INTUITION LITEPAPER

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Wednesday 3rd July, 2024

Abstract

In our migration to increasingly objective trust systems, the Intuition protocol emerges as a response to a critical challenge: the continued reliance of decentralized systems on social consensus and trust in humans. By decoupling complex data from both minds and platforms and streamlining it into a semantic, transparent, open, and verifiable framework, Intuition helps remediate the issues presented by this trust paradox by empowering users to achieve asymptotically probabilistic levels of trust based on readily available, relevant, relative, trusted, and contextual information. The result is a paradigm shift in society's interaction layer, adding additional context to decision-making processes to foster more secure and reliable interactions, ultimately paving a path toward a more holistic programmatic trust stack.

Keywords

1 Introduction

The evolving landscape of the web is rooted in a fundamental shift from subjective, human-reliant trust mechanisms to more objective, system-driven trust frameworks. This migration is largely being led by decentralized/decentralizing technologies such as those under development in the crypto ecosystem. Despite the remarkable advancements in the development of 'trustless' systems, the broader paradigm of trust remains complex, nuanced, and multifaceted. While trustless systems eliminate certain trust assumptions from the equation of our interactions, even these 'trustless' systems are not fully trustless and are still largely predicated on social consensus and trust in humans. Furthermore, many layers of the decentralized web cannot yet be made 'trustless', and must be made more 'trust**ful**'.

Intuition is envisioned as a solution to help build a more trustful interaction layer of the internet. To accomplish this, Intuition reimagines how data is expressed, structured, refined, and monetized, an innovation only recently made possible through the advancements in the crypto ecosystem. Intuition introduces the concept of **Information Markets**, incentivizing people to create useful, semantic data by breaking data down into discrete units called 'Atoms', and encourages the expression of higher-order statements through semantic compositions of these 'Atoms' called 'Triples'. With discrete, referenceable identifiers for all things coupled with semantic data structures that maintain their shape regardless of data complexity, value can move through the system programmatically, rewarding users for contributing useful data and encouraging the capture of novel information. Intuition draws inspiration from the game theoretic mechanics that have successfully secured layer 1 blockchains for over a decade and applies them to the process of achieving consensus around standardized data and identifiers for all things.

The result is a universal token curated registry (meta-TCR) for all things that resolves to an open, permissionless, decentralized social and knowledge graph, built upon the verifiable collective wisdom of the crowds. Envisioned as a global semantic data lake, this system brings us closer to Tim Berners-Lee's vision for the Semantic Web, fostering maximal interoperability among identities, data, and algorithms. By decoupling these essential layers from the application layer, Intuition allows developers to shift this part of the tech stack to its infrastructure, much like cloud computing enabled the outsourcing of hardware needs.

Intuition aspires to become the foundational layer of the internet—a structured, interlinked network of the world's data where information is easily discoverable and value naturally flows back to its sources. Acting as an intelligent channel for data, Intuition cultivates a form of digital awareness, enabling the surfacing

of relevant information precisely when and where it is needed. With this, Intuition can enhance everyday interactions, enabling people and machines to make more informed choices as they navigate an increasingly complex and interconnected world.

2 Design Decision Rationale

2.1 The Vision: A More Semantic Web

In our pursuit of a trustful interaction layer, it is evident that building trust requires more comprehensive and reliable agent-centric information. By ensuring that data is not only abundant but also structured and accessible, we can foster an environment where trust can flourish through informed decision-making.

To illustrate the vision of a more interoperable web, consider the process of adding notes about a book to a reading list. Typically, this might involve jotting down the book title, the author, and perhaps some additional information in raw, unstructured text. Alternatively, one might paste the URL of the book from Amazon, which, when clicked, would provide the data Amazon has about the book. However, this approach restricts access to the data of a single platform, rather than leveraging the entire internet's wealth of information.

Imagine if this book had a unique, globally persistent, canonical digital identifier that could be referenced universally and directly. Using this identifier, it would be possible to instantly access all related data from across the web—ratings, reviews, purchase links, and more—regardless of the platform where the data resides. This identifier would serve as a unified reference point, aggregating information from multiple sources, thus providing a comprehensive view of the book. This would transcend Amazon's perspective, allowing access to reviews from Goodreads, purchasing options from various retailers, academic critiques, related articles, and even social media discussions.

Additionally, any data contributed about this book—such as personal notes, reviews, or tags—would be easily discoverable by others, enriching the global dataset. When annotating the book with thoughts or adding tags for easier referencing, these contributions become part of the shared knowledge pool. Other users, regardless of where they are on the web, can benefit from these inputs, just as they contribute their own.

Standardizing the structure of data about the book ensures consistency and interoperability across platforms. For instance, reviews can be categorized by sentiment, ratings can follow a universal scale, and purchase links can be formatted uniformly. This standardization allows for seamless integration and comparison of data from various sources, making it easier for users to interpret and utilize the information.

Incentivizing more and better expressions is also crucial. In this system, users should be encouraged to contribute high-quality data. Detailed and insightful reviews, comprehensive annotations, and accurate tagging are all examples of contributions that might be rewarded. This creates a virtuous cycle where the richness and reliability of the dataset continually improve as more users participate and contribute, and users gain access to the thoughts and opinions of the voices they trust.

This vision encompasses a more decentralized, semantic web, where data is seamlessly aggregated and accessible through universally recognized identifiers. Such a system fosters a dynamic and interconnected information ecosystem, vastly improving the efficiency and richness of digital interactions. By transcending the silos of individual platforms, we move towards a unified digital space where information flows freely and is easily accessible to all, ultimately enhancing the ability to find, share, and build upon knowledge.

2.2 The Challenge: Achieving Consensus

In an entirely permissionless environment, where new data structures, schemas, formats, standards, and identifiers can be created and leveraged without permission, coordination is a complex challenge. The decentralized nature of the web aligns with the core principle of avoiding any single authority. Instead, consensus must emerge organically from the community, reflecting the diverse and often conflicting interests within it. This decentralized approach is crucial to maintaining the openness and democratic nature of the system.

In traditional systems, a centralized authority might impose standards and ensure adherence. For example, the International Standard Book Number (ISBN) system is centrally managed, ensuring that every published book has a unique identifier. However, relying on a singular authority to enforce such standards contradicts

the ethos of decentralization. Centralization places an entity in a position of extreme power, which goes against the principles of promoting openness and avoiding monopolistic control.

Therefore, it is imperative that the process of reaching consensus be more democratic and community-driven. This involves the collective participation of users, developers, and stakeholders who contribute to and maintain the system. This approach encourages diversity and inclusivity, allowing for a broader range of perspectives and innovations. However, it also means that agreement on standards and identifiers can be slow and contentious, requiring extensive collaboration and negotiation.

To alleviate the coordination issues around achieving decentralized social consensus, mechanisms to facilitate collaboration and negotiation among a diverse set of participants must be put in place. Economic incentives, transparent governance models, and other consensus mechanisms play crucial roles in this process, driving participants towards mutually beneficial agreements while maintaining the decentralized nature of the system.

2.3   The Market-Driven Approach to Consensus

The market-driven approach to consensus is a foundational principle within the cryptocurrency ecosystem. Mechanisms like Proof of Work (PoW) and Proof of Stake (PoS) are designed based on game-theoretic principles that ensure that participants' actions align with the network's best interests. These principles can extend beyond ledger states to include the establishment of canonical identifiers for things and the convergence on arbitrary industry standards.

This process already unfolds indirectly through natural market dynamics. For instance, the market often decides which version of a memecoin coin, among thousands of identical deployments, will be considered the 'canonical' one. Consider PEPE - without any concrete fundamentals, the PEPE coin with the highest market capitalization has emerged as the standard. This result is shaped by the collective actions and preferences of the community, who gravitate toward the most widely adopted version.

Prediction markets also demonstrate this market-driven consensus by converging on the correct answer as more data becomes available. Participants in these markets are economically incentivized to align their predictions with the most accurate outcomes, resulting in a consensus that mirrors the collective intelligence of the participants.

The ERC-20 token standard further illustrates this approach. Before its introduction, the Ethereum ecosystem lacked a uniform protocol for tokens, leading to fragmentation and interoperability issues. Developers and users recognized the benefits of adopting a common standard: interoperability, ease of integration, and enhanced security. By adhering to the ERC-20 standard, developers ensured that their tokens could seamlessly interact with various wallets, exchanges, and decentralized applications (dApps). Conversely, deploying a token that did not follow the ERC-20 standard would lead to significant challenges. Such a token might not be compatible with existing wallets, making it difficult for users to store or transfer it. It could also face integration issues with exchanges and dApps, limiting its usability and adoption. This lack of interoperability would create friction for both developers and users, discouraging the adoption of non-standard tokens.

In these examples, the power of incentives is evident: users naturally converge when it best serves their interests. The collective actions of community members, driven by their individual economic motivations, result in the organic selection of the most robust and valuable options. This market-driven approach ensures that the best solutions rise to prominence through organic consensus rather than imposed mandates.

2.4   The Role of Economic Incentives in Intuition

Intuition leverages this market-driven approach by incorporating economic incentives to drive convergence on data structures, schemas, standards, and identifiers, as well as to encourage participation. Every action within the system incurs a nominal fee, similar to a gas cost in blockchain networks, which is used to grant fractional ownership of the data being interacted with and to compensate all other current owners. This mechanism ensures that participants are financially motivated to use and support canonical identifiers and standardized methods of expression, as they benefit from future interactions involving these elements.

For example, when a user makes a claim about a concept or entity, they gain fractional ownership of that claim and its associated data. Subsequent interactions that reference this data will generate rewards for all those who have previously engaged with it, thus incentivizing the use of widely accepted and recognized identifiers and standardized expressions. This alignment of individual economic interests with the collective goal of creating a cohesive and interoperable system is central to Intuition's design.

