TON Fingerprints

Unique digital identifier

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Review

TON Fingerprints is an NFT collection of 10 000 unique digital fingerprints based on a basic ring generation algorithm using a noise texture. Like human fingerprints, you can now use them for the Web3 and Metaverse era, as digital biometric information on The Open Network.

01

Introduction

NFT (non-fungible token), also a unique token, plays a unique role in the development of blockchain technology, and in 2021 it certainly took this space by storm. NFTs hit the media, since Beeple's "Everydays" sale sold for $69.3 million, CryptoPunks collection successfully traded at Christie's & Sotheby's auction, Twitter co-founder Jack Dorsey sold his first ever tweet as an NFT for $3 million dollars, and Elon Musk tweeted a techno song about NFTs in the form of NFTs. And while some argue about the longevity of this phenomenon and others are convinced that the NFT wave is here to stay, the numbers speak for themselves. In the first six months of 2021, NFT sales reached $2.5 billion, up from $13.7 million in the first half of 2020 (according to DappRadar). At the same time, this figure is greatly underestimated, since only sales along the chain, that is, on the blockchain, were tracked, without taking into account large over-the-counter sales, for example, from auctions. Moreover, demand remains at a consistently high level and continues to break records.

So what makes NFT technology so attractive to creators and collectors? Are there any issues or pitfalls that need to be considered and resolved?

02

What is NFT

Today, an NFT token is usually understood to mean exclusively digital art or crypto art, a certain object of copyright (music, text, picture). This is because tokens allow you to create any media file. However, not only copyright objects, but any other objects can be tokenized. Thus, in accordance with the laws of Liechtenstein, an NFT token is a container program that is wrapped on the platform, transferred using smart contracts, etc. In this "container" you can "wrap" any object (an object of movable or immovable property, the same AI, or an object created by AI). The legal regime of what is "wrapped" in a "container" is governed by customary law.

Accordingly, an NFT token has two components: unique objects that are "wrapped" in them, and the ability to use these objects. Thus, there is a bifurcation of the goals of the purchasers of these types of tokens. Some collect them or buy them in order to sell them for more after some time. Others acquire them in order to find a use. For example, NFT token exchanges circulate tokens in which domain names or objects used in virtual worlds are "wrapped". Accordingly, the purchaser of such tokens uses them to solve practical problems (marking certain objects, participating in a sports game or in the virtual world, hosting websites, etc.).

Thus, there is a convergence of technologies: first, a program is used to create a copyright object, then a program for its tokenization, and then various options for using tokens are possible. In this regard, NFT tokens cannot be subject to the legislation on digital financial assets, as they do not perform the corresponding functions. Rather, such tokens can be used as a tool for the protection and commercial circulation of intellectual property.

The main feature of the NFT is that each such token is unique, and also, as a rule, has a limited emission. This determines the main difference between NFT and cryptocurrencies.

Each NFT token contains a unique set of metadata. For example, each TON Fingerprints is created based on the algorithm for generating base rings using a noise texture. Metadata consists of random generation of various attributes. The lower the chance of generating an attribute, the higher the rarity, and hence the value of the NFT.

03

Benefits of NFT

NFT provides content creators with a unique opportunity to monetize their work. Because of this, they no longer have to depend on the intermediaries of the creative industries - artists no longer rely on galleries and auction houses to sell their art, musicians are no longer controlled by major record labels, and the like. Instead, content creators can sell their digital goods directly to the audience in the form of NFTs, which also allows them to keep most of the profits. They can program royalties to receive a percentage of sales whenever their work is sold to a new collector. This is an attractive feature, since artists usually do not receive future income after the first sale of their creations.

In a nutshell, the main advantages of NFT technology are as follows:

- Unlike cryptocurrencies, which require all tokens to be identical, each NFT is unique or limited in number, and is not replaceable by similar tokens;
- Ownership records are stored on the blockchain, every NFT has an owner and it is a public record;
- With the benefits of blockchain technology, content creators can claim royalties directly;
- Content creators can access global markets, easily connect with collectors and a community of like-minded people.

04

Disadvantages of NFT

Despite the obvious advantages of NFT, it is hard not to notice a number of problems that have arisen in the industry along with the rapid spread.

Some problems:

- Difficulty in finding the original owner of the NFT;
- Difficulty assessing uniqueness and understanding how many copies exist;
- Difficulty in determining the value of NFT.

As for sales, there are more and more questions about authenticity and copyright protection. By uploading content to the marketplace, it is possible that absolutely any content can also be sold on behalf of the creator (no matter generative collections, a text work, a photograph found on the Internet, or a masterpiece by a famous artist). An example is the incident with an NFT drawing by American artist Jean-Michel Basquiat, which was put up for auction in April 2021 and removed two days after it was revealed that the seller did not own it.

All of these problems still exist, and we as researchers are testing hypotheses to find solutions.

05

Digital biometrics as a solution

Biometrics, as a technology and form of identification to determine the level of access based on the measurement of individual characteristics of a person, can be used for everything from everyday life to ideas from science fiction. Therefore, it is not surprising that it can introduce its original solution to some of the shortcomings of this technology.

To solve the problem of copyright, we have identified three possible ways to verify the identity of the content creator:

1. Using something the creator has, such as an identity document.

2. Using something the content creator knows, such as a passphrase or password.

3. Through who the content creator is, i.e. through biometrics, such as face, finger, etc.

Because biometrics are unique to all individuals, they are more reliable than other methods in verifying identity, not to mention they are quick and easy to use.

Using the digital fingerprint as a foundation, our project creates a decentralized identity layer that will not only be used in The Open Network, but can also be used in various environments and services, including existing marketplaces and services of the Web3 era. These fingerprints ensure that a particular NFT is unique and this eliminates the issue of copyright.

The metadata of each NFT Fingerprint will be linked as a service to identify platform users as a full-fledged Web3 application. This option makes it easy to interact with blockchain-based services and will simplify the interaction interface for authors so that the experience is easy even for beginners. In addition, content creators and collectors will be able to remain anonymous using digital fingerprints based on the uniqueness of the digital fingerprint pattern without having to reveal their human biometrics. This will allow you to easily access your accounts, mint and sell tokens, and sign transactions in the most secure way.

