



Human-in-the-loop Schema Induction

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Introduction: Event Schema

➤ What is the event schema?

- Event schema is a **structured representation of actions (events)**
- It represents the **development of events** in cognition or reality

➤ Why we need schemas?

- It is essential

for **understanding the natural language**

(e.g. the logic in a long passage) and

for **improving on the downstream tasks**

(e.g. Question-Answering, event inference)

- E.g. Documents about the war between Russia and Ukraine

Schema:

... → battle → negotiation → armistice → another battle ...

Q: Why Russia called for a peace talk after the battle?

Q: What's the result of the negotiation? ...

➤ What's current bottlenecks for automatic schema induction?

- ✓ low cost, high efficiency
- ✗ unstable quality influenced by incompleteness, domain transferring, etc.

➤ What's our expectation for the schema induction?

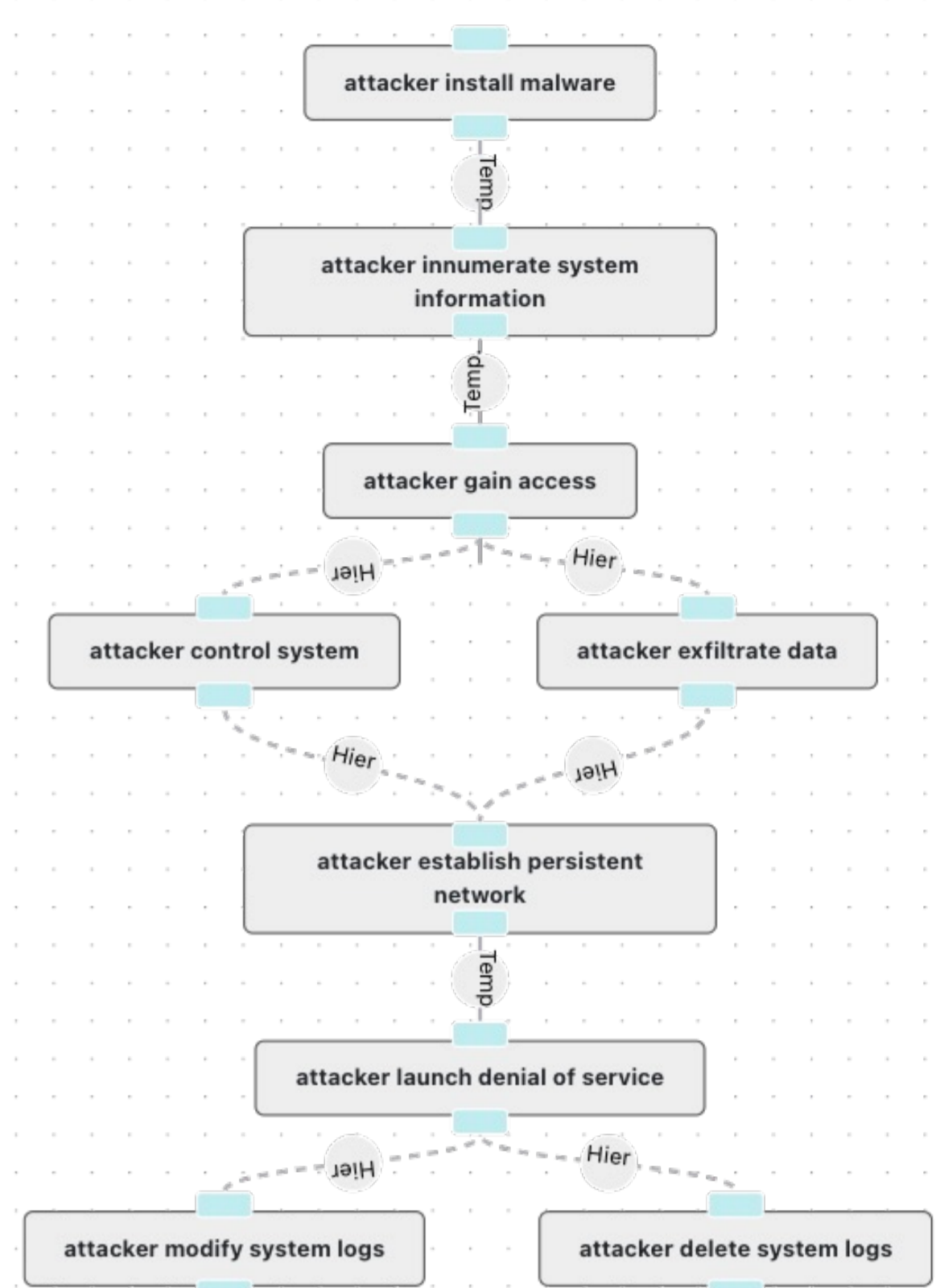
- ✓ **high quality**, ✓ **high efficiency**

➤ What we have in hand?

