Social Predict - Weighted Probability Adjustment Model (WPAM) for Payout Distributions

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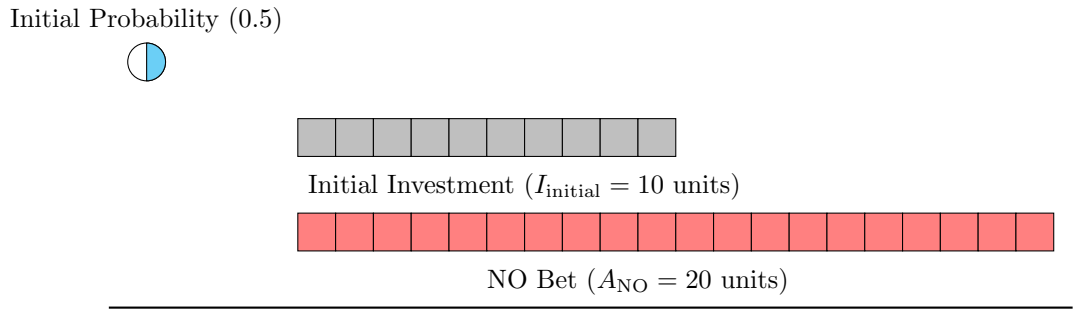
1 First Transaction

- **Initial Investment:** Every market is assumed to have an initial investment of at least 1. This investment comes from a fee assessed to the market creator. This initial investment goes both in the numerator and denominator of the probability calculation.
- **Initial Probability:** Every market starts out at a probability of 0.5 which means even odds between a YES and NO outcome.
- **First Transaction:** In our sample below, the first transaction is a bet of 20 Units in the NO direction.



New Probability (0.167)

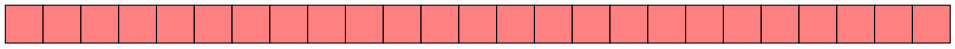
$$P_{\text{new}} = \frac{P_{\text{initial}} \times I_{\text{initial}} + A_{\text{YES}}}{I_{\text{initial}} + A_{\text{YES}} + A_{\text{NO}}} = \frac{0.5 \times 10 + 0}{10 + 0 + 20} = \frac{5}{30} \approx 0.167$$

Market Share Division

$$S = \text{Total Market Volume} + I_{\text{initial}} = 20 + 10 = 30 \text{ units}$$

$$S_{\text{YES}} = \lfloor S \times P_{\text{new}} \rceil = \lfloor 30 \times 0.167 \rceil = 5$$
$$S_{\text{NO}} = \lfloor S \times (1 - P_{\text{new}}) \rceil = \lfloor 30 \times 0.833 \rceil = 25$$

YES Shares ($S_{\text{YES}} = 5$)



NO Shares ($S_{\text{NO}} = 25$)

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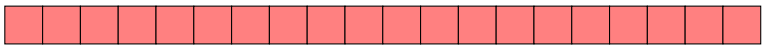
2 Second Transaction

- **Second Transaction:** A different bettor comes in and places 10 units in the YES direction.

Initial Probability (0.5)

Initial Investment ($I_{\text{initial}} = 10$ units)



NO Bet ($A_{\text{NO}} = 20$ units)

YES Bet ($A_{\text{YES}} = 10$ units)

New Probability (0.375)

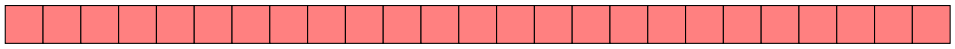
$$P_{\text{new}} = \frac{0.5 \times 10 + 10}{10 + 10 + 20} = \frac{15}{40} \approx 0.375$$

Market Share Division

$$S = \text{Total Market Volume} + I_{\text{initial}} = (10 + 20) + 10 = 40 \text{ units}$$

$$S_{\text{YES}} = \lfloor S \times P_{\text{new}} \rceil = \lfloor 40 \times 0.375 \rceil = 15$$
$$S_{\text{NO}} = \lfloor S \times (1 - P_{\text{new}}) \rceil = \lfloor 40 \times 0.625 \rceil = 25$$

YES Shares ($S_{\text{YES}} = 15$)



NO Shares ($S_{\text{NO}} = 25$)
