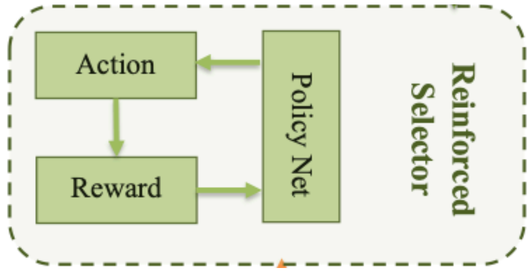
Methodology

Data Selection via Reinforcement Learning



- The criteria of the selection is based on whether adding the chosen sample cam improve the fake news detection performance
  - Design a performance-driven data selection method using reinforcement learning mechanism.
- $\tilde{X}$: all the input data of the proposed reinforced data selector
- Instead of directly putting the entire dataset $\tilde{X}$ into the selector, divide $\tilde{X}$ into K small bags of data examples: $\tilde{X} = \left\{\tilde{X}^{(k)}\right\}_{k=1}^{K}$
- For the k-th bag of data contains B samples: $\tilde{X}^{(k)} = \{x_1^{(k)}, x_2^{(k)}, \cdots, x_B^{(k)}\}$
- Using multiple small bags of samples can provide more feedback to selector and makes the training procedure of reinforcement learning more efficient

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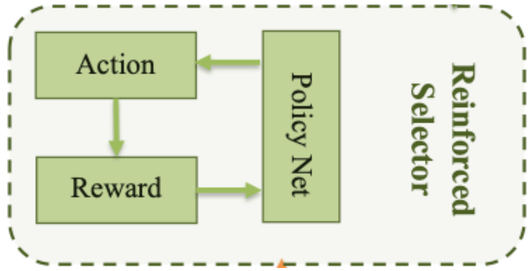

- For every sample, the *action* of reinforced data selector is to *retain* or *remove*.
- The decision of the current sample $x_i^{(k)}$ is based on its *state* vector and all previous decisions of samples $\{x_1^{(k)}, x_2^{(k)}, \cdots, x_{i-1}^{(k)}\}$
- The data selection problem can be naturally cast as a Markov Decision Process (MDP)
- Since the goal of data selection is to improve the performance of fake news detection, directly use the performance (accuracy) changes of fake news detection as the *reward* for reinforced selector