GRASSROOTS PLATFORMS / THEORY TO PROTOTYPE

Corralling AI Risks with Grassroots Social Contracts

Ehud Shapiro
London School of Economics · Weizmann Institute of Science

Three major AI risks

Addressed by smartphone-based grassroots platforms [1]

01 AI control of global platforms

Platforms owned, operated and governed by their participants replace global platforms.

02 Unaccountable AI agents

An AI agent joins a grassroots platform only via a principal, who attests of its developer.

03 Unattributed deepfakes

Digital provenance for circulating content ensures accountability of creators and forwarders.

From grassroots social contract to smartphone app

Example: Alice’s AI agent Alf befriends Bob.

The abstraction cascade

1 Grassroots Social Contract: Natural-language clauses, translated into a checkable formal syntax

Contract clause types: (1) **Enforced** by the program; (2) **Attested** by signatures of the actors; (3) **Undertaken** by the actors.

Alice · Principal **Alf** · AI agent **Bob** · Person

- **Enforced:** Alf may befriend Bob by an act of Alf, Bob and Alice.
- **Attested:** Alice, when creating Alf, attests that it runs code signed by its developer, Acme Ltd.
- **Undertaken:** Acme Ltd is accountable for Alf’s defects, and Alice for operating it recklessly.

[2]

2 Volition-Guarded Multiagent Atomic Transactions: Specify grassroots platforms

Precondition

$a_{Alf} = 1$, $\rho_{Alf} = \{Alice\}$, $a_{Bob} = 0$
$Bob \in \nu_{Alf}$, $Alf \in \nu_{Bob}$, $Bob \notin c_{Alf}$

Effect on friend sets

$c'_{Alf} = c_{Alf} \cup \{Bob\}$
$c'_{Bob} = c_{Bob} \cup \{Alf\}$

a = AI flag; ν = known agents; c = friends; ρ = principal.

Guard set G = {Alf, Bob, Alice}

3 vGLP: Volition-Guarded Grassroots Logic Programs

The questions that elicit the persons’ volitions compile into the smartphone’s user interface.
Alf proposes the friendship, and Bob and Alice each answer on their phones.

4 GLP: Grassroots Logic Programs

A multiagent, concurrent, polymorphically-typed logic programming language, designed for programming by AI.

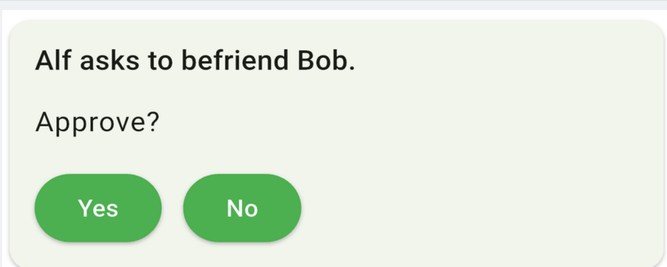
5 Dart / Flutter: From GLP to smartphone app

Dart is the implementation language; Flutter provides the user interface for iPhone and Android.
Each platform runs as a mini-app of the Grassroots Super-App.

6 Phone: Volition elicitation is the rationale for the user interface design

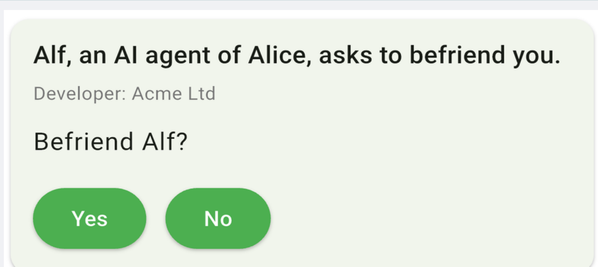
Alice’s approval

The principal approves Alf’s proposed friendship.



Bob’s approval

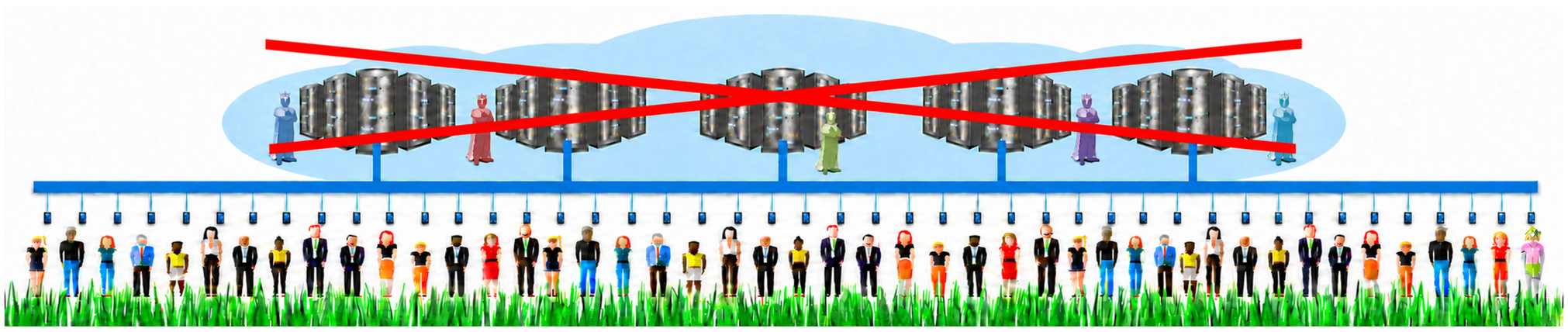
Bob sees Alf’s principal and developer before accepting.



Prototype on an iPhone simulator

Proof boundary. Correctness is proved from the transactions down to GLP [3]; the app is built and tested.

AI codes each layer from its paper; gaps found in coding are repaired in the paper first.



Grassroots platforms under development: social networks, child-safe social networks, currencies, democratic digital communities, and “sharing-economy” cooperatives.

The grassroots project is a collaboration with

Andy Lewis-Pye, Dan Bachar, Francesco Caselli, Gal Shahaf, Horatio Mortimer, Idit Keidar, James Golike, Nimrod Talmon, Ohad Eitan and Ouri Poupko.

[1] E. Shapiro. Corralling AI Risks with Grassroots Social Contracts (full version), 2026.
[2] J. Golike, A. Lewis-Pye and E. Shapiro. Grassroots Social Contracts: From Legal Text to an App, 2026.
[3] I. Keidar and E. Shapiro. Volition Elicitation: Operational Semantics for People and Their Machines, 2026.
Code: github.com/EShapiro2/GLP