By adopting this market-driven approach, Intuition ensures that the most effective and reliable data structures, schemas, standards, and identifiers naturally gain prominence through community consensus rather than top-down directives. This system encourages the adoption of standardized identifiers and data structures, reducing fragmentation and enhancing interoperability across the digital landscape.

Furthermore, the economic incentives within Intuition create a dynamic and adaptable ecosystem capable of evolving in response to changing needs and challenges. As participants continuously interact with and contribute to the system, they collectively shape and refine the standards and practices that define the ecosystem. This is a significant departure from more centralized solutions, such as schema.org, which rely on predefined schemas and centralized control over data standards. Intuition's decentralized and incentive-driven model allows for a more flexible and responsive approach. As new types of data emerge and the community's needs evolve, participants can propose and adopt new standards organically. Economic incentives ensure that the most useful and widely accepted standards are adopted, while less effective ones are naturally phased out. This adaptability is crucial in a rapidly changing digital landscape where new technologies and use cases are constantly emerging.

3 The Protocol

3.1 Overview

Intuition facilitates consensus on a common language for data across the Web, guided by game-theoretic economic incentives. Historically, efforts to facilitate peer-to-peer interactions have concentrated on the lower levels of the internet stack, such as the transfer of data packets and ensuring network connectivity and consistency. Protocols like TCP/IP, HTTP, and DNS have established robust foundations for data transmission, addressing issues of reliability, routing, and domain naming, respectively. Blockchain-based protocols like Ethereum have allowed for globally distributed consensus on the current and historical state of ledgers, systems, and networks.

However, while these lower layers have been adequately addressed, allowing for efficient and reliable data transfer, the higher levels of the stack—specifically those involving data semantics and interoperability—remain fragmented and inconsistent. Traditional network protocols ensure that data can be transmitted from one point to another, but they do not address the interpretation, standardization, and meaningful integration of that data.

Intuition's framework represents a paradigm shift by focusing on standardizing the higher levels of the stack. It introduces a universal language protocol for digital information interoperability, addressing an unfulfilled need in the current internet infrastructure. By promoting consensus through economic incentives, Intuition ensures that data is not only transmitted but also seamlessly integrated and understood across different platforms and applications.

Moreover, the implementation of such a system has only recently become viable. With reliable data transmission and connectivity now largely a solved problem, attention can be turned to enhancing the quality and interoperability of the data itself. With the emergence of blockchain technology and trustless decentralized networks, new economic models and incentive structures that were not previously possible have been unlocked, allowing for the game theoretic mechanisms frequently employed in the blockchain ecosystem to be applied to higher-order consensus.

Intuition fulfills this promise through several key innovations:

Incentive-driven social consensus on globally persistent canonical identifiers

Intuition employs a system of economic incentives to drive social consensus around universally recognized and interoperable identifiers for all entities, concepts, and data. These identifiers serve as the digital anchors for entities, concepts, and data across the web, ensuring consistent and reliable references. This approach is designed to mitigate data fragmentation and promote uniformity in how things are represented across the digital ecosystem.

Incentive-driven, many-to-one, deterministic and non-deterministic attestations

Intuition introduces a novel approach that facilitates and encourages the creation of both objective (deterministic) and subjective (non-deterministic) 'attestations' in a many-to-one manner. This method helps to generate a comprehensive and reconcilable dataset, incentivizing users to contribute valuable data regularly through economic rewards.

Incentive-driven structuring and standardization of attestation-based expression

Intuition incentivizes the convergence on standardized formats, structures, and schemas for verifiable data, thereby making data more semantic, interoperable, and consumable. By encouraging social consensus around uniform formats, structures, and schemas, Intuition ensures that data can be easily understood, processed, and integrated across various platforms and applications, without the need for the top-down imposition of rigid standards. This structured approach not only enhances the semantic richness of the data but also facilitates more complex and meaningful interactions that would be challenging to achieve in a fragmented data environment, making attestations a viable meta for human expression.

A permissionless platform for interpretation of the wisdom of the crowds

Intuition offers a decentralized framework where different interpretations of data can coexist, enabling a rich and diverse ecosystem of applications and services. In stark contrast to platforms which attempt to adjudicate the truthfulness, correctness, or validity of data, Intuition's mechanics are designed to function in the absence of the imposition of rigid models of 'truth'. This openness allows developers and users to bring their own unique perspectives, insights, and innovations to Intuition, enhancing the platform's overall versatility and utility. By encouraging and facilitating the permissionless interpretation of data, Intuition encourages a continual examination of interpretation techniques, immunizing the system against bias or manipulation.

3.2 Primitives

To achieve this vision, Intuition introduces a set of novel primitives that facilitate the process of monetizing and bringing structure to data at scale:

3.2.1 Atoms

Atom: *Intuition's atomic unit of knowledge. Atoms can be used to represent Subjects, Predicates, Objects, and Triples. All Triples are a composition of Atoms, and Triples can be used as Atoms in other Triples.*

In the Intuition system, Atoms function as the building blocks through which all higher-complexity structures are formed. The terminology highlights the fundamental role these identifiers play - just as atoms combine to form molecules, these Atoms can be composed into higher-order arrangements, enabling the deterministic and semantic organization of complex data.

The goal of the concept of Atoms is to achieve consensus around unique, globally persistent, decentralized digital identifiers for all things. Achieving consensus is essential for consistently and meaningfully referencing ***things of all types***—people, places, words, products, concepts, pieces of arbitrary data, etc.—universally across the web.

A system facilitating the arrival at social consensus around globally persistent canonical identifiers for all things demands that these identifiers possess a few key attributes.

- **Firstly**, these identifiers should be decentralized identifiers, providing unique, secure, and verifiable identification without any reliance on a central authority.
- **Secondly**, these identifiers should have a sufficient amount of associated data to ensure precise referencing of specific entities, concepts, or pieces of information. Without this contextual data, it would be unclear what each identifier is meant to represent.
- **Thirdly**, these identifiers must have some agent-centric state that is capable of tracking the usage of the identifier across contexts. This enables the community to discern which identifiers are being most frequently used to represent different concepts in different settings.

To solve for these requirements, the concepts of Atoms emerge as the foundation of the Intuition framework, representing the most fundamental units of data. These units can range from a single word to a complex concept, serving as discrete, manageable, and referenceable pieces of information that facilitate seamless data integration and manipulation across the web. By taking arbitrary data of any size and prescribing it a decentralized identifier, we can:

1. Start to reference data universally across the web.
2. Grant users equity in data as they signal its relevancy through usage.

3. Reward users for signaling the relevancy of data, thereby encouraging active participation and accurate data representation.
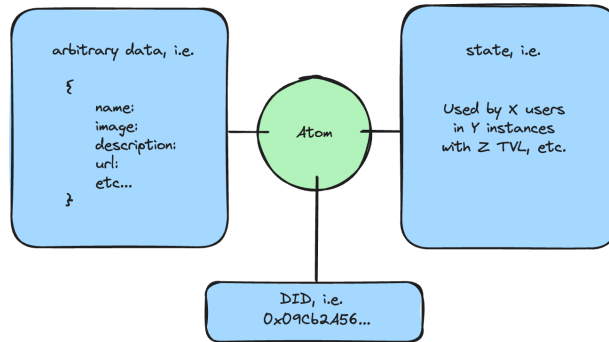

Figure 1: Basic overview of the key elements of an Atom

Each Atom is made universally referenceable through a decentralized identifier. This approach ensures that every Atom is uniquely identifiable and can be consistently referenced across the web, maintaining data integrity and meaning regardless of the system or context.

```
// An example DID

did:ethr:mainnet:0x3b0bc51ab9de1e5b7b6e34e5b960285805c41736

// An example DID Document

{
  "id": "did:ethr:mainnet:0x3b0bc51ab9de1e5b7b6e34e5b960285805c41736",
  "verificationMethod": [
    {
      "id": "did:ethr:mainnet:0x3b0bc51ab9de1e5b7b6e34e5b960285805c41736#controller",
      "type": "EcdsaSecp256k1RecoveryMethod2020",
      "controller": "did:ethr:mainnet:0x3b0bc51ab9de1e5b7b6e34e5b960285805c41736",
      "blockchainAccountId": "eip155:1:0x3b0BC51Ab9De1e5B7B6E34E5b960285805C41736"
    }
  ],
  "authentication": [
    "did:ethr:mainnet:0x3b0bc51ab9de1e5b7b6e34e5b960285805c41736#controller"
  ],
  "assertionMethod": [
    "did:ethr:mainnet:0x3b0bc51ab9de1e5b7b6e34e5b960285805c41736#controller"
  ],
  "@context": [
    "https://www.w3.org/ns/did/v1",
    "https://w3id.org/security/suites/secp256k1recovery -2020/v2",
    "https://w3id.org/security/v3 -unstable"
  ]
}
```

To provide guarantees around the entity/concept/data attempting to be referenced by the Atom, each Atom must have at least some de minimis corresponding data. This data can be anything, live anywhere, and take any format, though storing data in a Verifiable Data Registry and utilizing supported data structures and schemas is recommended, as it improves the usability of the data through strong guarantees around immutability, availability, liveness, and persistence. Atom uniqueness is enforced through a hash of this underlying Atom Data, ensuring that no piece of data can have two corresponding Atoms. To maintain the integrity of mutable data, it's crucial that any such data be timestamped. This ensures that any future references to the data clearly understand what the data was referencing at the specific point in time when the attestation was made.

