

Truthful Information Elicitation without Verification from Hybrid Crowd

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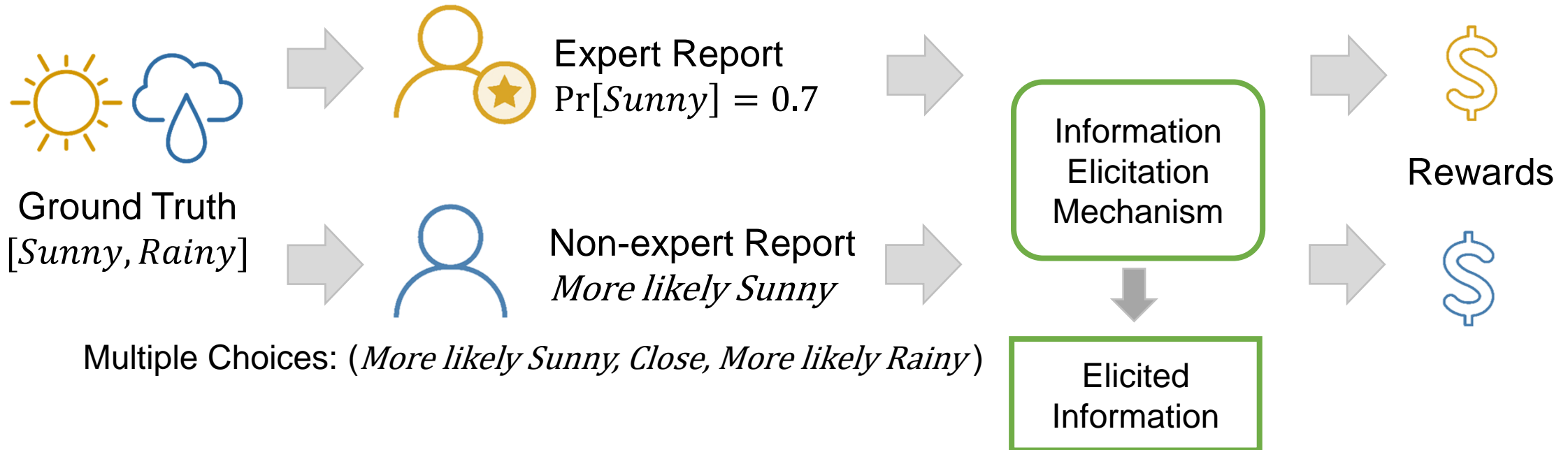
Motivation

In information elicitation problem, ignoring the heterogeneity of the crowd often leads to inefficient aggregations and decisions.

Two kinds of agents: **Experts** with high-quality information; **Non-experts** with basic information.

Every agent can choose to report a **distribution** or answer a **multiple choice question**.

Goal: **Experts** report **distribution truthfully**, **non-expert** answer **multiple choice question truthfully**.

