**Paper 1**

Title: Evaluating Voter Detection Rates of Attacks in Norwegian Internet Voting Protocol

Authors: Kristian Gjøsteen, Anders Smedstuen Lund

**Brief of the topic**

It is concerned with determining the rate at which voters can detect potential attacks on the voting protocol. The primary goal is to determine whether and how voters can identify and report discrepancies or issues in the voting process, which is an important factor in the overall integrity and trustworthiness of electronic voting systems.

Participants from the Norwegian University of Science and Technology acted as voters in a simulated voting environment in the experiment. The setup simulated potential voting system attacks, such as non-delivery of return codes, to see how participants would react to these anomalies. The findings revealed a range of reactions, with some participants noticing and considering the lack of return codes to be significant, while others ignored them. These responses were used to estimate the upper and lower bounds for the voter detection rate in case of system attacks. According to the study's findings, while some attacks are likely to be detected by voters, a significant number may go unnoticed, especially if voters are not explicitly vigilant.

This study emphasizes the importance of voter awareness and the ability to use electronic voting systems correctly in maintaining electoral integrity. The study also acknowledges its limitations, such as its small sample size and participant demographic. Because of these limitations, the actual detection rate in the general population may be lower than what was observed in the experiment. The paper emphasizes the importance of strong security measures in electronic voting systems that do not rely too heavily on voter detection of irregularities, as well as the importance of educating voters about the functions and significance of these systems.

**Conclusion**

According to the findings of this study, while certain system attacks can be detected by voters, there is a significant risk that many will go unnoticed. The experimental results, based on a simulated voting environment with university students, show that voter reactions to potential security anomalies, such as missing return codes, vary. These findings highlight a critical flaw in electronic voting systems: an overreliance on voter vigilance and detection capabilities to ensure electoral integrity. To ensure the overall trustworthiness of electronic voting, the study emphasizes the importance of implementing more robust, voter-independent security measures in electronic voting systems, as well as educating voters about the role and operation of these systems.

**Critical Opinion**

The paper by Gjøsteen and Lund presents a valuable contribution to understanding the security of electronic voting systems, particularly highlighting the role of voter detection in identifying system anomalies. However, its primary limitation is the demographic of its participants, primarily university students, who may not accurately represent the general voter population's computer literacy and vigilance levels. This choice may overestimate the average voter's ability to detect voting irregularities. Furthermore, the study's scale, which focuses on a single type of attack in a controlled environment, may not adequately represent the complexity and diversity of real-world attacks. Future studies would benefit from a more diverse participant pool and a broader range of simulated attack scenarios to provide a more comprehensive evaluation of the security and voter interaction of electronic voting systems.

**Paper 2**

Title: Security in Large-Scale Internet Elections: A Retrospective Analysis of Elections in Estonia, The Netherlands, and Switzerland

Authors: Guido Schryen and Eliot Rich

**Brief of the topic**

This paper, "Security in Large-Scale Internet Elections: A Retrospective Analysis of Elections in Estonia, The Netherlands, and Switzerland" by Guido Schryen and Eliot Rich, published in the IEEE Transactions on Information Forensics and Security, This study provides a critical examination of Internet voting systems used in major elections in three countries. The authors assess the security, verifiability, and transparency of online voting processes in Estonia (2007), the Netherlands (2006), and Switzerland (Neuchâtel, 2007).

According to the findings, each of these internet voting implementations had significant vulnerabilities. The use of digital ID cards and smart card readers in Estonia did not fully prevent potential security breaches because voters could not be certain of what happened on their personal computers. The study observes that in the Netherlands, the RIES system's conversion of mail votes to electronic ones posed risks, including potential coercion and vote buying. Similarly, in Switzerland, Neuchâtel's Pnyx system had transparency issues and was vulnerable to cyber threats like malware and internal breaches. It points out a common shortfall in these systems: the inability of voters to confirm if their votes were correctly tallied, casting doubt on the accuracy of the results. The lack of independent security audits and the non-transparency of system designs, implementations, and audit findings are major concerns. The paper recommends that future online voting initiatives should focus on closing these technological, administrative, and organizational gaps to ensure elections are secure, verifiable, and transparent.

**Conclusion**

The paper by Schryen and Rich critically examines the security, verifiability, and transparency of Internet voting systems used in important elections in Estonia, The Netherlands, and Switzerland, uncovering significant vulnerabilities and problems in each case. The study highlights the common issues that these systems face, such as the possibility of security breaches, voters' inability to verify the authenticity of their votes, and a lack of transparency in system operations and audit processes. To ensure the integrity and trustworthiness of Internet voting systems, the authors emphasize the importance of rigorous independent security audits, comprehensive system testing, and increased transparency. This analysis highlights the numerous challenges that must be overcome when implementing secure and dependable online voting solutions in democratic processes.