Through this, Atoms enable the breakdown of data into discrete, manageable units, which can be easily combined and reused across various contexts and applications. This structuring supports flexible and adaptable digital systems, ensuring that data is interoperable across platforms. The composability of Atoms enhances the functionality and versatility of the system, allowing data to be efficiently utilized in different settings.
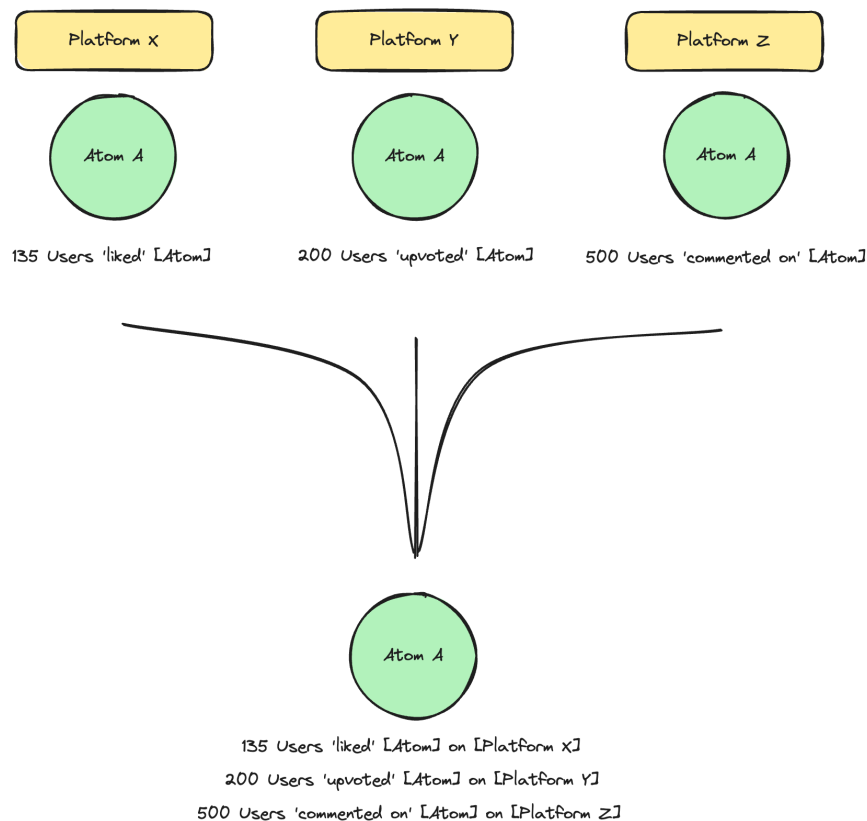
Atom Ownership and Token Curated Registries Given the permissionless nature of the system, multiple Atoms may be representative of the same concept. To foster consensus on high-quality Atoms and establish canonical identifiers for all things, Intuition employs the concept of a Token Curated Registry (TCR). In this model, users gain fractional ownership over the Atoms they interact with and receive a portion of the interaction fees each respective Atom generates, incentivizing engagement with popular Atoms. As users increasingly interact with these Atoms, a TCR emerges, ranking Atoms based on their relevance using metrics such as an Atom's Total Value Locked (TVL). This mechanism facilitates ecosystem convergence on and easy discoverability of the most valuable and widely accepted Atoms/identifiers representing each concept.

3.2.2 Triples

With discrete units of data established through Atoms, defining relationships between these units to form higher-order structures is essential. Intuition achieves this by employing Semantic Triples, ensuring a uniform and discrete structure that can be prescribed a decentralized identifier and have some associated agent-centric state. This structure is essential for achieving consensus on arbitrarily sophisticated and expressive forms of data.

Triples consist of three elements: Subject, Predicate, and Object, with each element represented as an Atom. This Subject-Predicate-Object format allows users to clearly and explicitly define relationships between Atoms. These connections can be visualized as a graph where each node and edge is an Atom.
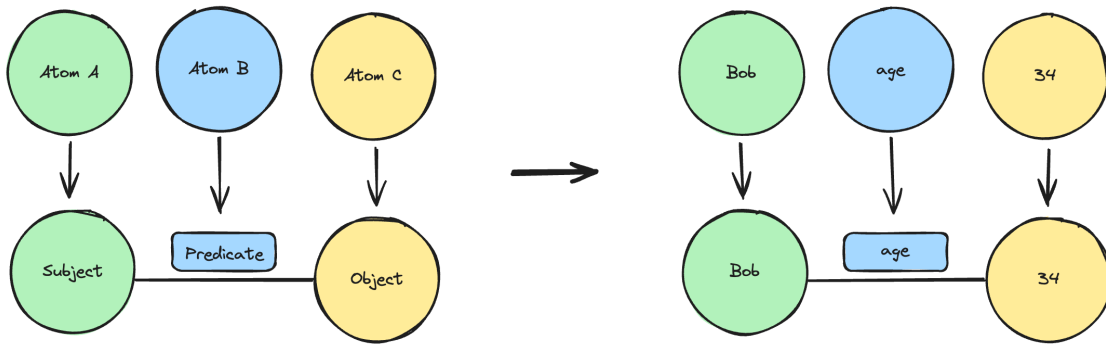
For example, a Triple may have the structure:

- **Subject:** "Bob"

Economically-optimal choice
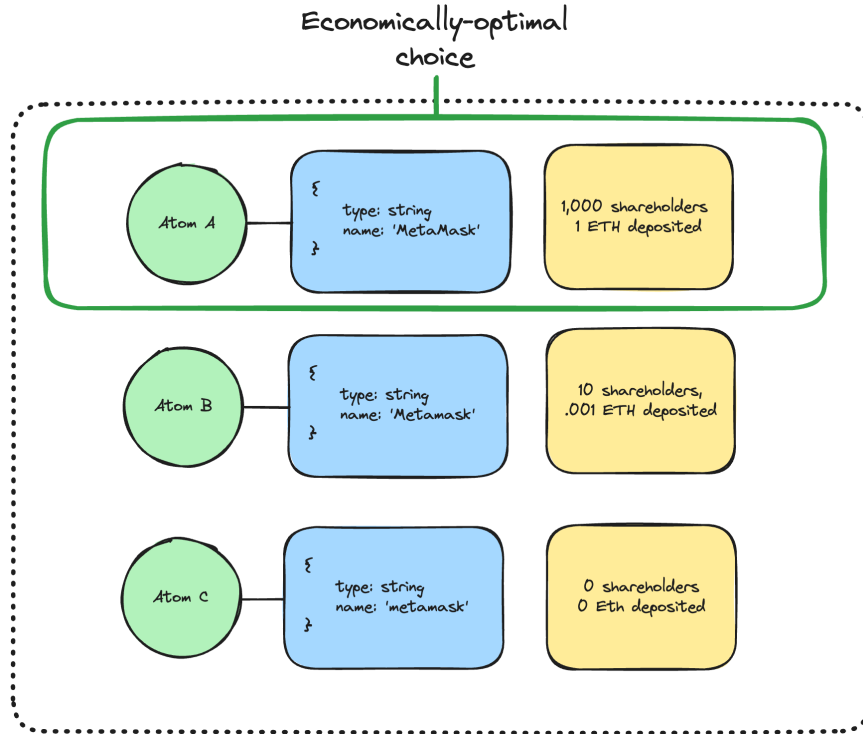
- **Predicate:** "age"
- **Object:** "34"

In this example, each component—Subject, Predicate, and Object—is an Atom, and the Triple expresses a specific relationship between these Atoms.

Fractal Data Representations

Triples offer a flexible yet structured method for representing data relationships. By allowing Triples to act as Atoms within other Triples, Intuition facilitates the expression, storage, and usage of arbitrarily complex data models that can scale and evolve over time. This flexibility is crucial for capturing intricate relationships and dynamics within data, enabling users to construct sophisticated applications and services on the Intuition framework. This approach maintains discrete, referenceable units for data at every layer of the structure, ensuring scalability and precision in data representation.

Triple Ownership and Token Curated Registries   Akin to the process outlined for Atoms, the structure of Triples allows users to gain fractional ownership of Triples through interaction. Each interaction generates interaction fees, which are distributed to the owners of each respective Triple, creating an incentivized Token Curated Registry (TCR) for data structures. The TCR encourages system participants to
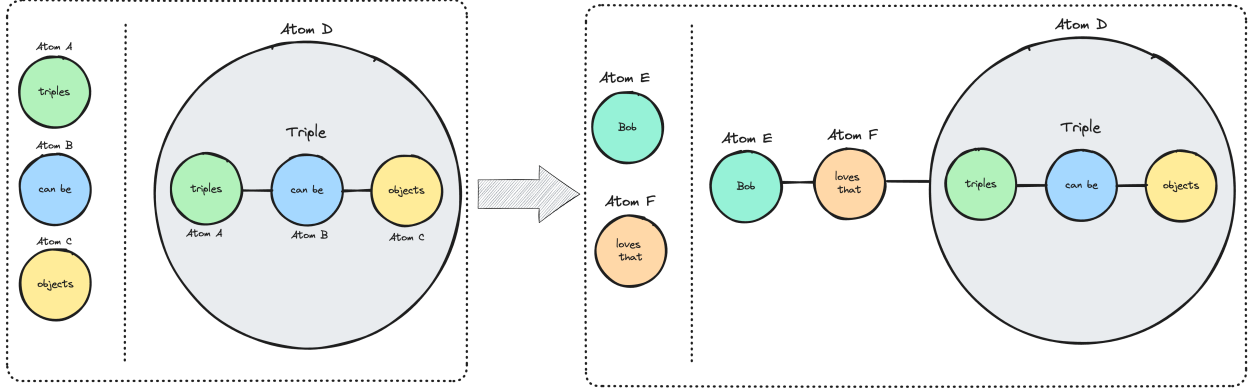
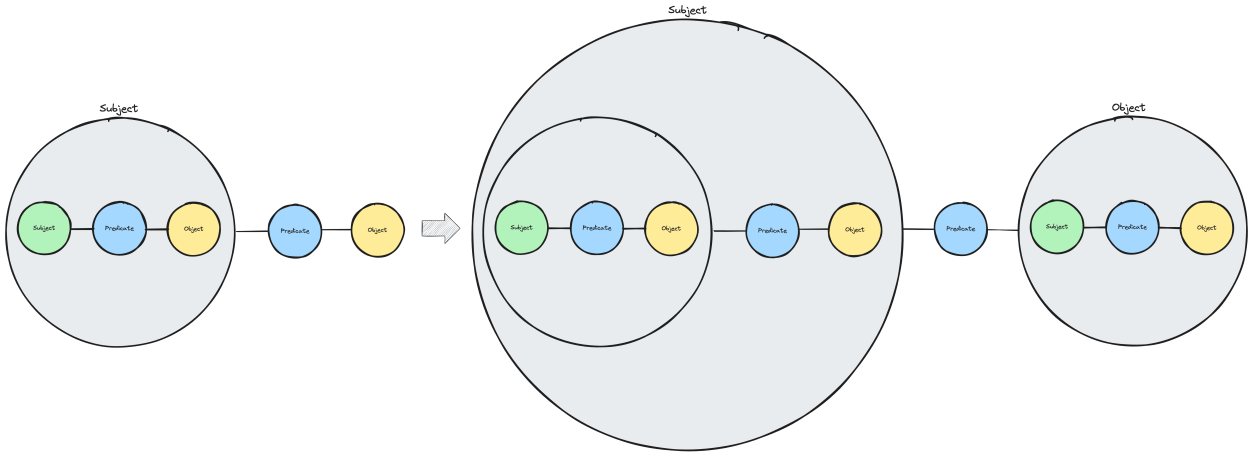Figure 2: A Triple as an Object of another Triple