As is known, the collection of biometric data raises the fundamental question of the confidentiality of the end use of this information. We are working on these issues. In addition to digital biometrics and blockchain technology in a broad sense, the project uses digital biometrics based on a stack of different disciplines and technological systems such as cybersecurity, encryption, attack resistance and zero-knowledge proof. When content authors or buyers enter a project, the search and match operation from 1 to N takes place in an encrypted space, and since it is based on zero knowledge, the only information that is looked up is whether the role status is registered or not.

Many digital objects are already hosted in metaverses and online collections of virtual worlds, which have art galleries where users can purchase crypto art and other collectibles in the form of NFT. As the virtual reality space becomes more popular, the display of digital content in it becomes more common and immersive for the community. Thanks to digital fingerprinting technology, in order to enter the metaverses and buy and sell NFTs there, artists and collectors will only need to have these NFTs on their account balance. The same can be said for video games, decentralized music and video streaming platforms, and other NFT-related services. All this will greatly simplify the interaction with the ecosystem for both content creators and collectors.

06

Biometric digital fingerprints

Since Web3 networks are built on an open source basis, developers can create a social graph whose nodes are represented by social objects, such as user profiles with various attributes (for example: name, birthday, city), communities, content, and so on, and the edges are social links between them, to track reputation. By integrating digital fingerprints into projects on The Open Network, this could solve the problem of the Sybil attack.

The problem is that today's networks have a problem that needs to be addressed: these networks are overrun with bots. The ease with which fictitious virtual identities are created has a big impact on how information is shared on the Internet. Public discussions are increasingly shaped by social media platforms, and the conflict between anonymity and openness on the Internet is an ever-increasing source of social risk.

Modern problems of digital identity

First of all, the anonymity of fictitious online accounts makes it difficult to find the culprit. Second, fake identities are easily replaced, so even if you authorize a user account, they can create another one for further abuse. Third, creating a fake virtual identity is cheap, so attackers can multiply their abuse by using multiple fake identities at the same time. Fourth, using deepfake technologies, attackers can create armies of bots that are increasingly difficult to distinguish from real profiles, increasing their power by an order of magnitude.

These problems are common in Web2 social networks, namely VK, Facebook, Instagram, Twitter, etc. Similarly, these problems exist in Web3, since creating an account does not require financial costs.

Numerous experiments are being carried out to try to prove the existence of man. Therefore, documents, passports, SIM cards are used for verification. Another approach is based on the principles of social trust, where members of a digital network vouch for the authenticity of online identities.

Web3

Web3 allowed greater transparency of identification using a private-public key pair and an application built on open source software. Decentralized social networks and marketplaces can be built on sub-social platforms. Censorship resistance and built-in monetization methods are two of its most notable features. Through such platforms, people can create and manage their own decentralized sustainable social networks.

Since Web3 networks are built on the basis of open source, developers can create a social graph, the nodes of which are represented by social objects, such as user profiles with various attributes (for example: name, birthday, city), communities, media content, and so

on, and the edges are social links between them, to track reputation. When integrating digital fingerprints into projects on The Open Network, this can solve problems, for example, with the Sybil attack.

The NFT community is the next step in this space as we see it in various applications of this technology. Only owners of certain NFTs get access to closed communities. It is a social media tool to offer exclusivity to token holders while building reputation for each account. It is imperative that tokenized communities recognize members who contribute and reward them accordingly. Open models with identity verification systems can more clearly identify member contributions, allowing incentives to be used to reward and retain members.

The Role of Human Capital

TON Fingerprints allows you to identify social media users without having to share any raw biometric information to create a unique human identity. In other words, social media users can be sure that each profile belongs to a unique person and not a bot. The NFT Fingerprint Project uses a search and match algorithm to prove the uniqueness of participants. Using the methods of discovery of the tree of connections, it is possible to prove that the verified participants are people. One way is to scan a QR code to detect the connection between NFT and a verified account when logging into a Web3 wallet such as TON Wallet. Based on the premise of "one person, one network member", we can build a more robust social network.

Another option for using fingerprints is that operations are available only to verified users. Once someone verifies ownership of the NFT fingerprint, their identity can be accepted on other projects and thus a proof of identity is created.

07

Variations

Each digital fingerprint consists of 10 properties:

Line counter, area, perimeter, major axis, minor axis, angle, circularity, integral density, skewness, kurtosis are unique properties.
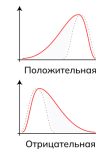
| **Line counter** | **Area** | **Perimeter** | **Major axis** | **Minor axis** |

| **Angle** | **Circularity** | **Integrated density** | **Skewness** | **Kurtosis** |

$$4\pi \frac{\text{Площадь}}{\text{Периметр}^2}$$
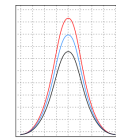
1. Line counter - number of lines per image area

2. Fingerprint area, % of the total area

3. Perimeter - the length of the outer border of the fingerprint

4. Ellipse: Major, Minor and Angle are used.

5. The major and minor axes are the major and secondary axes of the imprint ellipse.

6. Angle is the angle between the main axis and a line parallel to the x-axis of the print.

7. The Circularity is $4\pi \times$[Area]/[Perimeter]^2 with a value of 1.0, indicating a perfect circle.

8. The integral density is the sum of the pixel values in the print image.

9. The skewness coefficient in probability theory is a quantity that characterizes the skewness of the distribution of a given random variable:
Asymmetry of the third order about the average value in x and y.
--> =0 : SYMMETRIC distribution
--> <0 : Asymmetrical distribution to the LEFT (extended to the left of the center of mass)

> --> >0 : Asymmetrical distribution to the RIGHT (extended to the right of the center of mass)

10. Kurtosis coefficient

     Kurtosis of the fourth order relative to the average of x and y.

     --> =0 : Gaussian distribution (NORMAL)

     --> <0 : Distribution is FLAT than normal

     --> >0 : Distribution is HIGHER than normal

     --> <-1.2: BIMODAL (or multimodal) distribution

example

Fingerprint #1

attribute	value
Line counter	19
Area, %	10.17390
Perimeter	799.64173
Major axis	140.98328
Minor axis	35.85945
Angle	125.30953
Circularity	0.23153
Integrated density	1260708.31579
Skewness	-2.12691
Kurtosis	3.68638

08

Scanner

This is Web3 authentication for NFT Fingeprints, created after the publication and sale of the collection.