**Critical Opinion**

The paper by Schryen and Rich gives a valuable and comprehensive examination of Internet voting systems, highlighting critical security and transparency issues that are frequently overlooked when such technologies are implemented. The study, however, relies heavily on public records and documented sources, which may not fully capture the breadth of security protocols and measures in place. Because of this reliance on publicly available information, the security robustness of these systems may be underestimated. Furthermore, while the paper identifies the challenges and risks associated with internet voting, it provides little insight into practical solutions or alternative approaches that could be used to mitigate these risks. As a result, while the paper successfully raises awareness of major issues in internet voting, it falls short of providing a comprehensive roadmap for addressing these challenges in future implementations.

**Paper 3**

Title: Analysis of Internet Voting in India

Authors: Vaibhav Pratap Singh, Haribabu Pasupuleti, N Sarat Chandra Babu Centre for Development of Advanced Computing, Bangalore, Karnataka, India svaibhav@cdac.in

**Brief of the topic**

The paper "Analysis of Internet Voting in India" by Vaibhav Pratap Singh, Haribabu Pasupuleti, and N Sarat Chandra Babu from the Centre for Development of Advanced Computing, Bangalore, investigates the potential implementation of Internet voting in India. It underlines the convenience that internet voting can provide to service voters, non-resident Indians (NRIs), and domestic migrants who encounter geographical barriers to voting. The paper covers the effective implementation of Internet voting in Estonia and Switzerland, and it says that with India's developing digital infrastructure and programs such as "Digital India," the country is well-positioned to investigate Internet voting options. The authors present a detailed design for an Internet voting portal, including server and database configurations, as well as an analysis of major Internet voting system challenges. They emphasize the vulnerability of SQL injection attacks, offering a countermeasure based on positive tainting to mitigate such risks. The paper underlines the difficulty of properly implementing internet voting, stressing several problems such as user identity, personal computer security, digital divide, and server vulnerabilities. While the authors recognize the potential of Internet voting to increase democratic participation, they also emphasize the importance of stringent security measures to address the inherent threats associated with online systems.

**Conclusion**

The paper "Analysis of Internet Voting in India" concludes that although there is a great deal of promise for Internet voting to increase political engagement in India—particularly for service voters, foreign nationals, and domestic migrants—there are also a lot of obstacles to overcome. These challenges include security vulnerabilities like SQL injection attacks, the digital divide, and the risk of coercion or vote manipulation. The authors propose solutions like a positive tainting countermeasure for SQL injection and emphasize the need for comprehensive security measures. The study emphasizes that although online voting offers the potential to boost convenience and voter turnout, its implementation in India will need to take into account several socioeconomic, technological, and security-related factors. The effectiveness of online voting in India depends on addressing these issues with accurate research and development.

**Critical Opinion**

The paper "Analysis of Internet Voting in India" provides a valuable exploration of the complexities and challenges associated with implementing Internet voting in India, highlighting both the potential benefits and significant risks. It does not, however, provide comprehensive, practical solutions to the main problems mentioned, such as the digital divide and the possibility of vote tampering. Given the wide range of demographics among Indian voters, a more comprehensive examination of security tactics would be beneficial for the paper, even if the discussion of SQL injection and positive tainting is insightful. A more global context could have been provided by comparative analyses of the experiences of other nations with online voting, which would have further strengthened the paper's argument. All things considered, the paper starts a crucial conversation but falls short of providing detailed, workable solutions for the effective adoption of online voting in a country as complex and varied as India.

**Paper 4**

Title: Internet voting in Estonia 2005–2019: Evidence from eleven elections

Authors: Piret Ehin, Mihkel Solvak, Jan Williamson, Priit Vinkel

**Brief of the topic**

Piret Ehin, Mihkel Solvak, Jan Williamson, and Priit Vinkel's paper "Internet voting in Estonia 2005–2019: Evidence from eleven elections" offers a thorough examination of the development, administration, and effects of online voting in Estonia over fifteen years, encompassing eleven national elections. It looks at the integration of internet voting, or i-voting, into Estonia's advanced digital state and society, evaluating its technological and legal foundations, usage trends, challenges with trust, and political dynamics.

The study's main conclusions include the fact that i-voting was quickly adopted and is now widely used in Estonia, indicating that it has become a normal part of the political process. The study finds that although i-voting has taken over as the most popular early voting method in Estonia, it has not significantly increased overall voter turnout. i-voting has spread throughout many socio-demographic categories in Estonia, defying worries about digital divisions, with no one group having the majority of users. An important aspect impacting the i-voting system's acceptance and usage was found to be trust in it. The report also emphasizes the difficulties and complications involved in conducting online voting in addition to conventional voting procedures.

