

Decentralized Test of Humanity

Innovation labs





Summary

- Goals
- Image analysis VS ML
- Dapp V1
- AI Decider
- Dapp V2
- Global architecture
- Discussion



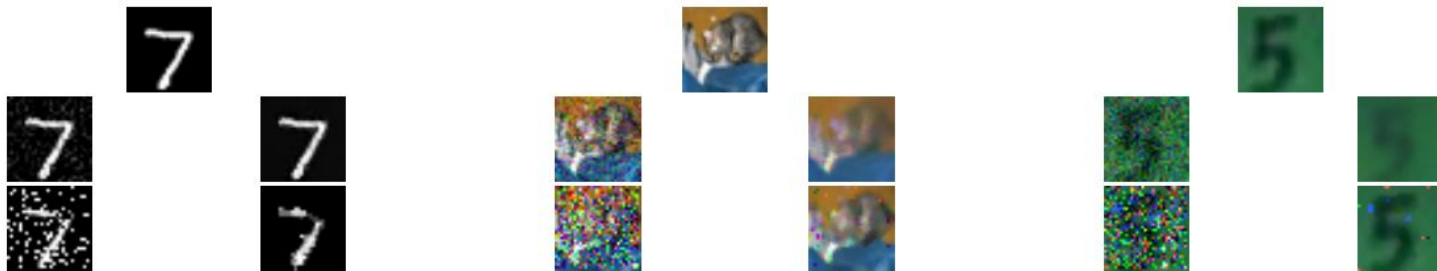
Goals

- No Centralization
- Functional Turing Test
- (Community driven)
- StarkNet Smart Contract
- Exploiting DApp properties for tests of Liveness.
- Research in Image Analysis against ML and Human



Image Analysis vs ML

- Object recognition “Hard problem”
- Abundant Literature about what's how to improve and make more robust recognition algorithms. → Extract the problems.
- Applying Noise + Denoising (cropping, rotation...)



Noise Type		MNIST		CIFAR-10		SVHN	
		noisy	restored	noisy	restored	noisy	restored
original		0.9903		0.8192		0.9438	
Gaussian	$\sigma = 10$	0.9916	0.9885	0.8007	0.8016	0.9415	0.9445
	$\sigma = 20$	0.9875	0.9878	0.7727	0.7583	0.9284	0.9210
	$\sigma = 30$	0.9898	0.9867	0.7309	0.7156	0.9015	0.8793
	$\sigma = 40$	0.9890	0.9851	0.6991	0.6625	0.8849	0.8455
	$\sigma = 50$	0.9860	0.9814	0.6608	0.6277	0.8542	0.7987
s&p	$p = 0.1$	0.9799	0.9861	0.7227	0.7613	0.9308	0.9418
	$p = 0.2$	0.9793	0.9802	0.6902	0.7508	0.9193	0.9425
	$p = 0.3$	0.9753	0.9718	0.6088	0.7138	0.9095	0.9301
	$p = 0.4$	0.9641	0.9605	0.5610	0.6921	0.9057	0.9239
	$p = 0.5$	0.9437	0.9426	0.5398	0.6627	0.8889	0.9228



Dapp V1

- V1 Test must be functional without the classifier.
- Javascript Front, CAIRO Back, IPFS for image storing
- Identical on all platforms
- Must be finished and functional completely for data collection



Machine Learning Decider

- **Goal:** Takes as input Human interactions with the test and judges whether the response was human like or not
- **Feature selection:** Human Machine Interaction Analysis
- **Training :** Gathering user inputs form interaction with the app.
(Around 2000 samples $20 \times 10 \times 6 \times 2 = 2400$). Bot inputs : or GAN (around 2400)
- **Cross Validation:** To estimate how accurate will be the prediction.
(Main problem with ML).
- **Test:** Sample of around 500 inputs. Aim of 90%> good classification.



Dapp V2

- Integration of the ML decider in the system (If more than >90% success rate in local test classification)
- ML training done locally
- Classifier is a NN in a smart contract that will take as input user collected data and in output Human, or NOT Human. Basically a function.



Global architec



Example of exec

Interface → Smart Contract

Display images random ← 9 classes 9 images

Disp question ← Random question from the 9 and save

Time:

Start time
10s



Discussion

Centralization vs Decentralization

Robustness, maintenance vs Zero downtime, data integrity, verifiable behavior