A service with an interconnected value, focused on verifiability, privacy when accessing projects on The Open Network.

What is a scanner?

Inclusivity of fingerprints

We strive to attract as many people as possible to discover the potential of NFT. Instead of creating an "exclusive" club with a high barrier to entry, we aim to create an inclusive and positive environment for newcomers to the NFT space.

Innovation in NFT

We believe that blockchain technology and smart contracts can do much more, and we intend to push these boundaries.

Practicality functionality

We strive to bring utility to digital identification and use the opportunity to connect the digital space with the "physical".

Significance of Web3 services

We strive to create a community that collectively makes decisions and professionally manages the project.

09

Approach

Stage 1	Stage 2	Stage 3	Stage 4	Stage 5	Stage 6
Sharpen the borders of papillary lines.	Calculation of the orientation field. The angle is calculated.	Binarization of the fingerprint.	Thinning of papillary lines to 1px.	Highlighting features. The density is calculated.	Comparison of the result.

Comparing fingerprints by local attributes:

Attributes

Candidate 3

Candidate 2

Candidate 1

Access control

Score
CID
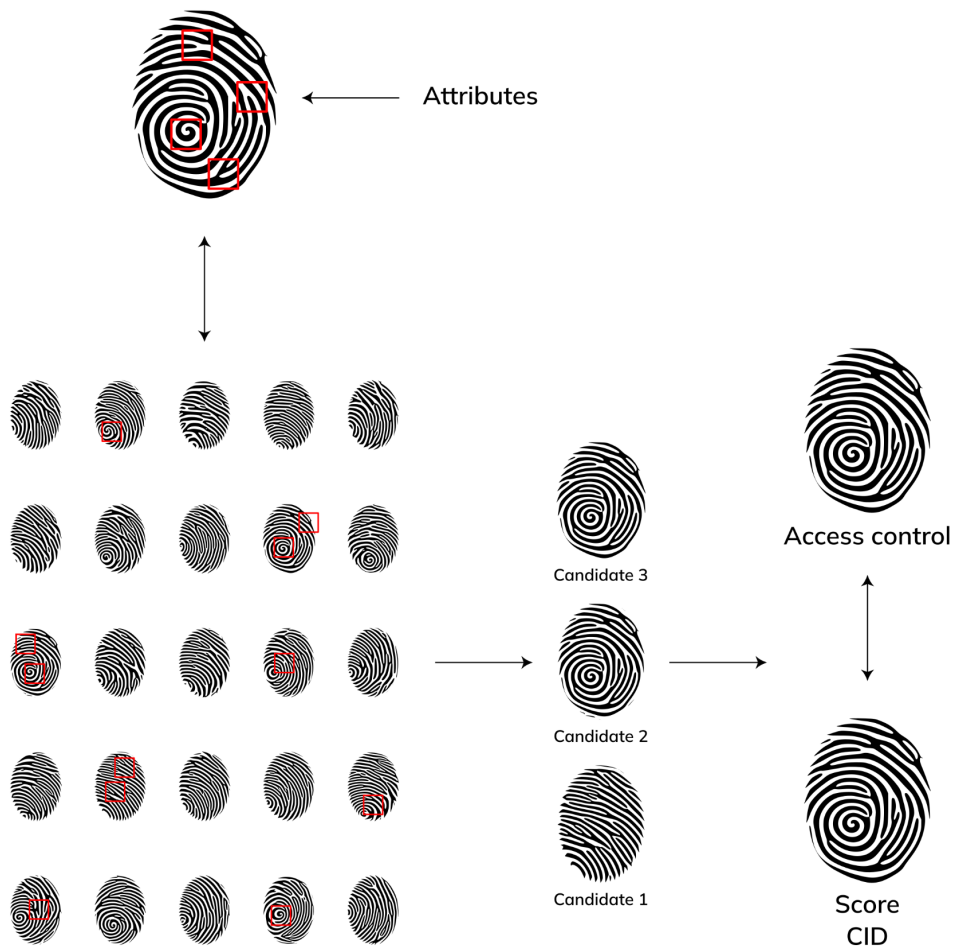
The hash of the fingerprints are compared with the metadata database of the automated identification system

10

Unique

Algorithm

Each fingerprint is created based on the accumulated data within a single generation session

Function of accumulation of information about the papillary pattern

```
float a=0.;
vec2 h = vec2(floor(7.*iTime), 0.);
for(int i=0; i<50; i++){
    float s=sign(h.x);
    h = hash2(h)*vec2(15.,20.);
    a += s*atan(uv.x-h.x, uv.y-h.y);
}
```

Random center function

```
uv += 20.*abs(hash2(h));
```

Spiral pattern generation function

```
a+=atan(uv.y, uv.x);
```

Fingerprint Width

```
float w = 0.8;
```

Smoothness of the pattern

```
float s = min(0.3,p);
```

Base ring length function

```
float l = length(uv)+0.319*a;
```

Noise generation function

```
{
    p = vec2( dot(p,vec2(63.31,127.63)), dot(p,vec2(395.467,213.799)) );
    return -1.0 + 2.0*fract(sin(p)*43141.59265);
}
```

Matadata

Each SVG contains information about the NFT: collection description, creation date, author, CC0 license for creative remixes and copyright license for the original

```
<metadata>
<rdf:RDF
xmlns:rdf = "http://www.w3.org/1999/02/22-rdf-syntax-ns#"
xmlns:rdfs = "http://www.w3.org/2000/01/rdf-schema#"
xmlns:dc = "http://purl.org/dc/elements/1.1/"
xmlns:cc = "http://creativecommons.org/ns#">
<cc:license rdf:resource="http://creativecommons.org/publicdomain/zero/1.0/deed.en"/>
<cc:permits rdf:resource="http://creativecommons.org/ns#Reproduction"/>
<rdf:Description about="https://nft.mir.one/fingerprints"
dc:title="TON Fingerprints"
dc:description="This is a unique digital fingerprint created based on the algorithm for
generating basic rings using a noise texture. Like human fingerprints, you can now use it for
the Web3 and Metaverse era as digital biometric information."
dc:publisher="MIR | Machine Intelligence Research"
dc:date="2022-02-22"
dc:format="image/svg+xml"
dc:language="en" >
<dc:creator>
<rdf:Bag>
<rdf:li>Roman Inozemtsev</rdf:li>
<rdf:li>https://ipfs.io/ipfs/bafkreihojxkzxvgqptb4v5xowqg7jbss3dmrttvhhlbxvwwdwbzyftbe
6q</rdf:li>
</rdf:Bag>
</dc:creator>
</rdf:Description>
</rdf:RDF>
</metadata>
```

11

Price policy

Presale pricing is based on the arithmetic mean - this is the average value of an attribute feature, in the calculation of which the total amount of the feature in the aggregate is evenly distributed among all its units. At 16 stages of the presale no more than 33% of the rarity attribute.