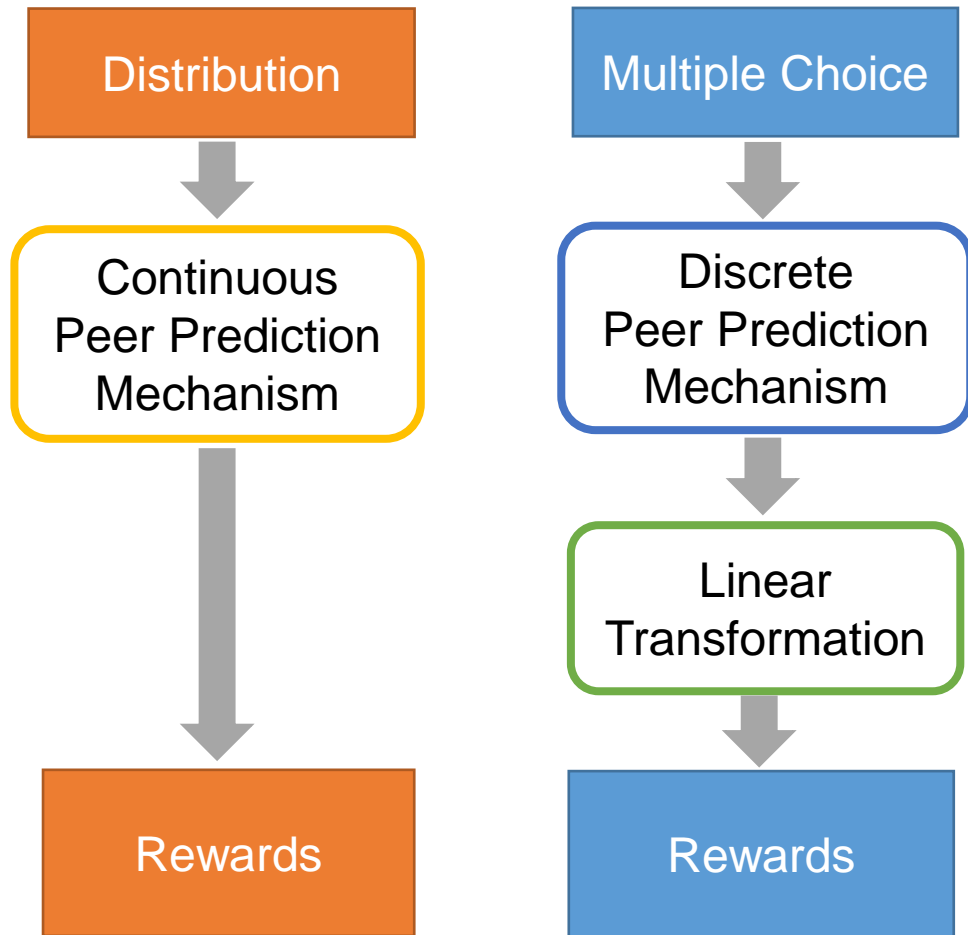


Our Main Contribution

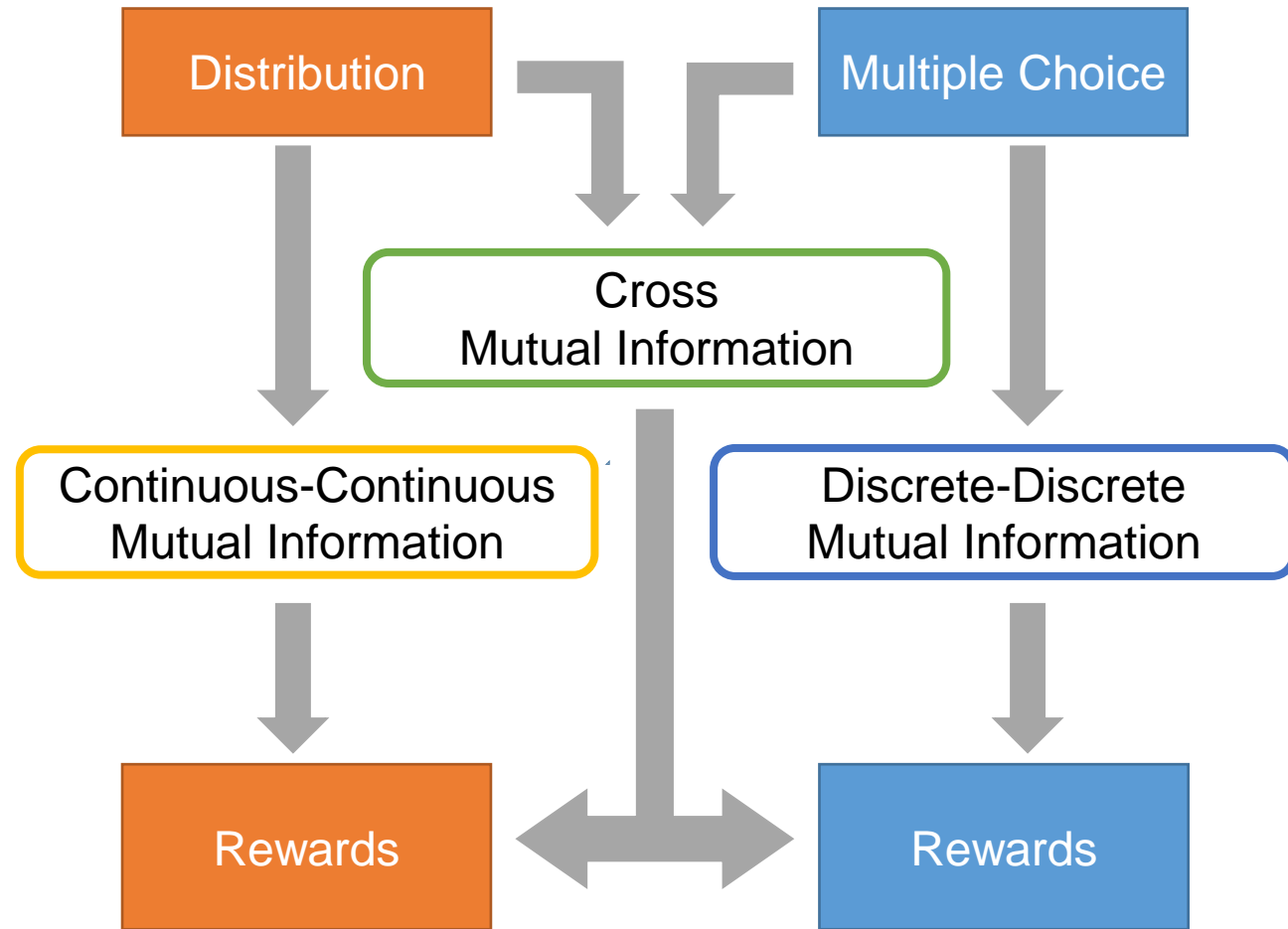
* Two types of agents are separated, and every agent is truthful in its chosen answer type.

