Crowd Robotics:

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Aims

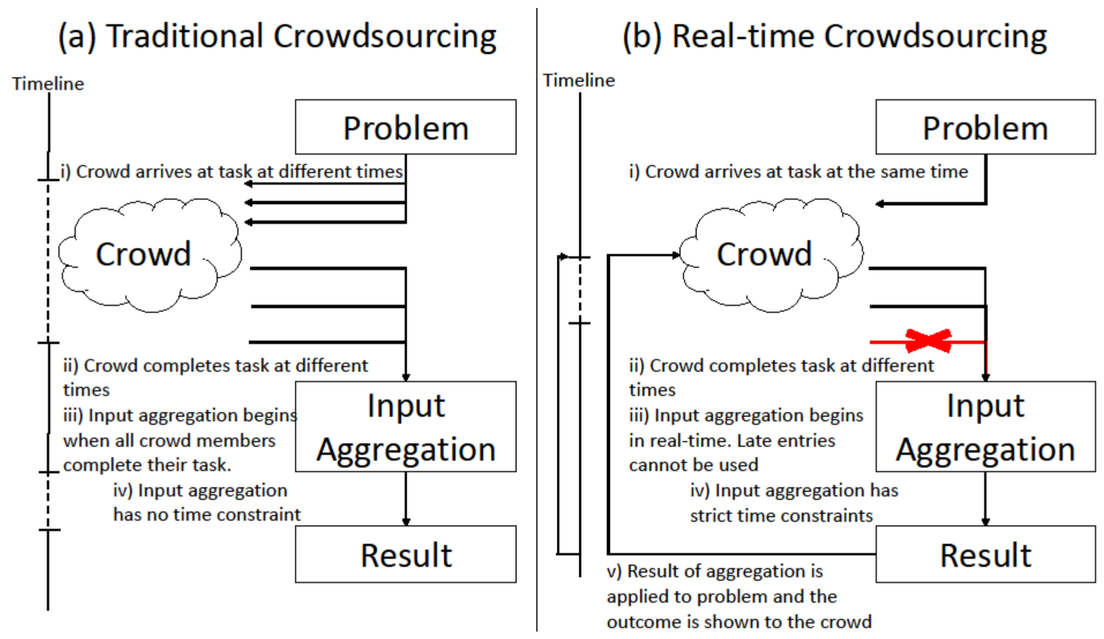
Provide situational awareness support to first responders at search and rescue operations.

Human performance during monotonous visual search tasks may drop quickly after only a few minutes of searching.
Whereas, a real-time crowd can be tireless and vigilant.

Real-Time Crowds

Real-time crowds are as fast as an individual, yet contain the wisdom of a crowd:

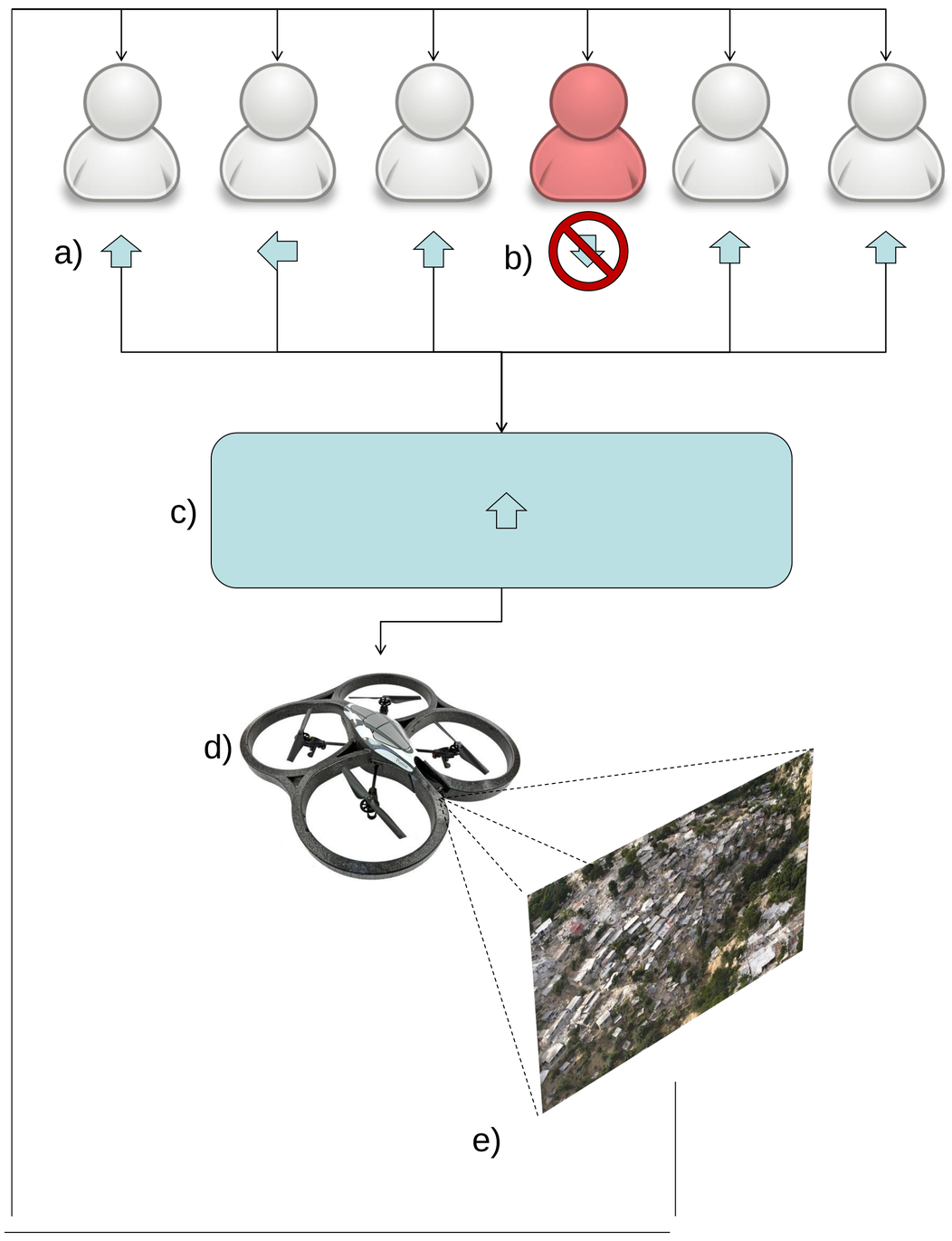
- A real-time crowd is a collection of people who are simultaneously connected to the same system.
- They provide frequent input to dynamically changing systems
- Their input requires real-time aggregation, the results of which can be acted upon and fed back to the crowd