Amount	Line counter	Rarity	Price
1085	17	10,85%	💎0,822
1080	18	10,80%	💎0,826
901	20	9,01%	💎1,010
888	16	8,88%	💎1,026
886	15	8,86%	💎1,029
826	19	8,26%	💎1,111
665	14	6,65%	💎1,404
542	21	5,42%	💎1,745
507	13	5,07%	💎1,872
491	22	4,91%	💎1,937
460	12	4,60%	💎2,074
407	23	4,07%	💎2,357
280	11	2,80%	💎3,471
248	10	2,48%	💎3,932
187	9	1,87%	💎5,248
171	24	1,71%	💎5,748
92	8	0,92%	💎10,770
91	25	0,91%	💎10,889
61	26	0,61%	💎16,293
36	27	0,36%	💎27,678
27	7	0,27%	💎36,937
20	28	0,20%	💎49,900

13	6	0,13%	💎76,823
11	29	0,11%	💎90,809
7	32	0,07%	💎142,757
6	31	0,06%	💎166,567
4	38	0,04%	💎249,900
4	30	0,04%	💎249,900
3	35	0,03%	💎333,233
1	4	0,01%	💎999,900

Stages

https://docs.google.com/spreadsheets/d/1bxJ2odMhz0NI4ZRHaE_DpW8LQYFQgxKMC3f7MBz0iRs/edit?usp=sharing

#	Amount	Counter	Rarity	Price	Total	S1 #	S1 "+10%"	S1 Price1 шт	S1 Total	S2 #	S2 "+33%"	S2 #	S2 "+10%"	S2 Price 1 шт	S2 Total	S3 #	S3 "+10%"	S3 Price 1 шт	S3 Total	S4 #	S4 "+10%"	S4 Price 1 шт	S4 Total	S5 #	S5 "+10%"	S5 Price 1 шт	S5 Total	S6 #	S6 "+10%"	S6 Price 1 шт	S6 Total	
1	1085	17	10,85%	0,822	891,500	1	195	0,822	89,150	17	297	33	70	1,096	76,140	49	52	1,461	76,518	64	47	1,948	91,821	85	42	2,597	110,186	101	382	3,462	1322,227	0
2	1080	18	10,80%	0,826	892,000	2	108	0,826	89,200	18	324	34	86	1,101	95,147	50	56	1,468	82,460	66	51	1,958	98,953	86	45	2,610	118,743	102	409	3,480	1424,916	0
3	901	20	9,01%	1,010	909,900	3	90	1,010	90,889	19	270	35	54	1,347	72,801	51	49	1,795	87,361	67	44	2,394	104,833	87	39	3,192	125,800	103	355	4,256	1509,601	0
4	888	16	8,88%	1,026	911,200	4	88	1,026	90,299	20	267	36	53	1,368	72,969	52	48	1,824	87,563	68	43	2,432	105,075	88	39	3,243	126,090	104	350	4,324	1513,085	0
5	886	15	8,86%	1,029	911,400	5	88	1,029	90,523	21	266	37	53	1,372	72,967	53	48	1,829	87,560	70	43	2,438	105,072	89	39	3,251	126,087	105	349	4,335	1513,041	0
6	826	19	8,26%	1,111	917,400	6	82	1,111	91,074	22	248	38	50	1,481	73,451	54	45	1,974	88,141	71	40	2,633	105,770	90	36	3,510	126,924	106	325	4,680	1523,085	0
7	665	14	6,65%	1,404	933,500	7	66	1,404	92,648	23	200	39	40	1,872	74,742	55	36	2,496	89,691	72	32	3,327	107,629	91	29	4,437	129,155	107	262	5,915	1549,858	0
8	542	21	5,42%	1,745	945,800	8	108	1,745	188,462	24	145	40	29	2,327	67,319	56	26	3,102	80,783	73	23	4,136	96,939	92	21	5,515	116,327	108	190	7,353	1395,925	0
9	507	13	5,07%	1,872	949,300	9	41	1,872	76,768	25	155	41	31	2,497	77,558	57	28	3,329	93,070	75	25	4,438	111,684	93	23	5,918	134,021	109	204	7,890	1608,251	0
10	491	22	4,91%	1,937	950,900	10	127	1,937	245,956	26	121	42	24	2,582	62,662	58	22	3,443	75,194	76	20	4,591	90,233	95	18	6,121	108,279	110	159	8,161	1299,353	0
11	460	12	4,60%	2,074	954,000	11	92	2,074	190,800	27	123	43	25	2,765	67,840	59	22	3,687	81,408	77	20	4,916	97,690	96	18	6,555	117,228	111	161	8,739	1406,730	0
12	407	23	4,07%	2,357	959,300	12	84	2,357	197,988	28	108	44	22	3,143	67,672	60	19	4,190	81,207	79	17	5,587	97,448	97	16	7,449	116,937	112	141	9,932	1403,250	0
13	280	11	2,80%	3,471	972,000	13	64	3,471	222,171	29	72	45	14	4,629	66,651	61	13	6,171	79,982	80	12	8,229	95,978	97	10	10,971	115,174	113	94	14,629	1382,084	0
14	248	10	2,48%	3,932	975,200	14	106	3,932	416,819	30	47	46	9	5,243	49,634	62	9	6,991	59,561	81	8	9,321	71,473	98	7	12,428	85,767	114	62	16,571	1029,207	0
15	187	9	1,87%	5,248	981,300	15	38	5,248	199,409	31	50	47	10	6,997	69,501	63	9	9,329	83,402	83	8	12,439	100,082	99	7	16,585	120,099	115	65	22,113	1441,182	0
16	171	24	1,71%	5,748	982,900	16	36	5,748	206,926	32	45	48	9	7,664	68,975	64	8	10,219	82,771	84	7	13,625	99,325	100	7	18,166	119,190	116	59	24,222	1430,275	0
17	92	8	0,92%	10,770	990,800		0	10,770	990,800		0		9	14,359	132,107		8	19,146	158,528		7	25,528	190,234		7	34,037	228,280		60	45,383	2739,364	0
18	91	25	0,91%	10,889	990,900		0	10,889	990,900		0		9	14,519	132,120		8	19,358	158,544		7	25,811	190,253		7	34,415	228,303		60	45,886	2739,640	0
19	61	26	0,61%	16,293	993,900		0	16,293	993,900		0		6	21,725	132,520		5	28,966	159,024		5	38,621	190,829		4	51,495	228,995		40	68,660	2747,935	0
20	36	27	0,36%	27,678	996,400		0	27,678	996,400		0		4	36,904	132,853		3	49,205	159,424		3	65,607	191,309		3	87,475	229,571		24	116,634	2754,847	0
21	27	7	0,27%	36,937	997,300		0	36,937	997,300		0		3	49,249	132,973		2	65,666	159,568		2	87,554	191,482		2	116,739	229,778		13	155,652	2757,335	0
22	20	28	0,20%	49,900	998,000		0	49,900	998,000		0		2	66,533	133,067		2	88,711	159,680		2	118,281	191,616		1	157,709	229,939		13	210,278	2759,270	0
23	13	6	0,13%	76,823	998,700		0	76,823	998,700		0		1	102,431	133,160		1	136,574	159,792		1	182,099	191,750		1	242,799	230,100		9	323,732	2761,206	0
24	11	29	0,11%	90,809	998,900		0	90,809	998,900		0		1	121,079	131,411		1	161,438	157,693		1	215,251	189,232		1	287,002	227,078		7	382,669	2747,935	0
25	7	32	0,07%	142,757	999,300		0	142,757	999,300		0		1	190,343	133,240		1	253,790	159,888		1	338,387	191,866		1	451,183	230,239		5	601,577	2762,865	0
26	6	31	0,06%	166,567	999,400		0	166,567	999,400		0		1	222,089	133,253		1	296,119	159,904		1	394,825	191,885		0	526,433	230,262		4	701,911	2763,141	0
27	4	30	0,04%	249,900	999,600		0	249,900	99,960		0		0	333,200	115,509		0	444,267	138,611		0	592,356	166,333		0	789,807	199,600		2	1053,077	2395,202	0
28	4	38	0,04%	249,900	999,600		0	249,900	99,960		0		0	333,200	115,509		0	444,267	138,611		0	592,356	166,333		0	789,807	199,600		2	1053,077	2395,202	0
29	3	35	0,03%	333,233	999,700		0	333,233	99,970		0		0	444,311	115,521		0	592,415	138,625		0	789,886	166,350		0	1053,182	199,620		2	1404,243	2395,441	0
30	1	4	0,01%	999,900	999,900		0	999,900	99,990		0		0	1333,200	115,544		0	1777,600	138,653		0	2370,133	166,383		0	3160,178	199,660		1	4213,570	2395,920	0
							1414				2737	617					523				471				424				3814			