Figure 3: The flow of a more complex structure achieved through nested Triples

adopt common ways of structuring data by offering economic rewards. This approach promotes an organic, incentive-driven structuring of data, contrasting with more rigid and traditional methods such as standards committees, which often struggle to achieve effective standardization.

3.2.3 Signal

Signal, in the context of Intuition, refers to any action or indication that expresses intent, belief, or support. Signals can be classified into two broad categories: explicit signals and implicit signals. These signals play a crucial role in interpreting user behavior, beliefs, and preferences within the system.

Explicit Signal

An explicit signal is a clear, intentional action taken by a user to express support, belief, or intent. These actions are directly observable and often involve a formal mechanism within the system. Examples of explicit signals include voting mechanisms, where casting a vote represents a user's preference. Verifiable claims and attestations are also forms of explicit signals; they are signed messages that convey specific information. For instance, a proof of humanity attestation from a trust anchor like Worldcoin is an explicit signal from Worldcoin that Worldcoin believes the entity to be human (a valuable data point for sybil resistance efforts).
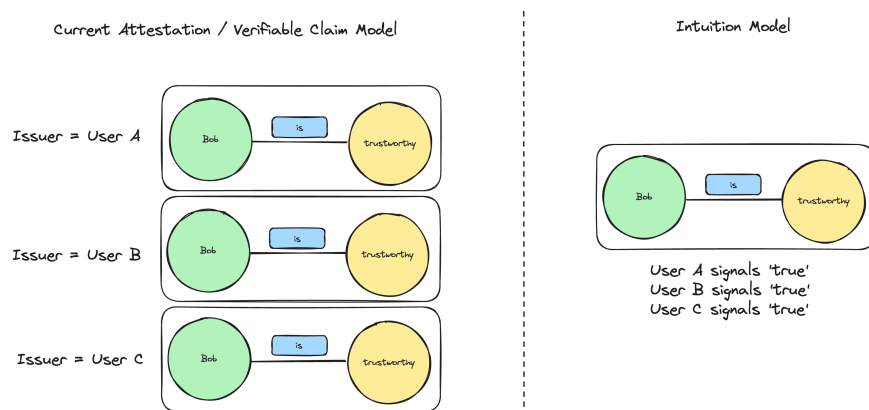
Implicit Signal

Implicit signal involves indirect or inferred indications of support, belief, or intent. This signal is not always directly observable and are often deduced from user behavior or patterns. For example, the frequency and context of user interactions with certain data points can imply their support or belief. Implicit signal requires sophisticated analysis to interpret accurately, as it is embedded within the user's activity data.

Transitive Signal

Transitive signal refers to the trust or belief that is passed along through a network of relationships. This type of signal leverages the idea that trust can be extended through connections. For example, if User A attests to something about User B, and User C trusts User A, then User C is likely to extend some level of trust to User B, even without a direct interaction. This transitive nature of trust is vital in decentralized systems like Intuition, where direct trust relationships are not always possible. By harnessing transitive signals, the system can create a more interconnected and trust-rich environment, where the credibility of one entity can influence the perception and trustworthiness of others within the network.

Signal in Intuition

Though all systems naturally generate implicit signal, explicit signal in Intuition is expressed in a novel format that enables and incentivizes the creation of many-to-one, non-deterministic attestations. In Intuition, these semantic statements do not have a single 'issuer' - instead, anyone/anything can signal support or rejection of any existing statement/attestation at any point in time. This decoupling of information from 'who is presently expressing/supporting that information' introduces the ability to accommodate many-to-one attestations, making the data significantly more usable - especially for more complex use cases that involve the concept of transitive signal, such as reputation.

To accomplish this, the Intuition system enables users to maintain positions on Atoms and Triples, interpreting these positions as explicit signal from the user. This mechanism can be implemented using tokens or other accounting systems that have the ability to track user balances over time across an arbitrarily large number of entities.

Atom Signal

Within the Intuition framework, users signal their belief in the relevance of an Atom by adjusting their balance on that Atom. This balance can be increased or decreased arbitrarily.

A balance of zero implies no signal, while any positive balance indicates a degree of belief in the Atom's relevance. This mechanism is economically driven: users earn fees proportional to their ownership stake in an Atom as other users interact with it. Thus, if a user deems an Atom relevant, they are incentivized to signal its relevance to receive these rewards.

Negative integers may be used if the Intuition system's implementation aims to allow users to explicitly signal the irrelevance of an Atom. In systems without negative balances, the absence of a positive signal can serve as an indication of the Atom's irrelevance.

Triple Signal

In the Intuition framework, users signal their belief in both the relevance and truthfulness of a Triple by modifying their balance on that Triple. Triple balances can be any integer, allowing for a nuanced expression of belief.

A balance of zero indicates no signal. A negative balance signals a rejection of the Triple, explicitly indicating that the Triple is considered false, and that this falsehood is relevant. Conversely, a positive balance affirms the Triple, explicitly indicating that the Triple is considered true, and that this truthfulness is relevant.

For example, with a Triple asserting "[Vitalik] [is] [trustworthy]," users would express their belief in its truthfulness, and the relevancy of this truthfulness, by increasing their balance on the affirmative side of the Triple, or signal disbelief by decreasing their balance into the negative. This mechanism allows for nuanced expressions of trust and belief within the decentralized ecosystem.
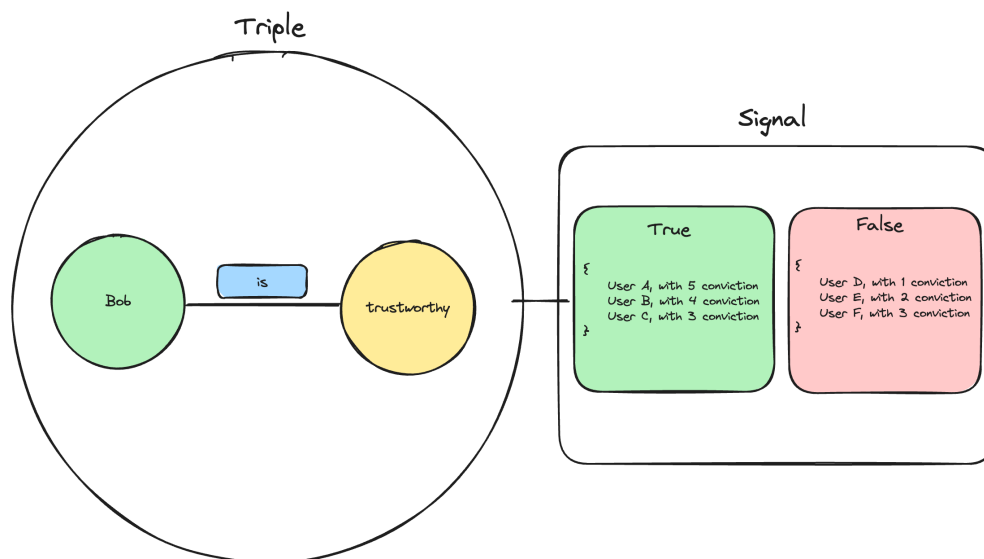
This system enables each "statement" to exist in different states based on who is affirming or rejecting it. To illustrate the power of this approach, consider the example of building a decentralized list of followers. In a traditional one-to-one model, where each claim or attestation has a single issuer, if a user had 1,000 followers, there would be 1,000 separate "following" claims. Most of this data would be redundant, as the "following Y" part would remain constant across all claims. Additionally, this data would only be easily reconcilable assuming consistent standards and schemas across all claims.

In contrast, the Intuition model simplifies this by having a single Triple representing a statement such as "I am following Y." Users would then adjust their balances on this statement to express their stance. To see all followers of Y, one would simply examine the "I am following Y" Triple and identify who has positive balances on the affirmative side. This approach consolidates data, reducing redundancy and making it easier to verify and aggregate information.

Furthermore, the ability to adjust balances allows for a more nuanced expression of preferences. In the context of a 'follow' functionality, instead of a flat follow list where all followers are treated equally, users could explicitly signal varying levels of interest or endorsement. By increasing their balance on the followers they value more, users can effectively rank their follow list. This means that someone could show a stronger preference for certain individuals or entities by staking more tokens on their affirmations, creating a dynamic and tiered system of trust and preference. This not only enhances the granularity of data but also provides richer insights into user preferences and social dynamics within the network.

