Price Determination with Evolutionary Strategies

Berk Can Özmen | Agent-Based Modelling

Setup

- Initialize environment
- Initialize agents with random genome

Go

- Produce goods
- Exchange goods
- Consume goods
- Evaluate fitness
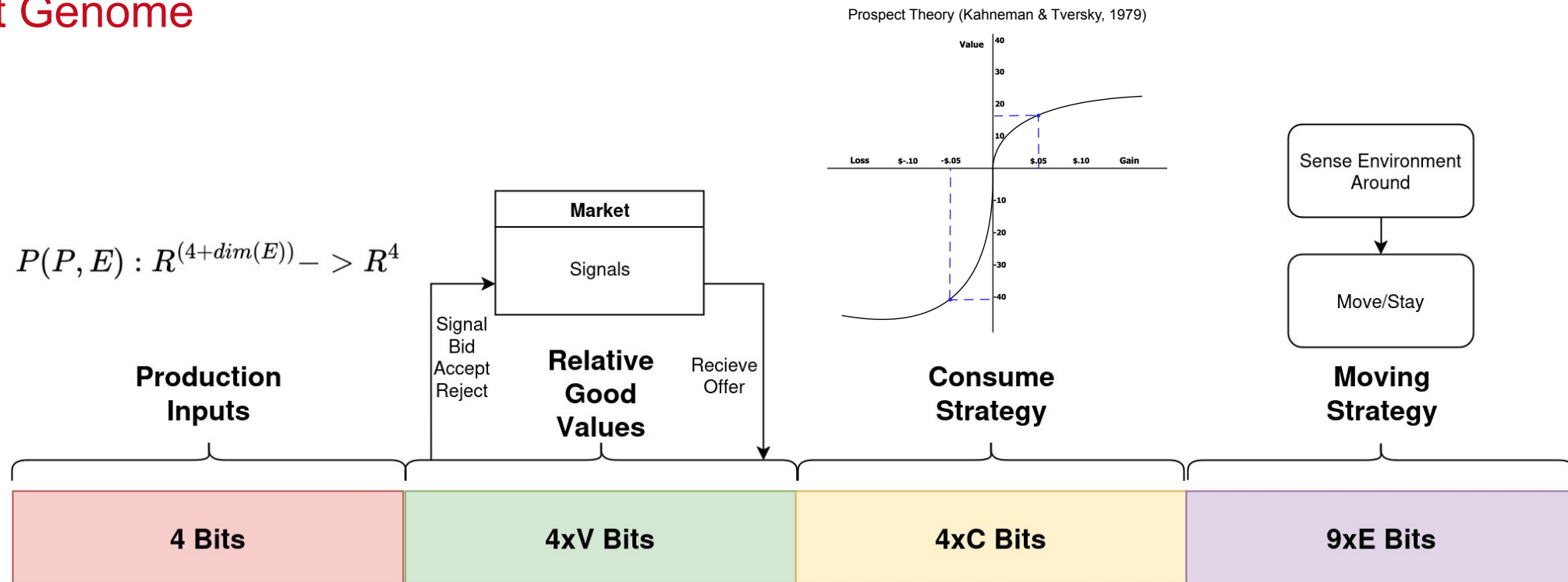- Move
- Reproduce - Mutate

Goods and Needs

- 4 type of goods
- 2 type of needs

Environmental Variables (E)

- Temperature/Season
- Location
- Agent Density

Agent Genome

Prospect Theory (Kahneman & Tversky, 1979)

$$P(P, E) : R^{(4+dim(E))} -> R^4$$

Market

Signals

Signal
Bid
Accept
Reject

Relative Good Values

Recieve Offer

Production Inputs

Relative Good Values

Consume Strategy

Moving Strategy

Sense Environment Around

Move/Stay

4 Bits	4xV Bits	4xC Bits	9xE Bits

Kahneman, D. and Tversky, A. (1979) 'Prospect theory: An analysis of decision under risk', *Econometrica*, 47(2), p. 263. doi:10.2307/1914185.

Questions:

1. Optimization of strategies? Creativity?

2. Environmental effects on agents (scarcity/abundance)

3. Cooperation - competition for market and location
   a. Local-global cartelization?
   b. Local-global cooperation?