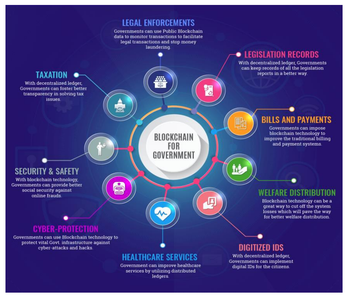
INTERNATIONAL INSTITUTE OF INFORMATION TECHNOLOGY
HYDERABAD

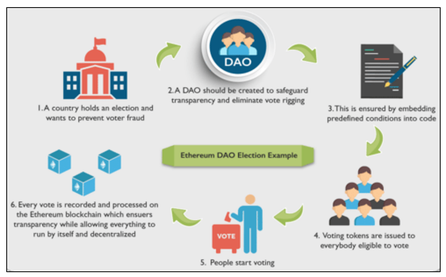
R&D SHOWCASE 2020

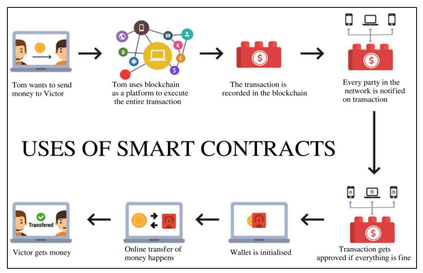
Fair E-Governance over Blockchain

E-GOVERNANCE USING BLOCKCHAIN

- Use of **Smart Contracts** is the main advantage of Blockchain Technology in **e-governance**.
- Decentralisation, Data Integrity, Transparency and **Increased effectiveness** of government.
- **Convenient** means of interaction between citizen and government.







SECURE E-GOVERNANCE

Record Management

- **Aim**: Secure maintenance of data
- Is it safe to have trust in a single party?
- How to assure that the data is not lost?

Auctions

- **Aim**: Maximize Social Welfare
- How to get a gents to elicit their true valuation?
- How to protect the privacy of these bidding information?

Solution: SMART CONTRACT

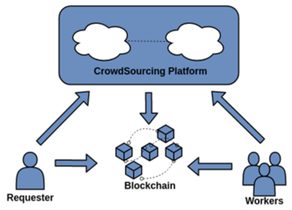
Voting

- **Aim:** Fair Voting System
- Voting requires high levels of anonymity, privacy and security
- In addition to this, the votes should be immutable and verifiable

FAIRNESS IN E-GOVERNANCE

CrowdSourcing and CrowdSensing

- **Information Aggregation** from wider pool of people
- **Examples:** NASA's Space Robotics Challenge, DARPA Red Balloon Challenge
- Community Sensing like pollution level reporting

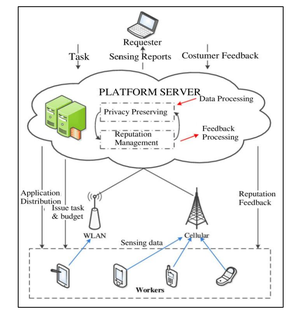


Challenges:

- Information Elicitation
- Ensuring privacy of personal information
- Fairness in reward

Types of CrowdSensing:

1. Participatory CrowdSensing
2. Opportunistic CrowdSensing



Peer Prediciton is a method that promotes information elicitation from settings where ground truth cannot be verified. This incentivizes agents to submit reports truthfully against which agents are rewarded.

FaRM: Fair Reward Mechanism

- **Nash Incentive Compatible** Mechanism
- Report Strength
- Consistency Score
- Reliability Score
- Spontaneous Localized Settings - Location robustness Score

Fairness can be achieved by introducing:

1. **Selective Fairness:** Different agents with same reports are evaluated similarly.
2. **Cumulative Fairness:** Considers agent's consistency and history of reporting as part of reward.

PUBLICATIONS

1. Moin Hussain Moti, Dimitris Chatzopoulos, Pan Hui, Sujit Gujar, "FaRM: Fair Reward Mechanism for Information Aggregation in Spontaneous Localized Settings". **IJCAI,** 2019.
2. Sankarshan Damle, Moin Hussain Moti , Praphul Chandra and Sujit Gujar, Civic Crowdfunding for Agents with Negative and Agents with Asymmetric Beliefs". **IJCAI,** 2019.
3. Sankarshan Damle, Boi Falting and Sujit Gujar, "A Truthful, Privacy-Preserving, Approximately Efficient Combinatorial Auction For Single-minded Bidders". **AAMAS,** 2019.
4. Sankarshan Damle, Moin Hussain Moti , Praphul Chandra and Sujit Gujar, " Aggregating Citizen Preferences for Public Projects Through Civic Crowdfunding". **AAMAS,** 2019.

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Machine Learning Lab