How blockchain ensure the reliability of Data and AI

2018/10/11 @Stanford University

Kazuaki Ishiguro
Chief Blockchain Architect
@Kazuakiishiguro
Index:

1. What Interface do we need in the near future
2. How blockchain ensure the reliability of Data and AI
About Me

Kazuaki Ishiguro
Chief Blockchain Architect at Couger

Chief Blockchain Architect at Couger.
Regional Head of Enterprise Ethereum Alliance.
Started career as a DJ at the multiple clubs in Hollywood, start self taught programmer.
Selected as a world’s top 10 team for super demo at ethereum developer conference, EdCon in 2018.
Since an early flush of optimism in the 1950s, smaller subsets of artificial intelligence – first machine learning, then deep learning, a subset of machine learning – have created ever larger disruptions.
AI Outline
AI Outline
AI Outline

- Machine Learning
- Deep Learning

INPUT
- Comprehension

OUTPUT
- Action
- Evaluation
AI Outline

INPUT
Comprehension
- Machine Learning
- Deep Learning

MIDDLE
Decision Making

OUTPUT
Action
- Evaluation
AI Outline

- Comprehension
  - Machine Learning
  - Deep Learning

- MIDDLE

- Output
  - Action
  - Evaluation

MAGIC HAPPENS

connectome
AI Problem #1

Black-Boxed Data
Black-Boxed AI

Requires:
- Data
- Resource

Cause:
- Silo
- Black-Box

Comprehension
- Machine Learning
- Deep Learning
Black-Boxed AI

- Machine Learning
- Deep Learning

Comprehension
AI is not Trustworthy

- On Being a Data Skeptic - Cathy O’Neil
- Amazon Alexa Bug
- Google Home Bug
- Uber autonomous car accidents
- data leaks .....
GeneFlow

A system that records the learning and execution history of AI in the Blockchain and ensures the reliability of AI.
Blockchain

- Chain of blocks, which contain the list of record transactions.
- A decentralized, distributed and public digital ledger.
- Once transaction stored in the block, it's immutable.
- Each block contains, transaction data, a timestamp and a cryptographic hash of previous block.
- Use various time-stamping schemes such as Proof-of-Work (PoW).
- Managed autonomously using a peer-to-peer network.
- Every peer (node) has a copy of the blockchain.

source: wikipedia
Smart Contract

- First used by Nick Szabo in 1994.
  - Made an analogy to vending machines.
- Computer program stored inside of the blockchain.
- Immutable and distributed.
- Directly control digital assets.
- Can be applied to many different things.
  - Banks
  - Insurance
  - Postal
  - etc...

source: http://www.fon.hum.uva.nl/rob/Courses/InformationInSpeech/CDROM/Literature/LOTwinterschool2006/szabo.best.vwh.net/smart.contracts.html
How GeneFlow applied in Connectome

- Comprehension AI
- Character AI

CONNECTOME

GeneFlow applied.
GeneFlow: Decentralized vs Centralized

- Learning Data
  - Blockchain
  - Can trace history of learning data and algorithm
  - Can Trust
  - Decentralized

- IoT Devices
  - Data falsification
  - Transparency

- Learning Data
  - Block-boxed
  - Can not trace history of learning data and algorithm
  - Can Not Trust
  - Centralized
GeneFlow

AI / ML
- Training Data
- Algorithm
- Trained Model

Blockchain
GeneFlow
GeneFlow
GeneFlow

AI / ML

Training Data

Algorithm

Trained Model

Blockchain

Training Data

Algorithm

Trained Model

Training Data

Algorithm

Trained Model

Training Data

Algorithm

Trained Model
GeneFlow

AI / ML

Training Data + Algorithm → Trained Model

Blockchain
AI Outline

- **INPUT**
  - Comprehension
  - Machine Learning
  - Deep Learning

- **MIDDLE**
  - Decision Making

- **OUTPUT**
  - Action
  - Evaluation
AI Outline

Input

- Comprehension
  - Machine Learning
  - Deep Learning

Middle

- Decision Making

Output

- Action
  - Evaluation
AI Problem #2

Algorithm
Decision Making and Action Process

If my brain have received input A, and detect _____, do _____.
Decision Making and Action Process (from our POV)

If my have received input A, and detect , do .
Decision Making and Action Process (from our POV)

If my have received input A, and detect , do .