3.2.4   Fees & Economics

Interactions within the Intuition system incur a fee, comparable to a gas cost in blockchain transactions. This fee serves several essential purposes:

Firstly, in decentralized and permissionless systems with shared infrastructure, it is vital to prevent system abuse, such as Sybil and denial-of-service (DoS) attacks. Intuition mitigates these risks by employing an economic model similar to those in blockchain networks, necessitating a fee for data creation. This economic disincentive discourages abuse, thereby preserving the system's integrity and functionality. Furthermore, any attacks inadvertently benefit the network due to the fee payment, much like how Ethereum benefits from transaction fees even when used for non-productive purposes. This mechanism ensures the ecosystem remains robust and sustainable despite potential misuse.

Secondly, the creation of coherent and valuable data is often neglected, especially within the Web3 environment. Providing infrastructure for generating verifiable data alone has proven insufficient in motivating users

to produce meaningful contributions. This issue is also prevalent in Web2, where the majority of users refrain from leaving reviews on platforms such as Amazon, Yelp, or Google, and rarely endorse others on LinkedIn or contribute to Wikipedia. Thus, there is a clear need for incentives to promote active and meaningful participation in the data contribution process, similar to how block rewards encourage participation in the layer 1 blockchain consensus process.

Thirdly, the sheer volume of data generated globally has reached overwhelming proportions, leading to an abundance of low-quality, redundant, or irrelevant information. This overabundance dilutes the value of truly meaningful and actionable data, complicating efforts to derive valuable insights. In both Web2 and Web3 environments, the emphasis needs to shift from merely producing more data to generating high-quality, reliable information. Intuition addresses this challenge by implementing mechanisms that discourage the production of irrelevant data and promote the creation of useful, pertinent information through economic incentives. By introducing an economic cost and associated rewards to data creation and curation, Intuition ensures that contributors are motivated to generate data that is coherent, valuable, and meets predefined standards of relevance and accuracy. This economic model not only deters the proliferation of "junk data" but also encourages the continuous refinement and validation of existing data.

Fourthly, the process of establishing standards in most industries has historically been fraught with difficulties, often described as "standards hell." This status quo has failed to adequately address the needs of our ecosystem. Intuition's system of trustless economic incentives expands the concept of leveraging financial rewards for distributed consensus—a principle successfully demonstrated in the blockchain ecosystem—to additional domains requiring social consensus and global coordination. These domains include standards for data structures, schemas, and formats, as well as canonical identifiers to which this data can be attached and correlated.

Intuition's imposed fees addresses these challenges in two main ways:

1. **Granting Ownership in Data**: A portion of the fee contributes to granting the user ownership in the data they interact with. This mechanism ensures that users have a vested interest in the data they create or engage with, promoting responsible and meaningful interactions.

2. **Rewarding Data Owners**: A portion of the fee is distributed to existing owners of the data being interacted with. This incentivizes the creation and maintenance of valuable data, as users receive economic rewards for their contributions to the ecosystem.

This flow of value is enabled by Intuition's innovative approach to data representation, which encompasses Atoms, Triples, and Signal. By structuring data into fractals via discrete, ownable fragments, this model allows for the programmatic distribution of value throughout the system's state.

Consider a user who wishes to create a new data entry stating that they like a YouTube video. The user must pay a fee to create this data, part of which grants them ownership in the statement and part of which rewards previous owners of related data. Other users who agree with this statement can also pay a fee to do so explicitly, reinforcing the validity and increasing the value of the data. This process helps to ensure that only high-quality, relevant data remains prominent, as users are financially incentivized to support accurate and meaningful information.

This economic model encourages users to interact with data they believe will attract further engagement. Because data structures in Intuition are explicit, users are motivated to converge not only on the entities/concepts/data themselves, but also on the most effective ways to describe and reference these entities/concepts/data. This creates an incentive for users to reach fractal consensus on data structures, from individual Atoms to complex nested Triples.

By integrating these economic principles, Intuition not only secures the system against malicious attacks but also promotes a healthy, self-regulating ecosystem where users are rewarded for their contributions to the integrity and value of the data.

3.2.5 State Interpretations

By implementing the aforementioned mechanisms, we achieve a state that can be interpreted in an almost limitless number of ways. Intuition deliberately avoids enforcing any specific interpretation of the data, aligning with its core principle of avoiding "truth lock-in" or the imposition of a singular perspective. The Intuition Protocol is designed to remain completely neutral regarding the interpretation of state and signal. Nevertheless, it is crucial to discuss the topic of interpretation within the Intuition system to provide an
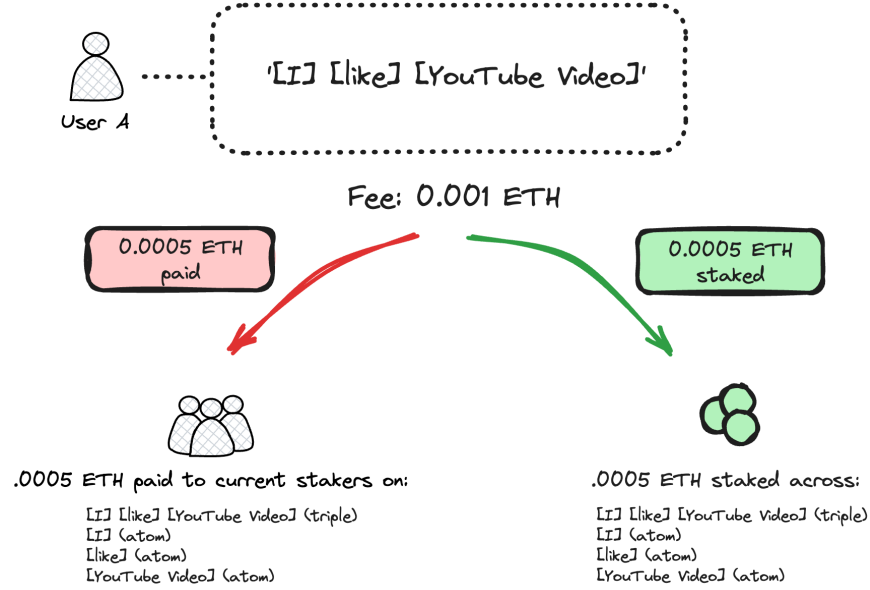
Figure 4: A demonstration of the high-level flow, with arbitrary example numbers.

initial understanding of the various methods and perspectives that users might explore when analyzing the system's state.

Literal interpretations In the Intuition ecosystem, literal interpretations are explicit, structured expressions designed to facilitate coordinated, higher-order applications of its discrete state. These interpretations provide a foundation for a cohesive and interoperable framework, enabling various stakeholders to understand and utilize the system's data explicitly. By achieving consensus on how specific concepts should be expressed and interpreted, the ecosystem can develop a composable system of expression and logic, similar to programming languages.

For instance, consider implementing an access control mechanism using the Intuition state. An implementor might use a specific Atom, defined as "has access to," as the Predicate in a Triple structure. The literal interpretation might state: if [Company's Multisig] attests to this Triple being True, this signifies that the Subject of the Triple has access to the Object—in this case, System X. This state can be used by the implementor to provision access to users of System X.

By publishing this literal interpretation, the implementor allows others to observe and utilize this interpretation for various purposes. For example, another system might use this information to grant User A access to System Y based on their access to System X, to adjust their loan-to-value ratio in a financial application, or to affect their reputation in a particular context.
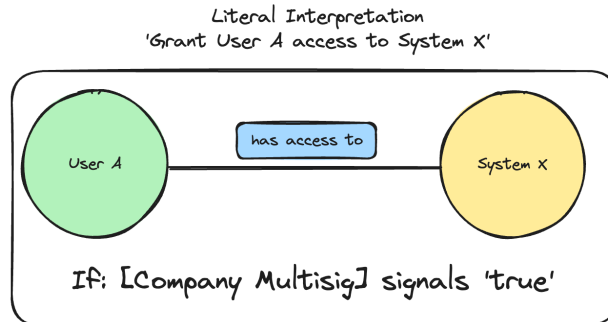
The Intuition system facilitates the publication process of these literal interpretations, allowing stakeholders to register and share their interpretations as Atoms and/or Triples. By doing so, the system can be used

recursively to create a registry of literal interpretations that promotes transparency and coordination. This registry enables the creation of programmatic languages on top of the Intuition protocol, leveraging the principles of discrete objects and their relationships to enforce logic and code.

Algorithms In the Intuition framework, algorithms function as tools to filter and interpret data, distinct from literal interpretations which resolve to deterministic logic. Given a permissionless environment where anyone can claim anything about anything, algorithms play a crucial role, enabling signal to be effectively distilled from the noise and allowing users to focus on the voices they trust.

Intuition rejects the idea of 'truth lock-in,' acknowledging that no single algorithm can be universally optimal. In response, Intuition promotes a diverse and permissionless ecosystem of algorithms that users and developers can select based on their specific requirements. This empowers users and developers to create, choose, and apply the most appropriate algorithms for their particular contexts. Such flexibility ensures that data filtering and interpretation can be customized to meet varied needs, thereby enhancing the overall utility and effectiveness of the Intuition framework.

This approach contrasts sharply with the current internet landscape, where platform interactions often necessitate accepting a pre-set, opaque algorithm. Intuition envisions decoupling algorithms from applications, allowing individuals to use their preferred algorithms across different platforms - a flexibility made possible through interoperable and composable data.

