deep rooted. The design of India's EVMs relies entirely on the physical security of the machines and the integrity of election insiders. This seems to negate many of the security benefits of using electronic voting in the first place. The technology's promise was that attacks on the ballot box and dishonesty in the counting process would be more difficult. Yet we find that such attacks remain possible, while being potentially more difficult to detect. It is highly doubtful that these problems can be remedied by simple upgrades to the existing EVMs or election procedures. Merely making the attacks we have demonstrated more difficult will not fix the fundamental problem: India's EVMs do not provide transparency, so voters and election officials have no reason to be confident that the machines are behaving honestly. India should carefully reconsider how to achieve a secure and transparent voting system that is suitable to its national values and requirements. One option that has been adopted in other countries is to use a voter-verifiable paper audit trail (VVPAT), which combines an electronic record stored in a DRE with a paper vote record that can be audited by hand. Existing EVMs do not have updatable software, but it would be possible to add a VVPAT by interposing on the cable between the control unit and the ballot unit. Another option is precinct-count optical scan (PCOS) voting, where voters fill out paper ballots that are scanned by a voting machine at the polling station before being placed in a ballot box. Attacking either of these systems would require tampering with both the paper records and the electronic records, provided that routine audits are performed to make sure these redundant sets of records agree. A third option is to return to simple paper ballots. Despite all of their known weaknesses, simple paper ballots provide a high degree of transparency, so fraud that does occur will be more likely to be detected. Using EVMs in India may have seemed like a good idea when the machines were introduced in the 1980s, but science understands of electronic voting security—and of attacks against it—has progressed dramatically since then, and other technologically advanced countries have adopted and then abandoned EVM-style voting. Now that we better understand what technology can and cannot do, any new solutions to the very real problems election officials face must address the problems, not merely hide them from sight.

REFERENCES

[1.] A. K. Agarwal, D. T. Shahani, and P. V. Indiresan. Report of the expert committee for evaluation of the upgraded electronic voting machine (EVM). Sept. 2006.

[2.] R. Anderson and M. Kuhn. Tamper resistance: A cautionary note. In Proc. Second USENIX Workshop on Electronic Commerce, Oakland, CA, 1996.

[3.] Kumar, Sanjay and Ekta Walia, "Analysis of electronic voting system in various countries," International Journal on Computer Science and Engineering, 2011, 3 (5), 1825– 1830.

[4.] Wolchok, Scott, Eric Wustrow, J Alex Halderman, Hari K Prasad, Arun Kankipati, Sai Krishna Sakhamuri, Vasavya Yagati, and Rop Gonggrijp, \Security analysis of India's electronic voting machines," in \Proceedings of the 17th ACM conference on Computer and communications security" ACM 2010, pp. 1{14.3}

[5.] Times of India ,10May 2017.

International Conference on "Recent Trends in Technology and its Impact on Economy of India"
Guru Nanak College for Girls, Sri Mukstar Sahib, Punjab (India)
24ᵗʰ October 2017, www.conferenceworld.in