Happy and Healthy Citizens

A Citizen2Vec-Based Serious Game for Health-Aware Policy Decision-Making

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Background

Where people live shapes how long and how well they live. Citizens underestimate how strongly their environment affects their health and often don't know which compensations exist; decision-makers rarely see the delayed, uneven, population-wide consequences of their policies. In Ústí nad Labem, environmental burden, socioeconomic hardship and poor health cluster – both blind spots cost most here.

Objective & research question

Build one instrument – a serious game – that raises awareness on both sides at once.

RQ: Is data-grounded population heterogeneity, rather than narrative, sufficient to teach the complexity of fair, health-aware policymaking to citizens and to officials?

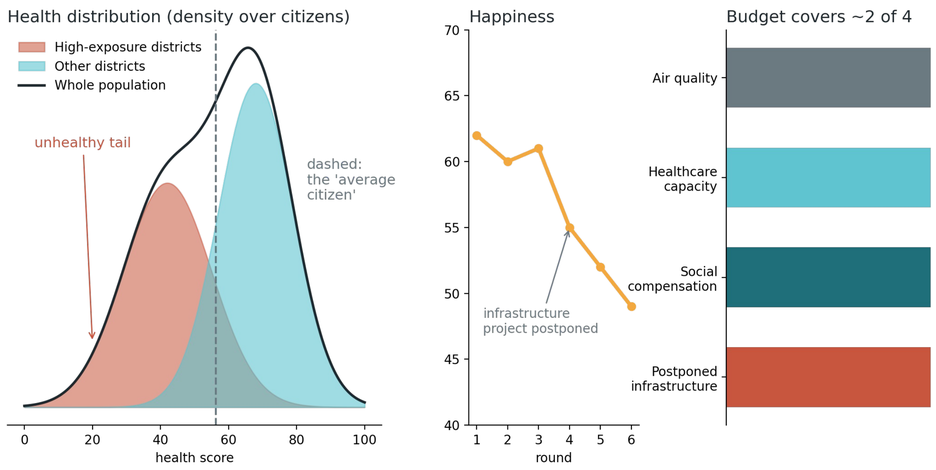
Scientific core: Citizen2Vec [1]

Heterogeneous citizen data from the Blood Drop Project (environmental exposures, socioeconomic conditions, health outcomes) are vectorized; dimension reduction and kernel density estimation predict how interventions shift the health distribution of a virtual urban population. Consequences are computed, not scripted – and the population keeps its real heterogeneity.