For instance, consider an algorithm that weights and filters data based on social graphs. In this model, a user who is one degree of separation away from the observer might have their signal weighted at 100%; at two degrees away, at 80%; and at three degrees away, at 60%. This allows for nuanced data interpretation based on social proximity.
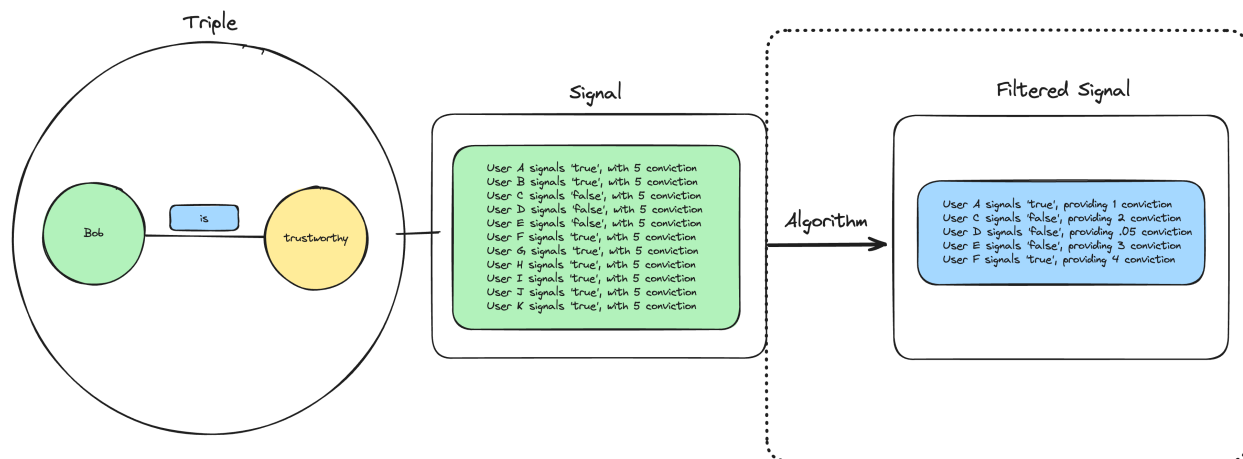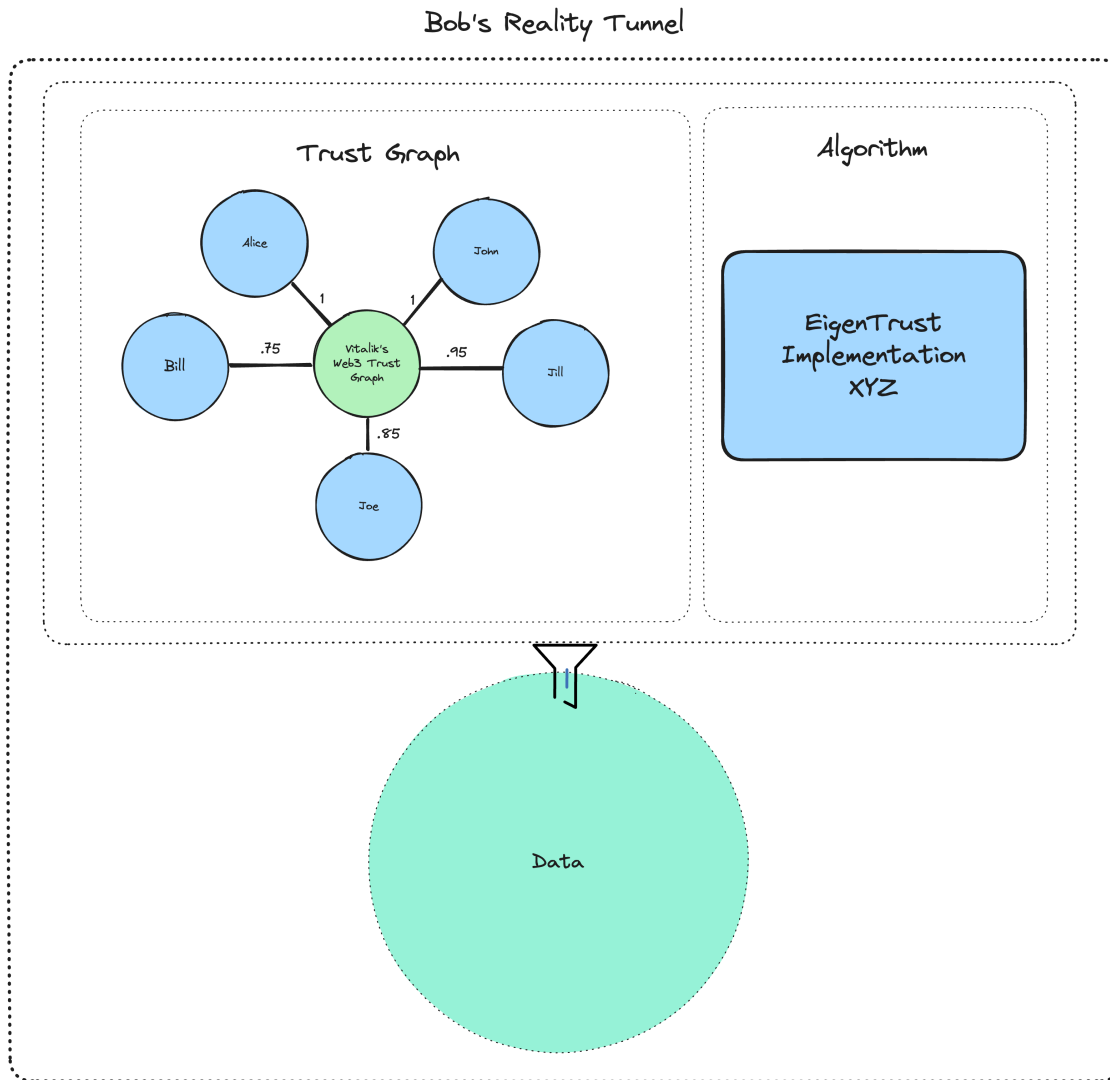

Figure 5: Data filtered through an algorithm, helping to distill the signal from the noise.

Reality Tunnels By decoupling each element of the data filtering process, we unlock the potential to recombine these elements in novel and innovative ways. Within the Intuition framework, these combinations are known as "Reality Tunnels." A Reality Tunnel typically includes a mix of literal interpretations and algorithms, but it can also incorporate other relevant components essential for data filtering, weighting, and sense-making.

To illustrate, consider the creation of a 'Trust Graph' using specific Triple structures. For instance, a Triple might be formatted as '[Subject] [in trust graph] [Vitalik's Web3 Trust Graph].' This Trust Graph could assign different users different weights, explicitly signaled by a particular curator, to facilitate the weighting and filtering of data. When this Trust Graph is combined with an algorithm such as EigenTrust, it can be applied to a relevant context—like a portion of the knowledge graph pertaining to Web3 topics. This integrated viewpoint or "lens" is referred to as a Reality Tunnel.

The concept of Reality Tunnels also allows users to switch between different perspectives. Imagine engaging in a debate and having the ability to view the data from your opponent's perspective to understand their reasoning. Currently, most platforms restrict users to a single "reality tunnel," shaped by their social graph

Trust Graph

Algorithm

Alice

John

1   1

Bill   .75   Vitalik's
Web3 Trust   .95   Jill
Graph

EigenTrust
Implementation
XYZ

.85

Joe

Data

and a specific platform's algorithm. However, if users could toggle between different social graphs and apply various open-source algorithms, they would gain access to diverse viewpoints and a more comprehensive understanding of the data and the world around them. This flexibility would enrich user experience by providing multiple angles on the same information, fostering better-informed discussions and decisions.

3.3 Intuition in Practice

The introduction of Intuition's core primitives lays a robust foundation for constructing a system that fosters a trustful interaction layer for the decentralized web. These seemingly basic primitives enable a wide range of powerful functionalities, transforming how we manage identities, data, and trust online.

To illustrate this, consider, once again, the experience of buying a product on Amazon. With Intuition's primitives, this process can be reimagined in a decentralized, trustless manner:

1. **Atoms and Triples**

   (a) Every user, product, review, and transaction can be represented as discrete objects (Atoms) and linked through relationships (Triples). For instance, a Triple could link a product (Atom) to a review (Atom) through a relationship like "hasReview."

2. **Signal**

(a) Each review can be evaluated for credibility using the Signal primitive. Reviews and Signals from verified purchasers or highly reputable users can carry more weight, helping users discern trustworthy feedback from potentially fraudulent reviews.

3. **Fees, Economics, and Incentives**

    (a) Users are encouraged to express themselves, and reviewers are incentivized to provide honest and detailed feedback. Users earn money for their valuable data contributions, and their reputation becomes cross-contextual, increasing its significance beyond a single platform. For example, a user's status as a trusted reviewer on Amazon could serve as a valuable reputation data point in other contexts, such as securing better loan-to-value ratios in decentralized finance (DeFi) or enhancing the ability to obtain a loan. This cross-contextual reputation system contrasts with Amazon's current reviewer reputation, which offers no tangible rewards.

    (b) Additionally, users might be more inclined to attest to useful information about products on Amazon because their claims can be easily seen by the people they care about, thanks to portable social and trust graphs. Unlike the current Amazon platform, which lacks a friends list, Intuition allows users to take their singular social graph or a set of trust graphs with them anywhere they go. This portability means that the review of one trusted individual in a specific context could hold more weight than numerous anonymous reviews. The ability to leverage these portable social and trust graphs ensures that valuable insights from trusted sources are prioritized, further enhancing the reliability and utility of the data within the ecosystem.

4. **Interpretations**

    (a) The listing of a product on a marketplace such as Amazon can be represented as a literal interpretation. For instance, adding a product to a marketplace can be as straightforward as creating a Triple like [Product] [listedOn] [Amazon]. Expanding on this concept, various stakeholders can publish their interpretations of product reviews. For example, a company might aggregate all reviews and provide a summary score, while an independent consumer protection group could highlight reviews mentioning safety concerns.