The study offers insightful information about how technology can change political processes. Estonia's i-voting experience highlights the significance of a dependable and safe digital infrastructure, the necessity for ongoing innovation and risk management, and the need for political support and trust for the effective deployment of online voting systems. When coupled with a robust digital infrastructure and broad public and political backing, Estonia's election system can effectively incorporate online voting provided certain conditions are met.

**Conclusion**

The research paper "Internet Voting in Estonia 2005–2019: Evidence from Eleven Elections" shows that in the space of 15 years, Estonia's internet voting system has developed into a reliable and extensively utilized part of the country's electoral system, demonstrating a noteworthy legal and technological advancement in the field of digital democracy. Estonia's advanced digital infrastructure and societal norms have profoundly incorporated the system, despite initial skepticism and political conflict. Though total voter turnout has not increased considerably, this integration has led to a notable increase in early voting, with internet voting playing a major role. Crucially, the system's broad acceptance across a range of demographic groups shows that online voting in Estonia has overcome digital boundaries, with the most important predictor of its use turning out to be faith in the system. This case study demonstrates how online voting can improve democratic processes in a technologically evolved society—as long as there is a persistent dedication to technological advancement, adaption of the legislative framework, and establishment of voter trust.

**Critical Opinion**

The study on Estonia's online voting system from 2005 to 2019 provides a comprehensive and educational overview of the nation's innovative e-voting initiatives, emphasizing its technological advancements and broad uptake. It fails, however, to properly assess the wider effects of online voting on democratic procedures and electoral integrity, especially when it comes to resolving security issues in a time of growing cyber threats. Furthermore, the absence of a comparison analysis based on other countries' experiences with online voting restricts the breadth of its conclusions and omits a chance to place Estonia's singular experience in a global context.

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**Paper 5**

Title: E-Voting in Developing Countries Current Landscape and Future Research Agenda

Authors: Manik Hapsara(&), Ahmed Imran, and Timothy Turner

**Brief of the topic**

A thorough analysis of electronic voting in the context of developing countries can be found in the study "E-Voting in Developing Countries: Current Landscape and Future Research Agenda". It reveals a notable emphasis on the technological aspects of electronic voting, frequently at the price of comprehending the interdependencies between technology and social, organizational, and technological factors, by examining 67 academic publications. The authors consider e-voting as a complex socio-technical phenomenon with wide-ranging social and political ramifications, and they urge that future research should adopt a more integrated approach.

They recommend that further research be done on the reasons for using electronic voting, how it affects democratic processes, and how important it is to strike a balance between technological innovation and organizational and social reality. The study stresses the significance of closely analyzing e-voting projects and warns against too many technological viewpoints, supporting an all-encompassing strategy that takes into account the complex nature of e-voting systems in developing nations. The objective of this strategy is to guarantee the efficient implementation of those systems and their favourable impact on the democratic processes within these nations.

**Conclusion**

The necessity of a comprehensive and integrated approach to the study and application of electronic voting in developing countries is emphasized in the paper "E-Voting in Developing Countries" conclusion. It points out a vacuum in the literature, which frequently ignores the important social, organizational, and political factors in favour of concentrating primarily on technological concerns. To ensure that e-voting systems not only improve technologically but also align with and support the democratic, social, and organizational structures within these countries, the authors recommend future studies to explore these larger issues. The effective and meaningful deployment of electronic voting technologies that genuinely improve democratic processes in underdeveloped countries depends on this strategy.

**Critical Opinion**

The study "E-Voting in Developing Countries" offers a thorough analysis of the current state of e-voting in these areas while emphasizing how much current research is focused on technology issues. It does, however, lack some of the in-depth examination of particular case studies, which would have provided a deeper understanding of the real-world difficulties and achievements of e-voting deployments. The study would benefit from specific instances or models that demonstrate how this integration could be accomplished, even while the plea for a more comprehensive strategy that takes social, organizational, and political variables into account is well-founded. Furthermore, it appears that little attention has been paid to the socio-political ramifications of electronic voting in various cultural contexts—a critical component in comprehending the complete scope of these nations' e-voting initiatives.

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**Paper 6**

Title: E-voting adoption in many countries: A literature review

Authors: Ikhsan Darmawan

**Brief of the topic**

In the Asian Journal of Comparative Politics, Ikhsan Darmawan's study "E-voting adoption in many countries: A literature review" offers a thorough, semi-systematic analysis of studies on the adoption of electronic voting from 2005 to 2020. Darmawan notes a decline in the number of nations using electronic voting, in contrast to a rise in scholarly studies concerning the topic, especially within the past two years. To provide a cohesive story on the advancement of e-voting adoption research over 15 years, the article examines 78 papers.