12

Roadmap

As immersed in the everyday issues of creating digital technologies and business solutions based on them, we believe in Web3 technology, and that is why we are in this for a long time! However, the entire journey of the NFT Fingerprint project will be determined by the choice of the community.

Genesis	**Sale**	**Authentication**	**Beta version**
Q2 2022	Q3 2022	Q4 2022	Q1 2023
The genesis stage of 10 000 Fingerprints will be held live, after the launch of the marketplace on the TON network. Distribution to early community members and project evangelists.	10 000 TON from the sale of the collection are sent to the community contract. The development of an ecosystem for the use of NFT Fingerprints is being initialized.	Launching a service for authentication using NFT and using metadata to fulfill the necessary access conditions.	Launch of the beta version of the platform for connecting to The Open Network wallets and NFT authentication.

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FAQ

License to use NFT?

In January 2022 we initiated a repository https://github.com/mir-one/ton-nft-license to discuss the issues of determining the rights to non-fungible tokens in The Open Network. A license file is attached to each NFT. The text is available on the NFT License page

Why do I need NFT TON Fingerprint?

1. Utilitarian application – adoption to various resources.

2. Collection application. Due to differences in price and parameters, and most importantly in rarity, its collection value is possible.

3. To vote.

4. To create creative remixes under the CC0 license.

5. How to use TON Fingerprints for copyright license?

In the near future, when DAOs start collaborating with other organizations, Fingerprints will provide Creator identification for the DAO-DAO model. As the use of these methods grows, we will soon begin to realize that control is a major attack vector, and to mitigate it, more robust systems need to be built.

Article: Read

License: Github

6, Hysteresis DAO: Read

How are resources accessed?

1. On the example of DAO.

The DAO bylaws may describe "Role Principles", i.e. various roles of DAO participants (there is a team core – the most active, participants – periodically participating, observers, etc.) Depending on the performance of certain tasks, a participant can receive a certain level of access to resources (either reward or votes) in the form of NFT Fingerprints, which being in the wallet allow you to access. Works as a motivational model.

2. On the example of creating your own collection.

Having NFT Fingerprints in your wallet, you can create a collection with your own parameters, royalties

How technically does the admission happen if there is an NFT Fingerprint in the wallet?

The admission will be carried out by a separate service that recognizes the NFT smart contract on the account wallet and identifies the state of the balance for the presence of NFT Fingerprints.

What is #NFT and why is it needed?

This is essentially a wrapper for your token to be able to use various parameters in NFT (for example, the ability to capitalize the token, etc.)

What is token capitalization?

When creating an NFT and then wrapping it, the possibility of royalties to the creator and the capitalization of the token itself are laid (that is, when buying a token, n% of the purchase amount is blocked on a special smart contract and this is an integral part of its capitalization). And so with every sale.

What other options are possible when wrapping a token?

It is possible to set different royalties by roles, as well as parameters related to the holding time of the capitalization of each NFT. For example, a token that is valid for a certain time, with the possibility of receiving capitalization by the last owner, etc.