5. **Algorithms**

    (a) Users can choose from various algorithms to filter and sort reviews based on their preferences. For instance, an algorithm can prioritize reviews from users with similar purchase histories or highlight reviews that mention specific product features.

6. **Reality Tunnels**

    (a) Users can compose together interpretations and algorithms to create curated 'views' of data, allowing them to find the voices they trust among thousands of anonymous voices.

7. **Portable Identity and Data**

    (a) Identities and data become universal, and can be referenced and integrated anywhere across the web. Users can see a product's aggregated reviews across Amazon, Facebook Marketplace, Craigslist, or eBay, provided the same canonical identifier for the products is used in each context. And, even if Amazon were to shut down, users' data and lists of favorites would still exist, ensuring continuity and control over their digital interactions.

By integrating these primitives into contexts and interactions that cannot yet be fully 'trustless,' Intuition establishes a decentralized trust layer. This layer allows users to interact with confidence, knowing that the information they rely on is transparent, verifiable, and free from centralized manipulation. For instance, when buying a product, users can access a wealth of credible reviews, filtered and presented according to their preferences, all while maintaining control over their data and identities. By leveraging these tools, we can build a more trustworthy and user-centric digital ecosystem, addressing many of the inherent flaws in the current Web2 trust stack and paving the way for a more decentralized and equitable internet.

4 Use Cases, Examples, & Implications

4.1 Web3 Use Cases & Examples

4.1.1 Transaction Security & Web3 Navigability

The current landscape of Web3 interactions through wallets like MetaMask often presents users with a complex and opaque interface. When interacting with smart contracts or sending transactions, users typically

see non-human-readable data strings, transaction hashes, and cryptic addresses, offering little context or insight into the nature and safety of their actions. This lack of clarity can lead to uncertainty and even security risks, as users are unable to easily assess the trustworthiness of the entities they are interacting with.

With Intuition data integrated into wallets like MetaMask, users can see comprehensive and meaningful information about the contracts and addresses they interact with. For instance, when a user is about to engage with a smart contract, the wallet can display data about who has audited the contract and their corresponding reputation scores. This may help provide trust around contract security and the fact that the contract being interacted with is the *correct* contract.

Integrating Intuition data into Web3 wallets also addresses the critical issue of scams and fraudulent activities. Users can see if a particular address has been flagged as a scammer by the community, based on collective attestations. For example, if numerous users have reported a specific address as a phishing scam, this warning can be prominently displayed within the wallet interface, alerting the user to proceed with caution or avoid the interaction altogether.

The open and permissionless nature of Intuition's data lake ensures that this information is continuously updated and verified by the community, enhancing its reliability. By leveraging the collective intelligence and vigilance of the decentralized ecosystem, Web3 wallets can provide a more secure and trustworthy environment for users.

Beyond security, the integration of Intuition data can enrich the user experience by providing semantic context to transactions. Users could see labels and descriptions for tokens, contracts, and addresses based on community-generated data. For example, a token address could be accompanied by a description of the token's purpose, the project behind it, and user reviews or ratings, without reliance on an intermediary such as Coingecko. This semantic enrichment makes the data more accessible and understandable, even for users who may not have deep technical knowledge.

Furthermore, this enriched context can be personalized based on the user's trust graph. By leveraging the trust relationships established within Intuition, wallets can prioritize information and recommendations from sources that the user personally trusts, creating a more tailored and relevant experience.

4.1.2 Developer Tooling Discoverability

The rapid pace of innovation in the Web3 and blockchain space has led to a proliferation of developer tools, frameworks, and libraries. While this wealth of resources is a boon for developers, it also presents a significant challenge: keeping track of the latest and most effective tools is increasingly difficult. The current ecosystem suffers from fragmentation, with many valuable tools going unnoticed or underutilized, leading to duplicated efforts and inefficiencies. Intuition offers a solution by leveraging the power of crowdsourced knowledge to create comprehensive, dynamic, and easily navigable lists of developer tools.

With new tools and frameworks being released frequently, developers face the daunting task of staying updated and identifying the best resources for their needs. The decentralized nature of the Web3 space further complicates this, as information is scattered across various platforms and repositories. This fragmentation not only hampers productivity but also leads to the unintentional duplication of work, as developers may unknowingly create tools that already exist.

Intuition tackles this problem by providing a platform for the community to collectively categorize, review, and endorse developer tools. By aggregating and organizing data through user contributions, Intuition ensures that valuable resources are easily discoverable, reducing the time and effort developers spend searching for the right tools.

Intuition enables users to tag and categorize developer tools based on their functionality, use cases, and other relevant criteria. When a developer organizes their own toolkit—by tagging a new library or framework as "smart contract development" or "Ethereum scaling solution"—this information is shared with the entire Intuition ecosystem. This crowdsourced approach ensures that the collective knowledge and experience of the developer community are harnessed to create a comprehensive and up-to-date repository of tools.

For instance, a developer might discover a new tool that simplifies the process of deploying smart contracts. By tagging and categorizing this tool within Intuition, they not only organize their own resources but also make this tool discoverable to others who might benefit from it. This collaborative effort helps prevent the duplication of work and encourages the adoption of the best available tools.

Intuition's decentralized and permissionless data lake allows for the creation of a dynamic and interconnected knowledge base. As more developers contribute to the platform, the repository of developer tools grows richer and more nuanced. Each tool's entry can include detailed descriptions, user reviews, and endorsements from trusted community members, providing a holistic view of its capabilities and reliability.

This interconnected knowledge base enables developers to quickly find the tools they need, understand their use cases, and assess their quality based on community feedback. The ability to access this wealth of information in one place significantly enhances the efficiency of the development process.

Leveraging Intuition's personalized trust graphs, developers can receive tailored recommendations based on their specific needs and preferences. By overlaying their trust graph onto the list of developer tools, they can prioritize recommendations and endorsements from individuals and organizations they trust. This personalized approach helps developers navigate the vast array of tools and focus on those most relevant to their projects.

For example, if a developer trusts the recommendations of a well-known blockchain development team, they can see which tools this team endorses and uses. This not only streamlines the discovery process but also provides an additional layer of confidence in the quality and reliability of the tools selected.

4.1.3 Delegate Reputation

In the Web3 ecosystem, decentralized governance is highly prized, and the decision to delegate tokens or voting power plays a critical role in the success of decentralized projects. However, the current processes for vetting and selecting DAO (Decentralized Autonomous Organization) delegates are deeply flawed. Despite the value placed on pseudonymity, control over multi-billion-dollar protocols is often handed to individuals who haven't undergone proper vetting and may lack the necessary expertise. The typical vetting process is superficial, relying on factors like usernames, profile pictures, or brief bios, which fall far short of what's needed. Users are expected to conduct their own thorough due diligence, which is impractical in a decentralized environment where individual stakes are usually too small to justify the effort. Even when due diligence is performed, the data available is often unreliable, with falsified credentials being a common issue.

Intuition offers a solution by providing tools that enable the verification of key information, such as who made specific claims about what, and at what time—for example, a university verifying that an individual graduated with a specific degree, or an employer confirming that someone worked for them. Additionally, Intuition incentivizes community members to share more data points, helping to build a more comprehensive picture of an individual's reputation within the ecosystem.

The semantic structuring of this data allows users to easily navigate and filter through trust networks, or "trust circles," within specific contexts. This means that users can view data, sentiment, and opinions filtered through people they trust within relevant fields. For instance, users could identify which experts in a particular area endorse a specific delegate or staking operator. Contextual reputation is key here—knowing that an entity has a high general reputation is less valuable than understanding their reputation within the specific context of their role. For example, a delegate's expertise in managing hardware and software operations is far more relevant to their role in a DAO than their reputation in unrelated areas like sports or entertainment.

Furthermore, this system incentivizes delegates to act in the best interests of the protocol, as their actions directly impact their reputation within the Intuition system. A transparent, aggregated trust score, derived from the collective input of the Web3 community, provides a more accurate and holistic view of their capabilities and track record. This reputation score can then be used as a credential, unlocking new opportunities and offering tangible benefits that may have previously been out of reach.

4.1.4 Credit Scores

In the traditional financial system, credit scores are pivotal for accessing financial services, yet they often rely on limited, centralized data that doesn't fully capture an individual's financial behavior or potential. This approach can exclude those without established credit histories, such as young adults or individuals in underserved regions, limiting their access to financial opportunities.

Intuition can revolutionize credit scoring by leveraging decentralized attestations and community-driven reputation systems. Here, creditworthiness is determined not just by traditional financial data but also by a comprehensive array of attestations—both objective and subjective. These attestations provide deeper insights into an individual's financial behavior. For example, when someone borrows money, the lender can

attest to their reliability, timeliness in repayment, and overall trustworthiness. These attestations, whether formal statements or subjective opinions, are recorded, timestamped, and integrated into the borrower's decentralized credit profile, creating a nuanced and dynamic credit score.

One of the key innovations of Intuition is the ability to leverage this reputation as collateral. If Intuition is widely adopted and people invest significant time and resources into building their reputations, these reputations themselves acquire tangible value. A strong reputation within the Intuition system could become a valuable asset that can be used to secure loans. Since the reputation is built on a foundation of community-validated attestations, any attempt to undermine it would need to outweigh the value of that reputation. This makes malicious attacks costly and impractical, further reinforcing the trust and reliability of the system.

Imagine a scenario where, based on your Intuition reputation, you could borrow money with the assurance that the loan amount is less than the value of your reputation. The system inherently discourages defaulting, as the cost to one's reputation—and the associated loss of future opportunities—would far exceed the benefit of a short-term gain. This creates a powerful incentive for individuals to maintain and protect their reputations, knowing that their standing within the community holds real, tangible value.