Important conclusions include a significant inclination towards the positivist paradigm and the preponderance of single case studies, especially from the United States. Darmawan does point out that the term "e-voting adoption" is used in a variety of ways and that research is evolving to answer more focused issues. The review examines institutional and individual viewpoints on electronic voting, highlighting research on the consequences of technology, public perception, and voter participation.

The paper concludes that, despite a positivist approach and a bias towards US-based studies, there has been progress in terms of terminology variety and study question specificity. Future study directions are suggested by Darmawan, who highlights the need for individual perspectives across various continents, comparative case studies, and an investigation of the influence of political elites in e-voting adoption decisions. The review is an essential tool for comprehending the current status and prospects of research on the deployment of electronic voting worldwide.

**Conclusion**

In summary, Ikhsan Darmawan's work on the adoption of electronic voting offers a crucial summary of the current status of research in this field, showing a tendency toward a decline in e-voting acceptance worldwide despite a rise in scholarly interest. The study notes that the majority of case studies in the literature are U.S.-centric and take a positivist approach. However, it also acknowledges that the phrase "e-voting adoption" is used in a variety of ways and that research topics have evolved to become more diversified and particular. To provide a roadmap for a more thorough and worldwide investigation of the adoption of electronic voting, the study ends with recommendations for future research that highlight the value of comparative studies, comprehend the impact of political elites, and take individual perspectives across different regions into account.

**Critical Opinion**

Ikhsan Darmawan's work on the adoption of electronic voting offers a thorough survey of the literature, but a critical examination uncovers some of its shortcomings. The emphasis on research that is mostly U.S.-centric risks producing a limited viewpoint and maybe ignoring special difficulties and insights from other areas where e-voting dynamics might be very different. Furthermore, while semi-systematic reviews are valuable, relying solely on them may miss out on the subtle insights provided by full systematic reviews or meta-analyses. However, the paper does a great job of pointing out gaps in the literature and making recommendations for future research, which is essential for creating a more inclusive and worldwide knowledge of the spread of electronic voting. To properly capture the intricacies and varying experiences of e-voting across various political and cultural landscapes, however, a wider and more diversified range of case studies and methodological approaches would be beneficial.

**Reference**

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**Paper 7**

Title: Blockchain for Electronic Voting System - Review and Open Research Challenges

Authors: Uzma Jafar, Mohd Juzaiddin Ab Aziz and Zarina Shukur

**Brief of the topic**

Uzma Jafar, Mohd Juzaiddin Ab Aziz, and Zarina Shukur's study explores the use of blockchain technology in electronic voting systems and emphasizes how revolutionary it can be in comparison to the existing voting methods. The study is on how blockchain technology might improve e-voting's security, transparency, and dependability while also potentially lowering costs and enhancing user experience. It highlights how technology may decentralize the voting process, strengthening its defences against manipulation and fraud.

The authors' analysis identifies and discusses important obstacles that blockchain-based electronic voting systems must overcome. Scalability is one of these issues since blockchain networks might become unreliable when used for large-scale events like national elections. The importance of protecting user privacy and anonymity during voting transactions is also covered in the paper. This is a critical issue for the democratic process. Furthermore, a major issue that needs to be addressed is how much energy blockchain systems use, especially when using consensus algorithms like Proof of Work.

The article also discusses the political and societal implications of using blockchain technology in voting systems. It emphasizes how crucial it is to increase public acceptance and trust in blockchain technology for it to be successfully implemented. The article also discusses the possibility of opposition from governmental organizations that could see blockchain's decentralization and transparency as a threat. Overall, the authors conclude that while blockchain has the potential to completely transform electronic voting, significant research and development work is still needed to overcome these obstacles and realize its full potential.

**Conclusion**

An intelligent examination of the possibilities for incorporating blockchain technology into electronic voting systems is provided by the work of Jafar, Aziz, and Shukur. It draws attention to the benefits of blockchain technology, including increased security, transparency, and decentralized control, all of which have the potential to greatly increase the reliability and integrity of electronic voting procedures. The authors do, however, also identify important issues such as scalability, privacy problems, energy efficiency, and the requirement for blockchain technology to be widely accepted and understood. They conclude that although blockchain presents viable e-voting options, more thorough investigation, advancement, and social acceptance are needed to get beyond these obstacles and reach the full potential of blockchain in electoral systems.

**Critical Opinion**

The paper by Jafar, Aziz, and Shukur provides a comprehensive review of the potential for blockchain in electronic voting systems, offering valuable insights into its benefits and challenges. However, the paper could benefit from a more in-depth analysis of real-world applications and case studies to substantiate the theoretical advantages of blockchain in e-voting. Additionally, a discussion on the practicality of implementing such systems in different political and technological landscapes worldwide would enhance its relevance. The paper strongly focuses on technological aspects, but integrating sociopolitical factors could provide a more holistic view of the blockchain's potential in electoral processes.

**Reference**

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