Why do I need digital biometrics by NFT Fingerprints, if I can be identified by the very presence of a wallet, for example, MetaMask?

NFT allows using a wrapper to use more unique parameters for adoption, etc.

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Team

TON Fingerprints project is led by a team of enthusiastic entrepreneurs, artists, designers and developers. Our mission is to push the boundaries of blockchain technology and combine the real with the digital world, creating a collection that can be used for the era of Web3 and Metaverse, as digital biometric information.
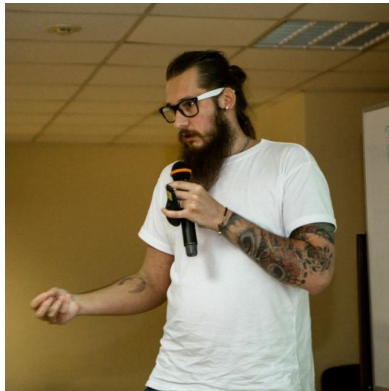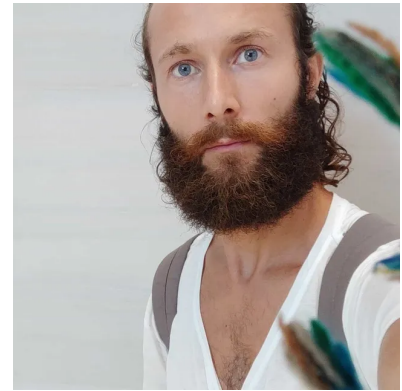

Roman Inozemtsev

Manages all aspects and levers of value creation within the framework of a complete digital transformation, brings inspiration and expertise for tokenization

Grigory Slynko

He is looking for opportunities to transform the business through digitalization and is moving towards a fully digital strategy and operating model
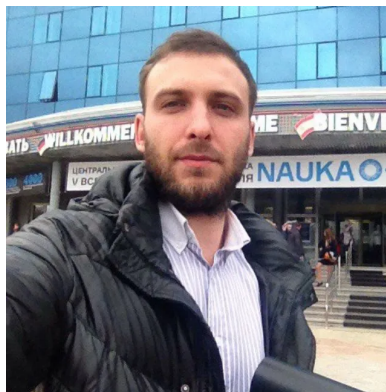

Alexander Menchik

Focuses on developing a user-friendly, engaging and hassle-free consumer experience across all channels, online and physical

Yaroslav Loginov

Works to increase revenue and profitability through competitive differentiation

Danil Dashkevich

Increases operational efficiency and digitizes everyday work processes, also manages the processes of internal cultural change

Maxim Chernichenko

Focused on digital strategy development and innovation around the perimeter

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Application:

Algorithm for generating basic rings

```glsl
vec2 hash2( vec2 p )
{
      p = vec2( dot(p,vec2(63.31,127.63)), dot(p,vec2(395.467,213.799)) );
      return -1.0 + 2.0*fract(sin(p)*43141.59265);
}

void mainImage( out vec4 fragColor, in vec2 fragCoord )
{
  float invzoom = 100.;
  vec2 uv = invzoom*((fragCoord-0.5*iResolution.xy)/iResolution.x);
  float bounds = smoothstep(9.,10.,length(uv*vec2(0.7,0.5)));

  float a=0.;
  vec2 h = vec2(floor(7.*iTime), 0.);
  for(int i=0; i<50; i++){
     float s=sign(h.x);
     h = hash2(h)*vec2(15.,20.);
        a += s*atan(uv.x-h.x, uv.y-h.y);
  }

  uv += 20.*abs(hash2(h));

  a+=atan(uv.y, uv.x);

  float w = 0.8;
  float p=(1.-bounds)*w;
  float s = min(0.3,p);
  float l = length(uv)+0.319*a;

  float m = mod(l,2.);
  float v = (1.-smoothstep(2.-s,2.,m))*smoothstep(p,p+s,m);

        fragColor = vec4(v,v,v,1.);
}
```

deployNFT.ts

```typescript
import TonWeb from 'tonweb'
import { callTonApi, delay, isNftExists } from '../utils'
import { NftCollection as NftCollectionType } from
'tonweb/dist/types/contract/token/nft/nft-collection'
```

```
import Deployer from './index'

const { NftItem } = TonWeb.token.nft

export async function deployNft(this: Deployer, nftCollection: NftCollectionType) {
  if (!nftCollection.address) {
    throw new Error('[Deployer] Corrupt nft collection')
  }

  const toDeploy = this.nfts[this.deployIndex]

  await this.ensureDeployerBalance()
  await this.ensureCollectionBalance(nftCollection)
  await this.ensurePreviousNftExists(nftCollection, toDeploy.id)

  this.log(`[Deployer] NFT deploy started ${toDeploy.id} ${toDeploy.owner_address || ''}`)

  const nftItemAddress = await callTonApi<
    ReturnType<typeof nftCollection.getNftItemAddressByIndex>
  >(() => nftCollection.getNftItemAddressByIndex(toDeploy.id))
  const nftItem = new NftItem(this.tonweb.provider, {
    address: nftItemAddress,
  })

  const exists = await isNftExists(this.tonweb, nftCollection, toDeploy.id)
  if (exists) {
    this.log(`[Deployer] NFT item already exists ${toDeploy.id}`)
    this.deployIndex++
    return
  }

  const amount = TonWeb.utils.toNano(0.05)
  const walletAddress = await this.wallet.getAddress()

  const seqno = toDeploy.seqno ? toDeploy.seqno : await
callTonApi(this.wallet.methods.seqno().call)

  if (typeof seqno !== 'number' || seqno === 0) {
    throw new Error('[Deployer] No seqno found')
  }

  await callTonApi(
    this.wallet.methods.transfer({
      secretKey: this.key.secretKey,
      toAddress: nftCollection.address,
```

```
      amount: amount,
      seqno: seqno,
      payload: await nftCollection.createMintBody({
        amount,
        itemIndex: toDeploy.id,
        itemOwnerAddress: toDeploy.owner_address
          ? new TonWeb.utils.Address(toDeploy.owner_address)
          : walletAddress,
        itemContentUri: `${toDeploy.id}.json`,
      }),
      sendMode: 3,
    }).send
  )

  if (!toDeploy.seqno) {
    toDeploy.seqno = seqno
  }

  await this.ensureSeqnoInc(seqno)

  await delay(8000)

  const itemInfo = await callTonApi<ReturnType<typeof nftCollection.getNftItemContent>>(()
=>
    nftCollection.getNftItemContent(nftItem)
  )

  if (!itemInfo) {
    throw new Error(`[Deployer] no nft item info ${toDeploy.id}`)
  }
  if (!itemInfo.ownerAddress) {
    throw itemInfo
  }

  this.deployIndex++
  this.log(`[Deployer] NFT deployed ${toDeploy.id}`)
}
```