I will destroy humans.
Decision Making and Action Process (from our POV)

If my
have received input A,
detect
, do

(because my algorithm said
so.... )
Smart Space Use Case
Smart Space Use Case: Example

If my have detect seated person without something to drink, do ______.
Smart Space Usecase: Architecture
Smart Space Use Case: Architecture
If there are seated person without something to drink, let Virtual Human find someone in the office and suggest the person to bring bottle.
AI Outline

INPUT

Comprehension
- Machine Learning
- Deep Learning

MIDDLE

Decision Making

OUTPUT

Action
- Evaluation
AI Outline

**INPUT**
- Comprehension
  - Machine Learning
  - Deep Learning

**MIDDLE**
- Decision Making

**OUTPUT**
- Action
  - Evaluation
Virtual Human Agent

- Comprehension
  - Machine Learning
  - Deep Learning

- Decision Making

- Action
  - Evaluation
Next step....
Next step....
Next step....
Next step....
Next step....
HOW TO EVALUATE VHA with DIVERSITY?
Evaluation Platform: Centralized?

Problems:
- Sponsored content has priority
- Search engine optimized
- Black-boxed filtering algorithms
- Untrusted feedback

AAAAA  Sponsored
Accidents: a couple times.
Very reliable, best selling in the market!
Great deal, do not miss this chance!

BBBBB
Accidents: once.
Feedback: 5 stars.

You have 100,000 results.
Evaluation Platform: Decentralized

- Decentralized market platform for VHA
- Any developers can create their own Virtual Human functions / interface
- Marketplace maintained by community:
  - Incentive Mechanism
    - Token Curated Registry - TCR
  - Self-Sovereignty
  - Cryptography
Incentive Mechanism: Circle of Crypto-economic Activity

Creator-User Exchange

Creator-Investor Exchange

User-Investor Exchange

work
token
capital

@jmonegro
Token Curated Registry: TCR

3 types of actors:
- Consumers
- Community Curators
- Applicants

<table>
<thead>
<tr>
<th>List</th>
<th>status</th>
</tr>
</thead>
<tbody>
<tr>
<td>No accidents</td>
<td>✓</td>
</tr>
<tr>
<td>Road Assistance</td>
<td>✓</td>
</tr>
<tr>
<td>Sing</td>
<td>✘</td>
</tr>
<tr>
<td>Knows your schedules</td>
<td>proposed</td>
</tr>
</tbody>
</table>

source: Adapted from Sebastian Gajek.
COMMUNITY DEVELOPMENT
**Virtual Human TCR w/Ocean Protocol**

```python
class TokenCuratedRegistry:
    def propose(algorithm):
    def challenge(proposal):
    def vote(challenge):

<table>
<thead>
<tr>
<th>Function</th>
<th>status</th>
</tr>
</thead>
<tbody>
<tr>
<td>Smile</td>
<td>“Proposed”</td>
</tr>
<tr>
<td>Rude</td>
<td>“Challenged”</td>
</tr>
<tr>
<td>Remember Your name</td>
<td>“OK”</td>
</tr>
<tr>
<td>Recognize your emotion</td>
<td>“OK”</td>
</tr>
</tbody>
</table>
```

- new TokenCuratedRegistry(schellingpoint="Best Virtual Human Customer Service")
- propose (algorithm)
- 300 Tokens (stake)
- challenge (proposal)
- 300 Tokens (challenge)
- 10 Tokens (weight)
- vote (challenge)
Community Development

EUROPE

AFRICA

ASIA

N.AMERICA

ocean

stellar

WIRED

CONSENSYS

CONNECTOME
Thank you

Kazuaki Ishiguro
Chief Blockchain Architect
@Kazuakiishiguro