Two mechanisms, where **experts** and **non-experts** are **truthful***.

Composite Elicitation Mechanism



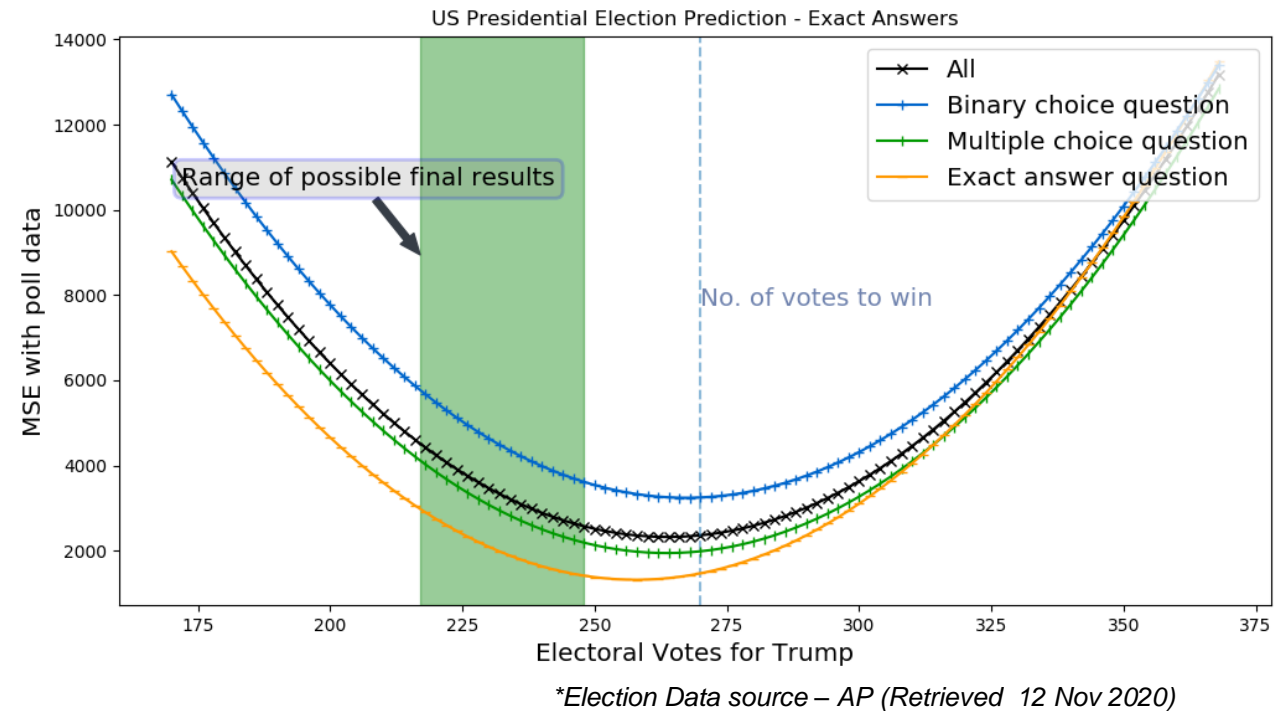
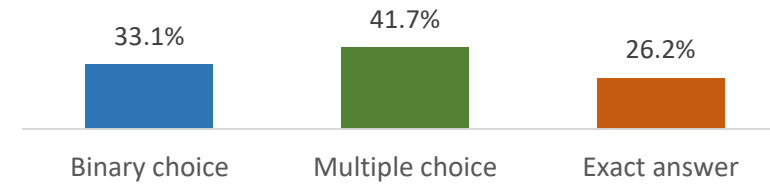
Mutual-Information Based Mechanism



Experiments

- MTurk experiment with 703 participants, 660 valid responses
- Answer Multiple question types--
 - (Binary choice question) Who will win the US presidential election?
 - Biden/Trump
 - (Multiple choice question) Around how many electoral votes will Trump get?
 - <270 / 270-290 / >290
 - (Exact answer question) Exactly how many electoral votes will Trump get?
 - Integer in [0,538]
- Report “which type of question is the best?”

Best question types (%)



- Different agents comfortable with different type of questions
- Groups of agents with different question type preference have different mean squared error (MSE) levels
$$MSE(\text{Exact answer}) < MSE(\text{Multiple Choice}) < MSE(\text{Binary choice})$$
When ground truth votes < 310

Merit in offering different types of question to agents
Merit in discriminating between different type of answers