By focusing on decentralized attestations, subjective claims, and the intrinsic value of reputation, Intuition not only democratizes access to credit but also fosters a more secure and fair financial ecosystem. This system empowers individuals to build, leverage, and protect their financial identity, offering a credit score that truly reflects their behavior, trustworthiness, and the confidence others have in them.

4.2 Web2 Use Cases & Examples

4.2.1 Media & News

In the current landscape of media, manipulation and misinformation are pervasive issues that undermine the integrity of public discourse. The rapid spread of misinformation and disinformation and the strategic use of propaganda tactics can significantly distort public perception and decision-making. Intuition provides a framework to mitigate these challenges by enhancing transparency, accountability, and trustworthiness in information dissemination.

One of the key features of Intuition is its ability to trace the provenance of data. Intuition ensures that the origin and history of information are transparent and verifiable. This transparency allows users to trace the source of information to its origin, determining its credibility and authenticity. By examining the history of data and users, individuals can evaluate the consistency and reliability of the sources over time. Transparency in data provenance helps identify alterations or misrepresentations, making it more difficult for malicious actors to manipulate information without detection.

Additionally, Intuition's opt-in state interpretation mechanisms, such as the ability to toggle between Reality Tunnels, ensure that no one is locked into a single, manipulative echo chamber. This feature helps users discern trustworthy information from manipulative or false narratives, providing a more balanced perspective on the information they encounter.

Intuition also enables a community-driven approach to fact-checking. Similar to 'community notes' on platforms like Twitter, but applicable to the entire internet, Intuition leverages the collective intelligence and expertise of its users. This community-driven model allows for real-time policing to ensure higher data quality and accuracy.

Consider the context of a major political election. In such a scenario, misinformation and propaganda can significantly influence voter behavior. Intuition can help mitigate these effects by providing a transparent and accountable information ecosystem. In Intuition, people can express their thoughts and opinions freely, without risk of censorship, bias, or manipulation. Political statements and campaign promises can be recorded on Intuition, with their origins and subsequent modifications transparently documented. Voters can verify the authenticity and consistency of these statements. News articles and reports can be evaluated based on their source reputation and content quality, allowing voters to access information from high-reputation sources and reducing the risk of being misled by biased or false reporting.

By providing tools for verifying the authenticity of information, Intuition empowers individuals to make more informed decisions. Ensuring that voters have access to accurate and reliable information strengthens the democratic process and protects it from manipulation. Transparent and accountable information dissemination fosters a healthier public discourse, where ideas can be debated based on their merits rather than

misinformation. By reducing the prevalence of manipulation, Intuition can help restore trust in our media, building a more informed and engaged society.

4.2.2 Reviews

The landscape of reviews in Web2 is fundamentally broken.

Identity fragmentation makes it difficult to reconcile reviews across platforms. As new platforms emerge, they compete for data, leading to further fragmentation. Although building aggregators is possible, Web2 companies often restrict access to their data, charge exorbitant fees for API usage, or eliminate access entirely, as their data is their moat.

Data fragmentation exacerbates the problem. Users frequently express themselves through unstructured text in closed environments, such as group chats and verbal conversations. Without a suitable platform that ensures this data reaches the intended recipients, data remains fragmented and disconnected.

A significant issue is the lack of incentives for users to leave reviews on these platforms meant to aggregate communal sentiment. These incentives can be categorized into four main areas:

- **Economic Incentives**: Currently, platforms like Amazon typically do not offer financial rewards for consumers to leave reviews.
- **Reputational Incentives**: There is no mechanism for users to build and benefit from a reputation as reviewers within or outside most platforms.
- **Educational Incentives**: Users have no certainty that their reviews will be seen by people they care about, discouraging them from investing time and effort.
- **Functional Incentives**: Reviewing products does not provide any practical utility to the user, aside from maybe occasionally serving as an outlet for frustrations.

Due to these limitations, most users do not contribute reviews, even though most people relies on these reviews to make daily decisions. The absence of a better alternative forces reliance on fragmented and unreliable data to discern who or what to trust online.

Intuition introduces a paradigm where every ***thing*** - including you, your network, and the things you are reviewing - has a canonical decentralized identifier, making it universally referenceable across the web. Imagine leaving a review on a product in an Intuition-enabled app, and having it seamlessly propagate across all platforms that display reviews. Furthermore, imagine carrying your social and trust graphs, along with all your data, wherever you go. There would be no need to rejoin communities, rebuild follower lists, or repeatedly create profiles and set preferences. For instance, when shopping for supplements on Amazon, you could see recommendations from experts in your global 'supplements trust graph'. When searching for AI podcasts on Spotify, you would see recommendations from trusted individuals in the AI field.

Envision being compensated for sharing useful information. Liking a YouTube video could earn you money for each subsequent like it receives. You could build a reputation as a trusted reviewer of content or products. Your social graph or followers could always see your opinions if they wished—whether you liked a YouTube video, which supplements your trusted expert recommends, or which influencers in Web3 to follow.

Furthermore, if users could take their reputation as a reviewer and use it elsewhere, such as in the process of securing an undercollateralized loan in decentralized finance (DeFi), the incentive to build and maintain a good reputation would be much stronger. The ability to leverage their reviewer reputation in other contexts would enhance the value of leaving reviews, fostering a more interactive and community-driven environment.

By allowing for the capture of many-to-one, non-deterministic attestations and incentivizing people economically to participate in this process, Intuition provides a powerful tool for enhancing the value and impact of reviews across all platforms. This system not only improves the reliability and trustworthiness of reviews but also creates a more interconnected and motivated community of reviewers, ultimately leading to richer and more valuable user experiences.

4.2.3 Recommendations and Advertisements

Advertising, when executed effectively, has the potential to significantly enhance the user experience by delivering relevant and desired content. Effective advertising is beneficial because it connects users with products and services they genuinely want or need. Rather than being perceived as a nuisance, relevant

advertisements can enrich users' lives by providing information about useful products, new music, upcoming events, or services they might not have discovered otherwise. When advertisements are tailored to individual preferences, they add value to the user experience. This is especially important in a world where there is **infinite content** to consume and our options are nearly limitless.

Spotify's Discover Weekly playlist is a prime example of how personalized recommendations can lead to positive outcomes. Every week, Spotify curates a playlist of songs specifically tailored to each user's music tastes, based on their listening history and preferences. This feature leverages sophisticated algorithms to predict which songs the user will enjoy, resulting in a highly personalized music discovery experience.

For many users, Discover Weekly has become an anticipated event, offering a curated selection of new and lesser-known tracks that align perfectly with their tastes. This not only enhances the user's enjoyment but also supports artists by introducing their music to new audiences. In this case, the recommendation system acts as a form of advertising that users actively seek out and appreciate.

However, current platforms often rely on interpreting implicit signaling of user preferences, which can lead to less-than-ideal recommendations. For example, Spotify's Discover Weekly is based on the user's listening activity over the past week. While this method often provides good recommendations, it does not always capture the user's true preferences.

Imagine a scenario where users could explicitly express their preferences in a universally semantic format that all platforms could ingest. This would eliminate irrelevant ads and recommendations. For instance, users who do not speak Spanish would no longer receive ads in Spanish, and those who prefer House music over Techno would receive recommendations that better match their tastes. By allowing users to explicitly communicate their preferences, platforms would be able to deliver more accurate and satisfying content.

Furthermore, this approach would incentivize users to share their preferences. Users could be rewarded for providing data that helps refine the accuracy of recommendations and advertisements. This creates a mutually beneficial relationship where users receive content that genuinely interests them, and platforms can better serve their audiences.

4.3 AI Implications

Artificial Intelligence (AI) systems are becoming increasingly integral to various sectors, significantly influencing decision-making processes, automating tasks, and driving innovation. However, the efficacy of AI is fundamentally dependent on the quality and integrity of the data it ingests. Inaccurate, unverifiable, or biased data can lead to flawed AI outputs, potentially causing significant negative impacts. Intuition offers a robust framework for ensuring that AI systems have access to high-quality, verifiable, and attributable data, thus enhancing their reliability and effectiveness.

The Intuition protocol incentivizes users to label data in a semantic format, thereby creating a global, permissionless network of actors contributing to a global AI dataset. This decentralized approach aims to serve as the intuition module of the collective consciousness, encouraging individuals to share their information, knowledge, wisdom, and intuition. By signing contributed data with self-sovereign private keys, Intuition ensures that the data is verifiable and attributable, thereby maintaining its integrity.

Verifiable attributes provided by Intuition enable AI systems to also selectively ingest data from trusted sources. Users are motivated to build their reputations to a level where AI companies seek to incorporate their data, potentially rewarding them for their contributions. This system also disincentivizes actions that could harm reputations, promoting a culture of accuracy and reliability. AI companies may pay for data reads, creating a financial incentive for users to provide high-quality data. The original data creators are thus rewarded, fostering an ecosystem of continuous improvement and trust.

Furthermore, Intuition facilitates the discoverability of private data. AI companies can issue requests to users to run their models over local encrypted datasets, compensating them for selectively disclosing pieces of data or for allowing their models to run using homomorphic encryption/decryption techniques. This approach not only protects user privacy but also expands the dataset available to AI systems, enhancing their learning and predictive capabilities.

5   Conclusion

Intuition acknowledges that digital trust is not static but an ever-evolving construct that must adapt to the changing contours of technology, society, and individual expectations. As we advance, it is crucial to blend

technological innovation with human-centric design to foster genuine trust and collaboration in the digital age. This involves not only improving the underlying protocols and systems but also addressing the social and psychological aspects of trust. Understanding this evolution is crucial for developing systems that can foster genuine trust and collaboration in the digital age. By leveraging both the strengths of decentralized technologies and the insights from social dynamics, Intuition aims to create a more resilient and trustworthy digital ecosystem - one where trust is not a commodity to be controlled but a communal resource to be shared.