ensureCollection.ts

```
import TonWeb from 'tonweb'
import { NftCollection as NftCollectionType } from
'tonweb/dist/types/contract/token/nft/nft-collection'

import { callTonApi } from '../utils'
import Deployer from './index'
```

```
const { NftItem, NftCollection } = TonWeb.token.nft

export async function ensureCollection(this: Deployer): Promise<NftCollectionType> {
  const walletAddress = await this.wallet.getAddress()

  if (typeof this.config.collection.royalty !== 'number') {
    throw new Error('Wrong collection royalty')
  }

  const createCollectionParams = {
    ownerAddress: walletAddress,
    royalty: this.config.collection.royalty,
    royaltyAddress: walletAddress,
    collectionContentUri: this.config.collection.content,
    nftItemContentBaseUri: this.config.collection.base,
    nftItemCodeHex: NftItem.codeHex,
  }

  const nftCollection = new NftCollection(this.tonweb.provider, createCollectionParams)

  try {
    const collectionData = await callTonApi<ReturnType<typeof
nftCollection.getCollectionData>>(
      () => nftCollection.getCollectionData()
    )

    if (collectionData.collectionContentUri !== '') {
      return nftCollection
    }
  } catch (e) {}

  await this.ensureDeployerBalance()

  this.log('[Deployer] Deploying new collection')
  const nftCollectionAddress = await nftCollection.getAddress()

  let seqno = await callTonApi(this.wallet.methods.seqno().call)

  if (seqno === null) {
    seqno = 0
  }
  if (typeof seqno !== 'number') {
    throw new Error('[Deployer] Blockchain issue. No seqno found')
  }
```

```
  await callTonApi(async () =>
    this.wallet.methods
      .transfer({
        secretKey: this.key.secretKey,
        toAddress: nftCollectionAddress.toString(true, true, false),
        amount: TonWeb.utils.toNano(this.config.deployAmount),
        seqno: typeof seqno === 'number' ? seqno : 0,
        payload: '',
        sendMode: 3,
        stateInit: (await nftCollection.createStateInit()).stateInit,
      })
      .send()
  )

  await this.ensureSeqnoInc(seqno)

  try {
    const newData = await callTonApi<ReturnType<typeof
nftCollection.getCollectionData>>(() =>
      nftCollection.getCollectionData()
    )

    if (newData.collectionContentUri === '') {
      throw new Error('[Deployer] Collection data after deploy not found')
    }
  } catch (e) {
    throw new Error('[Deployer] Collection data after deploy not found catch')
  }

  this.log('[Deployer] Collection deployed')

  return nftCollection
}
```

ensureCollectionBalance.ts

```
import TonWeb from 'tonweb'
import { NftCollection as NftCollectionType } from
'tonweb/dist/types/contract/token/nft/nft-collection'
import BN from 'bn.js'

import { callTonApi } from '../utils'
import Deployer from './index'

export async function ensureCollectionBalance(this: Deployer, nftCollection:
NftCollectionType) {
```

```
  const nftCollectionAddress = await nftCollection.getAddress()
  const sBalance = await this.tonweb.getBalance(nftCollectionAddress)

  if (!sBalance || typeof sBalance !== 'string') {
    throw new Error('[Deployer] Balance error')
  }

  const balance = new BN(sBalance)
  const minBalance = new BN('500000000')
  if (balance.gt(minBalance)) {
    return
  }

  const seqno = await callTonApi(this.wallet.methods.seqno().call)
  if (typeof seqno !== 'number') {
    throw new Error('[Deployer] No seqno found')
  }

  await callTonApi(
    this.wallet.methods.transfer({
      secretKey: this.key.secretKey,
      toAddress: nftCollectionAddress.toString(true, true, true),
      amount: TonWeb.utils.toNano(this.config.topupAmount),
      seqno: seqno,
      payload: '',
      sendMode: 3,
    }).send
  )

  await this.ensureSeqnoInc(seqno)

  const newSBalance = await this.tonweb.getBalance(nftCollectionAddress)
  if (!newSBalance || typeof newSBalance !== 'string') {
    throw new Error('[Deployer] Cannot retrieve balance')
  }

  const newBalance = new BN(newSBalance)

  if (minBalance.gt(newBalance)) {
    throw new Error('[Deployer] Collection balance deposit error')
  }
}
```

ensureDeployerBalance.ts

```
import BN from 'bn.js'
```

```ts
import Deployer from './index'

const ONE_TON = new BN('1000000000')

export async function ensureDeployerBalance(this: Deployer) {
  const address = await this.wallet.getAddress()
  const sBalance = await this.tonweb.getBalance(address)

  if (!sBalance || typeof sBalance !== 'string') {
    throw new Error('[Deployer] Balance error')
  }

  const balance = new BN(sBalance)
  const minBalance = new BN('1000000000')
  if (balance.lt(minBalance)) {
    const currentBalance = balance.div(ONE_TON).toString()
    const currentAddress = address.toString(true, true, true)
    throw new Error(
      `[Deployer] Deployer balance insufficient (Min balance 1 TON). Current balance ${currentBalance}. Current wallet: ${currentAddress}`
    )
  }
}
```

