1. Weather Crowdsourcing (WC)
With the ubiquity of smart phones, every person with a mobile phone can report weather conditions, e.g., precipitation, air quality. The reported data, often in real-time, offer a valuable addition to the satellite remote sensing and radar detections technologies.

Applications
✓ Environmental sensing
✓ Disaster response
✓ Transportation decision making

Task Assignment
1. Requester issues tasks to server
2. Server assigns tasks to nearby workers
3. Server sends tasks to assigned workers

2. Challenges
Distinctions from crowdsourcing paradigms:
1. Reported observation is near (within) task’s location (duration)
2. Server maximizes task coverage with worker budget constraint
3. Dynamic arrivals of tasks/workers

3. Fixed Budget
Off-line Scenario
MTC is NP-hard by reduction from the maximum coverage problem with group budget constraint problem
Greedy algorithm gives 0.5-approximation ratio.

On-line Scenario
Heuristics to MTC time instance: Basic, Spatial, Temporal

4. Dynamic Budget

Off-line Scenario
MTC is NP-hard by reduction from the maximum coverage problem
Greedy algorithm gives 0.63-approximation ratio.

On-line Scenario
Adapt allocates budget to time instances based on contextual bandits
i.e., balances budget status and coverage gain
Improve Adapt by leveraging workers’ activity patterns

5. Performance Evaluations
Real Datasets

Table: Performance Evaluation
<table>
<thead>
<tr>
<th>Dataset</th>
<th>Time Instance</th>
<th>Budget</th>
<th>Coverage Gain</th>
</tr>
</thead>
<tbody>
<tr>
<td>Go-Poisson</td>
<td>1</td>
<td>3586</td>
<td>28</td>
</tr>
<tr>
<td>Go-Poisson</td>
<td>1</td>
<td>28</td>
<td>3586</td>
</tr>
</tbody>
</table>

Synthetic Datasets

Table: Performance Evaluation
<table>
<thead>
<tr>
<th>Dataset</th>
<th>Time Instance</th>
<th>Budget</th>
<th>Coverage Gain</th>
</tr>
</thead>
<tbody>
<tr>
<td>Go-Poisson</td>
<td>1</td>
<td>3586</td>
<td>28</td>
</tr>
<tr>
<td>Go-Poisson</td>
<td>1</td>
<td>28</td>
<td>3586</td>
</tr>
</tbody>
</table>

6. Discussions
✓ Worker overload to avoid repetitive activations of the same worker
✓ Profit for each task to represent the importance of tasks
✓ Utility of tasks as a function of spatial/temporal distance to worker
✓ Activation cost of workers is not uniform