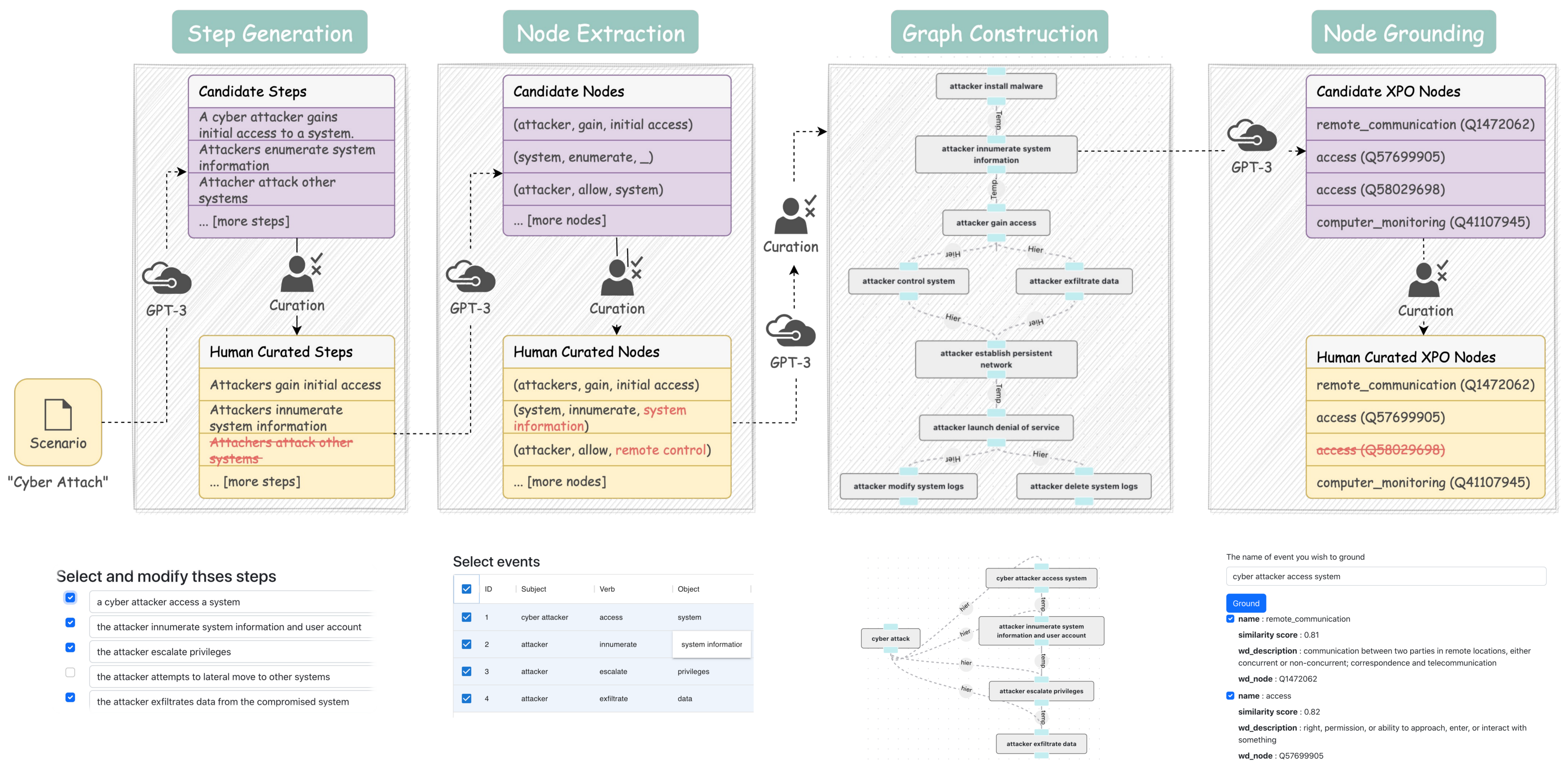
- ✓ GPTs: good **background knowledge** in various scenarios w/o fine-tuning
- ✓ limited human force: high quality

➤ Our proposed approach:

- First, GPTs offer candidate materials (steps, nodes, relations...)
- Next, human judges correct them with their knowledge



Methods: Human Improves Machine Generation at Each Step



Evaluations: High Quality and High Efficiency

	EVC	FOD	JOB	MED	MRG
Step Acc	11/12	7/8	10/10	10/10	12/12
Node Acc	13/15	10/10	11/12	12/12	12/14
Graph Node ED	1	0	0	0	0
Graph Edge ED	8	0	7	3	16
Grounding Success Rate	5/12	3/10	3/11	6/12	9/12
Self-reported time (min)	15	10	11	10	14

- ✓ high efficiency: Reducing from hours to minutes
- ✓ high quality: Human improves automatic generation
- ✓ easy to use: Clear instruction & friendly interaction

- shows **good commonsense knowledges** of the GPTs
- shows **human improvements** made on the auto generations
- shows the **efficiency** of our approach