The game: playing the decision-maker

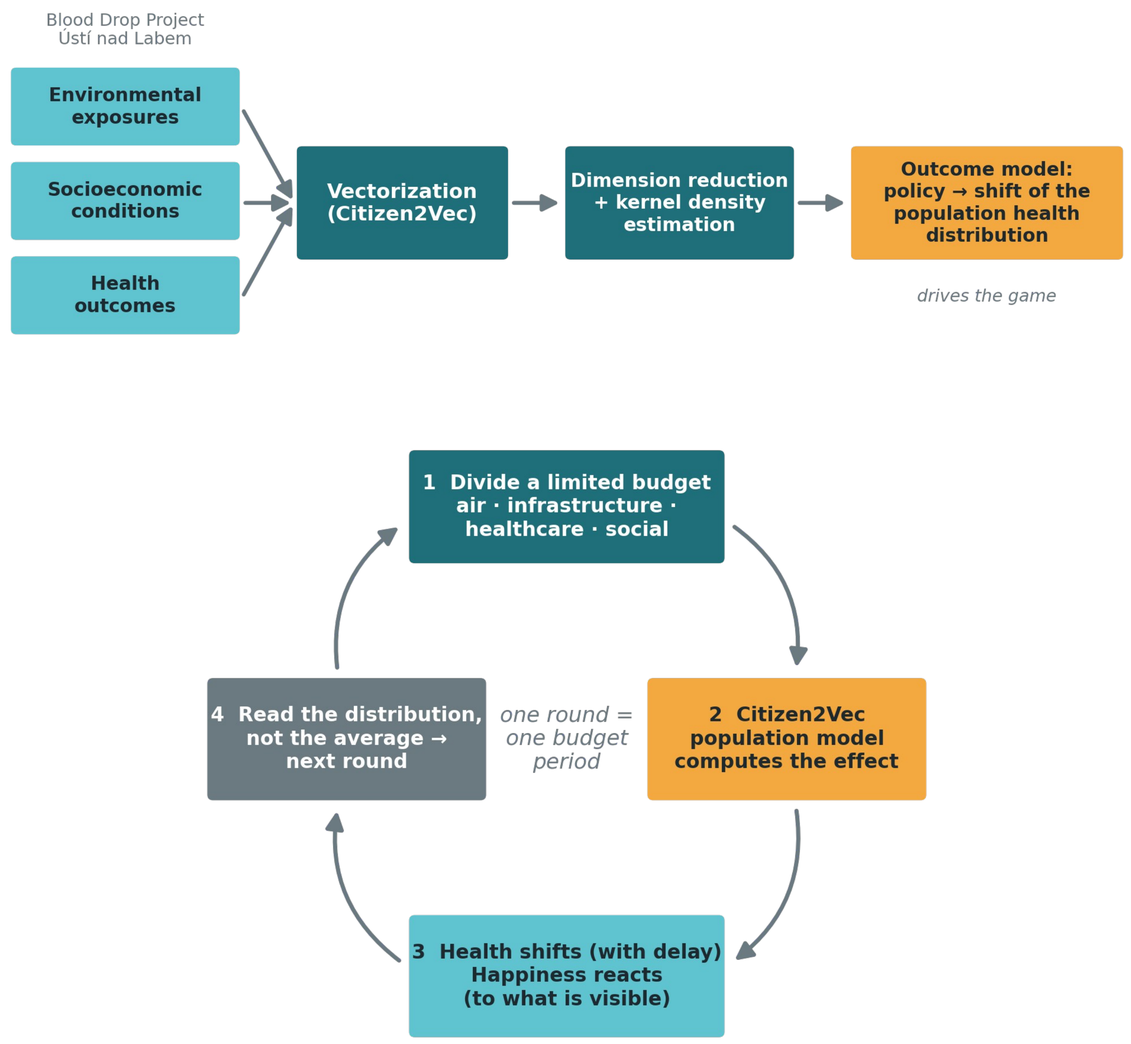
Goal: keep the citizens happy and healthy. Each round, a limited budget is divided among air quality, infrastructure, healthcare and social measures. Health shifts with realistic delays; happiness reacts to what is visible. No policy helps everyone equally – a player optimizing for one 'average citizen' watches parts of the population fall behind. The felt complexity is the lesson.

An illustrative round



ILLUSTRATIVE – mechanics and numbers are placeholders under calibration

From data to game



Implementation

Same foundation as our flood-management game POVODEŇ [2]: transparent, browser-based, self-hostable static build; optional backend for consent-based research telemetry. Current work: policy-action vocabulary, calibration of intervention-to-health delays, happiness model.

Planned evaluation (mixed methods)

Phase 1 – university students: difficulty calibration; citizen-side awareness of environment, health and compensations; telemetry of budget allocations.

Phase 2 – Czech municipal officials and public-health administrators: change in stated priorities on prevention and subpopulation differences.

Expected impact

An openly hostable awareness and training instrument for municipal health governance; evidence on teaching fair policymaking through data-grounded heterogeneity. Sustainability is the core mechanic: short-term wins vs. long-term population health.

Next: proposed policy domains

Clean environment & waste: waste collection, litter and illegal dumping as a visible, local lever on exposure and on how a neighbourhood feels

Diet: access to healthy food, school and canteen meals – slow health return, uneven reach across groups

Physical activity: the tendency to exercise: parks, cycling routes, sports programmes – benefits depend on who actually uses them

Proposed game mechanics – not yet part of the published Citizen2Vec model; each needs its own data grounding.

Open questions for discussion

Awareness measurement: Which instruments best capture a change in citizens' awareness of environmental health burdens and available compensations?

Heterogeneity & fairness: How to show diverging subpopulation outcomes without stigmatizing the real region the data comes from?

Transfer: How to re-ground the population model in Greek and Cypriot municipal health data?

Ethics: What telemetry is appropriate when players are public officials whose in-game choices could read as professional judgments?

[1] Binter, J., Hladský, T., Říha, D., Stachoň, M., Slavík, J., Prossinger, H.: Citizen2Vec: A Vectorization Strategy and A Serious Game for Simulating Beneficial Policy Impacts on Urban Populations. HCI in Games, HCII 2025, LNCS 15816, pp. 17–30. Springer (2025). doi:10.1007/978-3-031-92578-8_2

[2] POVODEŇ – a serious game of flood management and inter-municipal cooperation. github.com/Glitch-Maker-Jakub/POVODEN