ensurePreviousNftExists.ts

```ts
import TonWeb from 'tonweb'
import { NftCollection as NftCollectionType } from
'tonweb/dist/types/contract/token/nft/nft-collection'
import Deployer from '.'
import { callTonApi } from '../utils'

const { NftItem } = TonWeb.token.nft

export async function ensurePreviousNftExists(
  this: Deployer,
  nftCollection: NftCollectionType,
  nftId: number
) {
  if (nftId < 0) {
    throw new Error('Wrong nftId')
  }

  if (nftId === 0) {
    return
```

```
  }

  const id = nftId - 1

  const nftItemAddress = await callTonApi<
    ReturnType<typeof nftCollection.getNftItemAddressByIndex>
  >(() => nftCollection.getNftItemAddressByIndex(id))
  const nftItem = new NftItem(this.tonweb.provider, {
    address: nftItemAddress,
  })

  const existingItemInfo = await callTonApi<ReturnType<typeof
nftCollection.getNftItemContent>>(
    () => nftCollection.getNftItemContent(nftItem)
  )

  if (!existingItemInfo || !existingItemInfo.ownerAddress) {
    throw new Error('Nft not exists')
  }

  if (existingItemInfo.index !== id) {
    throw new Error('nft id error')
  }
}
```

index.ts

```
import TonWeb from 'tonweb'
import { KeyPair, mnemonicToKeyPair } from 'tonweb-mnemonic'
import { Config, Nft } from '../models'
import { callTonApi, delay } from '../utils'
import { deployNft } from './deployNft'
import { ensureCollectionBalance } from './ensureCollectionBalance'
import { ensureCollection } from './ensureCollection'
import { ensureDeployerBalance } from './ensureDeployerBalance'
import { ensurePreviousNftExists } from './ensurePreviousNftExists'
import { WalletContract } from 'tonweb/dist/types/contract/wallet/wallet-contract'
import { NftCollection as NftCollectionType } from
'tonweb/dist/types/contract/token/nft/nft-collection'

class Deployer {
  protected workInProgress = false
  protected config: Config
  protected nfts: Nft[]

  protected deployIndex: number
```

```
protected collection: NftCollectionType

protected tonweb: TonWeb

protected mnemonic: string
protected key: KeyPair
protected wallet: WalletContract

protected log: (log: string) => void
protected workInterval: number | NodeJS.Timer

constructor(config: Config, nfts: Nft[], log?: (log: string) => void) {
  this.config = config
  this.nfts = nfts

  this.deployIndex = this.config.startIndex

  this.mnemonic = config.walletMnemonic

  const tonApiEndpoint = config.tonApiKey
    ? `${config.tonApiUrl}?api_key=${config.tonApiKey}`
    : config.tonApiUrl
  this.tonweb = new TonWeb(new TonWeb.HttpProvider(tonApiEndpoint))

  this.log = log || console.log
}

async start() {
  this.log('[Deployer] STARTED')

  const words = this.mnemonic.split(' ')
  this.key = await mnemonicToKeyPair(words)

  const WalletClass =
    this.config.walletType === 'v4R2'
      ? this.tonweb.wallet.all.v4R2
      : this.config.walletType === 'v4R1'
      ? this.tonweb.wallet.all.v4R1
      : this.config.walletType === 'v3R2'
      ? this.tonweb.wallet.all.v3R2
      : this.config.walletType === 'v3R1'
      ? this.tonweb.wallet.all.v3R1
      : this.tonweb.wallet.all.v3R2

  this.wallet = new WalletClass(this.tonweb.provider, {
    publicKey: this.key.publicKey,
```

```
    wc: 0,
  })

  const walletAddress = await this.wallet.getAddress()
  const stringAddress = walletAddress.toString(true, true, true)

  if (this.config.walletAddress !== stringAddress) {
    this.log(
      `Config address: ${this.config.walletAddress}, Mnemonic address: ${stringAddress},
Config wallet type: ${this.config.walletType}`
    )
    throw new Error('[Deployer] Wallet address mismatch')
  }

  const collection = await this.ensureCollection()
  collection.address = await collection.getAddress()
  this.collection = collection

  if (this.deployIndex === -1) {
    const collectionData = await callTonApi<ReturnType<typeof
collection.getCollectionData>>(() =>
      collection.getCollectionData()
    )

    if (collectionData.collectionContentUri === '') {
      throw new Error("[Deployer] Start error, can't get collection start index")
    }

    this.deployIndex = collectionData.nextItemIndex
  }

  if (this.nfts.length <= this.deployIndex) {
    throw new Error(
      `[Deployer] Start index ${this.deployIndex} bigger than supplied nfts amount
${this.nfts.length}, check nfts.csv`
    )
  }

  this.work()
  this.workInterval =
    typeof window !== 'undefined'
      ? window.setInterval(() => {
          this.work()
        }, 1000)
      : setInterval(() => {
          this.work()
```

```
    }, 1000)
}

stop() {
  if (typeof this.workInterval === 'number') {
    window.clearTimeout(this.workInterval)
  } else {
    clearTimeout(this.workInterval)
  }
}

async work() {
  if (this.workInProgress) {
    return
  }

  if (this.nfts.length <= this.deployIndex) {
    this.log(`[Deployer] Got no more nfts to deploy ${this.deployIndex}`)
    if (typeof this.workInterval === 'number') {
      window.clearTimeout(this.workInterval)
    } else {
      clearTimeout(this.workInterval)
    }
    return
  }

  this.workInProgress = true

  try {
    await this.deployNft(this.collection)
  } catch (e) {
    this.log(`[Deployer] deployNft error ${e}`)
  } finally {
    this.workInProgress = false
  }
}

protected deployNft = deployNft

protected ensureCollectionBalance = ensureCollectionBalance

protected ensureDeployerBalance = ensureDeployerBalance

protected ensureCollection = ensureCollection

protected ensurePreviousNftExists = ensurePreviousNftExists
```

```
  async ensureSeqnoInc(seqno: number) {
    let seqIncremented = false
    for (let i = 0; i < 5; i++) {
      await delay(8000)
      const newSeqno = await callTonApi(this.wallet.methods.seqno().call)
      if (newSeqno === seqno + 1) {
        seqIncremented = true
        break
      }
    }

    if (!seqIncremented) {
      throw new Error('seq not incremented')
    }
  }
}

export default Deployer
```

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Contacts

EN https://nft.mir.one/fingerprints

RU https://nft.mir.one/ru/fingerprints

EN https://t.me/ton_fingerprints

EN https://t.me/ton_fingerprints_chat

RU https://t.me/ton_fingerprints_ru

RU https://t.me/ton_fingerprints_chat_ru

EN https://github.com/mir-one/fingerprints

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