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# **Vishrambh: Trusted Philanthropy with end-to-end Transparency**

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**Abstract**

Philanthropy is a huge sector worldwide and a rapidly growing one in India. The sector globally suffers from various problems such as lack of transparency, lack of trust between donors and non-profits and corruption. With Vishrambh, we aim to leverage blockchain along with other technologies to design a trusted framework which would enable philanthropic donations to be as accountable and transparent as direct charity. Use of blockchain in a practical application other than cryptocurrencies results in its own set of technical and social challenges which we also tackle and partly address through this project.

**Author Keywords**

Blockchain; Philanthropy; India Stack.

**ACM Classification Keywords**

H.5.m. Information interfaces and presentation (e.g., HCI): Miscellaneous; See <http://acm.org/about/class/1998> for the full list of ACM classifiers. This section is required.

**Introduction**

Data from several reports suggest that the philanthropy space in India has been growing consistently since early 2010. India today has millions of donors with



## **Building Blocks**

Figure 1 provides a high-level overview of our current design and implementation. We use various components which work in tandem to enable a trusted framework on which all kinds of operations can be performed.

### *Blockchain*

Bitcoin is a decentralised cryptocurrency system which works on a peer-to-peer network, using blockchain technology [5]. Blockchain technology has gained rapid interest due to its decentralised nature and strong security properties [6]. However, blockchains are not limited to decentralised cryptocurrencies, but can also be applied to other innovative ideas such as smart contracts, recording asset ownerships, cross-border payment solutions, trade finance, etc.

Blockchain is the system that sits at the heart of bitcoin and its numerous sister currencies. Industry is seeing immense promise in blockchain which is visible from the fact that major players like Microsoft and IBM now provide blockchain solutions on their cloud platform.

But in the world of nonprofits, where accountability is king and many donors demand transparency for where their money is going, people and charities are already advocating use of crypto-currency, and some have even launched their own coins to donate money to enable tracking on blockchain [8][9][10].

In our approach blockchain sits at the heart of the architecture recording information in a trackable and tamperproof manner from various sources. Blockchain for us provides a shared storage for interoperability between various stakeholders in the ecosystem which

lacks mutual trust. On top of our blockchain solution we enable queries and visualizations to allow easy audit and track movement of assets.

### *India Stack API's*

IndiaStack is a set of APIs released by the government of India, that allows governments, businesses, startups and developers to utilise the digital infrastructure to solve India's hard problems towards presence-less, paperless, and cashless service delivery. The currently released API's include Aadhaar, UPI, DigiLocker and eSign.

**Aadhaar** - Aadhaar is India's national identity framework [1]. Aadhaar authentication is the process wherein Aadhaar Number, along with other attributes, including biometrics, are submitted online to the CIDR for its verification based on information or data or documents available with it. Aadhaar authentication provides several ways in which a resident can authenticate themselves using the system. It is being widely used and promoted by Indian government for various schemes. We use Aadhaar to identify donors, NGO staff members and beneficiaries. We also use Aadhaar to enable de-duplication of donors and track donations received by them. This information is tagged and recorded against the assets which were part of the transaction. To protect the identities of donors and beneficiaries we always store hash of their Aadhaar numbers.

**UPI** - "Unified Payment Interface" (UPI) enables all bank account holders in India to send and receive money instantly from their smartphones/laptops without the need to enter bank account information or net banking userid / password [2]. UPI protocol

provides a lot of advanced features such as registering e-mandates and push and pull requests which we leverage while transferring money between various stakeholders in the system. UPI helps us build a network of traceable donations onto the blockchain. Each transaction made via UPI endpoints we enable is written on the chain.

**eSign** - eSign service allows applications to replace manual paper-based signatures by integrating an API which allows an Aadhaar holder to electronically sign a form/document anytime, anywhere, and on any device legally in India [3]. This provides *Vishrambh* with an easy accountability solution which is ready to use pan-India. We use this API to eSign documents and media which charities attach to transactions as additional proofs. We also use this to do double verification of funds/services received by beneficiaries.

### **Implementation and Future Research**

Our current implementation uses Hyperledger Fabric [4] for the underlying blockchain. We have integrated our Blockchain with the various service providers for Aadhaar, eSign and UPI to provide a seamless interface for identity, payments and document signing and upload. We are currently in talks with a few local NGO's to deploy a version of the application with them and understand the ecosystem better.

Hyperledger Fabric is a consortium blockchain and does not scale [11] to our requirements. We face various performance vs scale tradeoffs while using Hyperledger Fabric as our blockchain solution. To this effect we are also working towards a hybrid blockchain design which can provide scale of public blockchains while ensuring high throughput of consortium blockchains.

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