QR Based Voting System and Validation Framework

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***Abstract*—Ensuring transparency and fairness are critical challenges in voting. This paper presents a QR based voting system, that uses facial recognition and QR generation libraries in python. The system uses facial data to generate the QR which will be used for voting. The aim is to increase security and transparency, which are not guaranteed in traditional voting methods.**

***Index Terms*—QR Voting, SqLite3, OpenCV, Facial recognition, Validation, Democracy**

I. INTRODUCTION

Fraud and impersonation are the important challenges while voting in democratic systems worldwide, such as traditional ballot system and basic EVM systems. These systems are prone to malpractices such as multiple voting, impersonation, tampering etc. The world economic forum reports that around 40% of voting systems face malpractices.

The proposed systems thus aim to use QR verification in voting processes to make the process secure, trustworthy and smooth. This is made possible by using python and libraries such as QR, OpenCV and datetime. The systems also aim towards low-cost implementation by only using basic hardware such an integrated webcam.

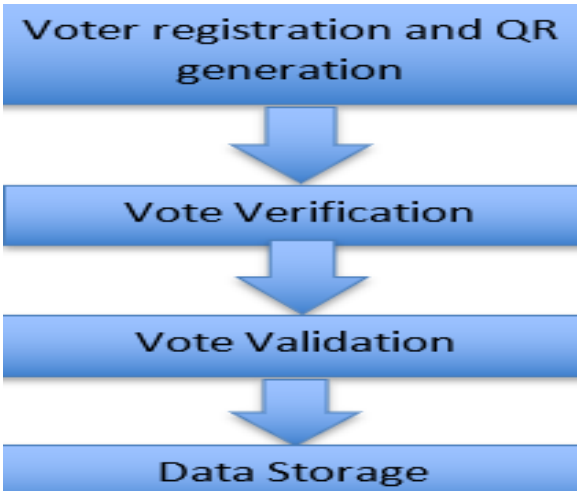
II. OBJECTIVE

The objective is to study existing voting systems identify their limitations and flaws, to make a system that reduces or removes these flaws. The objective is to reduce Fraud, impersonation and other problems that currently exist with traditional systems and methods. Another objective is to reduce time and make the process efficient and as easy as possible

III. METHODOLOGY

The System design or architecture mainly uses 3 basic technologies, databases, QR generation and facial recognition. At the registration booth the officer generates the QRbased cards for each voter. The system uses open cv library to achieve this. The inbuilt cam is used to capture images, which is then converted to unique set of data. The unique data is then used by the QRlibrary which then generates voting cards for voters using an html script. The use of QR code allows storing high density data with minimal space usage, while being readable even with damages (approximately upto maximum of 30% damage) At the voting station the QR embedded cards are used for voting.

The entries are then stored in a sqlite3 database. Using a database ensures Voter authenticity and no duplicate votes. The vote is also registered with the date and time of voting, which is possible due to the use of datetime library in python. The system uses 3 tables in the database of sqlite 3 to store voter details, officer details and voting details and validation with date and time



IV. TESTING AND RESULTS

The system was tested by around 100 users of different ages, education, and ethnicity to ensure acceptance and ease of use. The QR generation shows consistent results making proper and usable QR with 100% accurate generation. The database was also easily accessible and was updating with minimal delay. The system was easy to use and understand. However, the system was found to be affected greatly by background light with 89% accurate facial recognition under common light conditions. Overall, the average processing time was 2.46 seconds

V. CONCLUSION

This paper presents an alternative way of voting in form of QR code voting system. The system was tested by 100 testers and no major issues were found. The system provides a fast and efficient way of voting while ensuring transparency and helps in making the process smooth. The future work will be aimed for increasing security features and increasing privacy. OTP verification and ID verification may also be added

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