How it works

Use a real-time crowd to influence the movement of a robot:

a) Elicit input from the crowd about where the robot should move next.
b) Filter out noise from unreliable users.
c) Aggregate input in real-time.
d) Move the robot towards the most agreed upon direction.
e) Update crowd with footage from the robots



Crowd Robotics

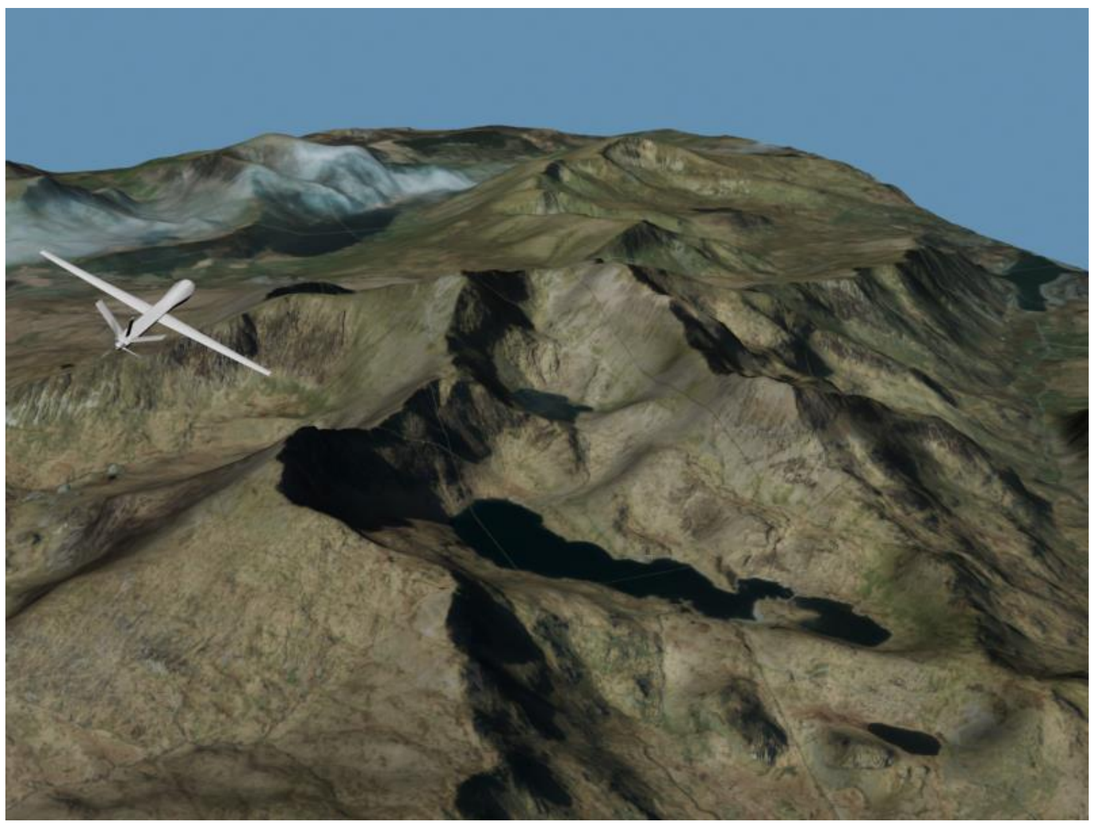
Crowd Robotics uses a real-time crowd to influence the control of a robotic agent

- Removes the need for a pilot but maintains the situational understanding that only a human can achieve
  - Autonomous robots are not as capable
    - Computer vision algorithms are not as good as Human vision
    - AI algorithms do not have the contextual understanding of a Human
- A real-time crowd is a tireless workforce that does not fatigue and maintains a consistent accuracy
  - Replaces unreliable or fatigued members with new members
- Detects unreliable crowd members
  - Crowd robotics is an open system in which anyone can participate

Implementation

Uses a 3D physically simulated environment in which an accurately simulated robot can explore.

- Amazon Mechanical Turk is used to recruit the real-time crowd
- The crowd votes on a direction they wish the robot to go
- Their input is aggregated and the robot moves towards the most voted direction



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