

# 1 Trust Game

## 1.1 Investor

The trust game is a two-player game. The game is played for  $T = N \in \mathbb{N}$  rounds. The investor ( $\mathcal{I}$ ) starts each round with a budget of 50. He can decide to invest

$$\mathcal{A} = \{0, 10, 20, 30, 40, 50\}.$$

## 1.2 Trustee (Env)

The trustee ( $\mathcal{T}$ ) receives the tripled amount of money  $a \in \mathcal{A}$  and has to decide how much of this money is returned ( $P$ ). The trustee, as part of the environment, has three different states:

- high cooperation ( $s = 1$ ),
- neutral ( $s = 2$ ),
- low cooperation ( $s = 3$ ).

Based on the current state and the chosen investment the payback probability

$$\mathbb{P}(P_t = p \mid S_t = s, A_t = a),$$

for all  $t \in \{0, \dots, N - 1\}$ ,  $s \in \{1, 2, 3\}$ ,  $a \in \{0, 10, \dots, 50\}$ , and  $p \in \{0, \dots, 3a\}$ . These values can be chosen by the user.

Based on the current state and the chosen investment the state transition probability

$$\mathbb{P}(S_{t+1} = s' \mid S_t = s, A_t = a)$$

for all  $t \in \{0, \dots, N - 1\}$ ,  $s, s' \in \{1, 2, 3\}$ , and  $a \in \{0, 10, \dots, 50\}$ . These values can be chosen by the user.

The reward is (for now) the sum

$$R_t = 50 - A_t + P_t,$$

for all  $t \in \{0, \dots, T\}$