A Novel GWAP System for

Disaster Monitoring

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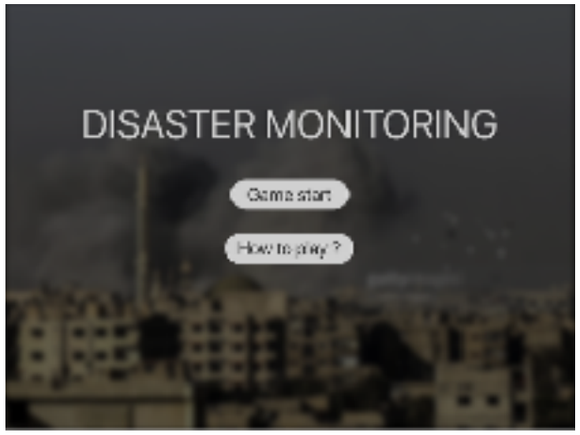
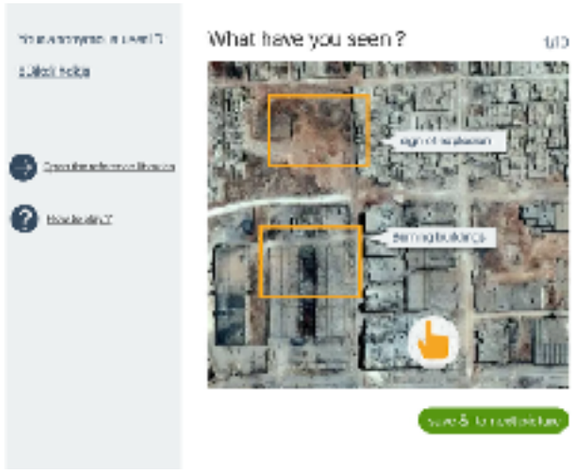
- Zhe Li

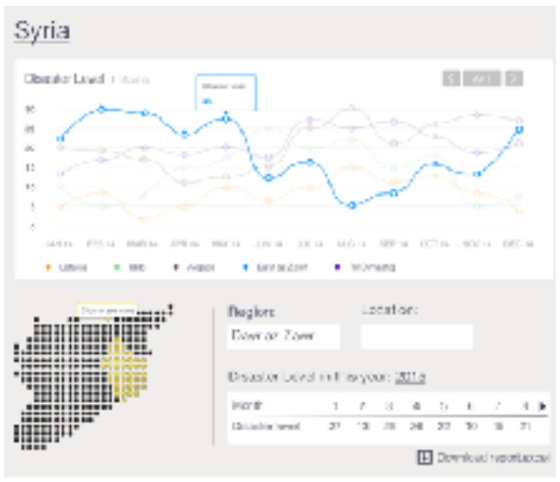
Functionalities

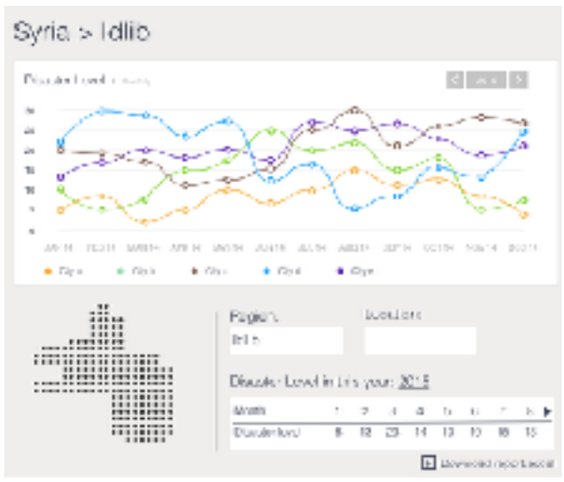
Functionalities: Player & Stakeholder

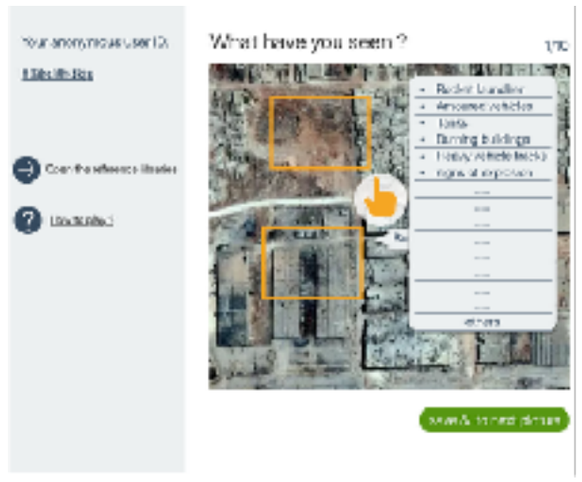
Interactive Prototype: https://invis.io/WQCKJRPJK#/243555585_home–Page











Functionalities: Web-based Technology Stack

- Front-end

  Polymer

- Back-end

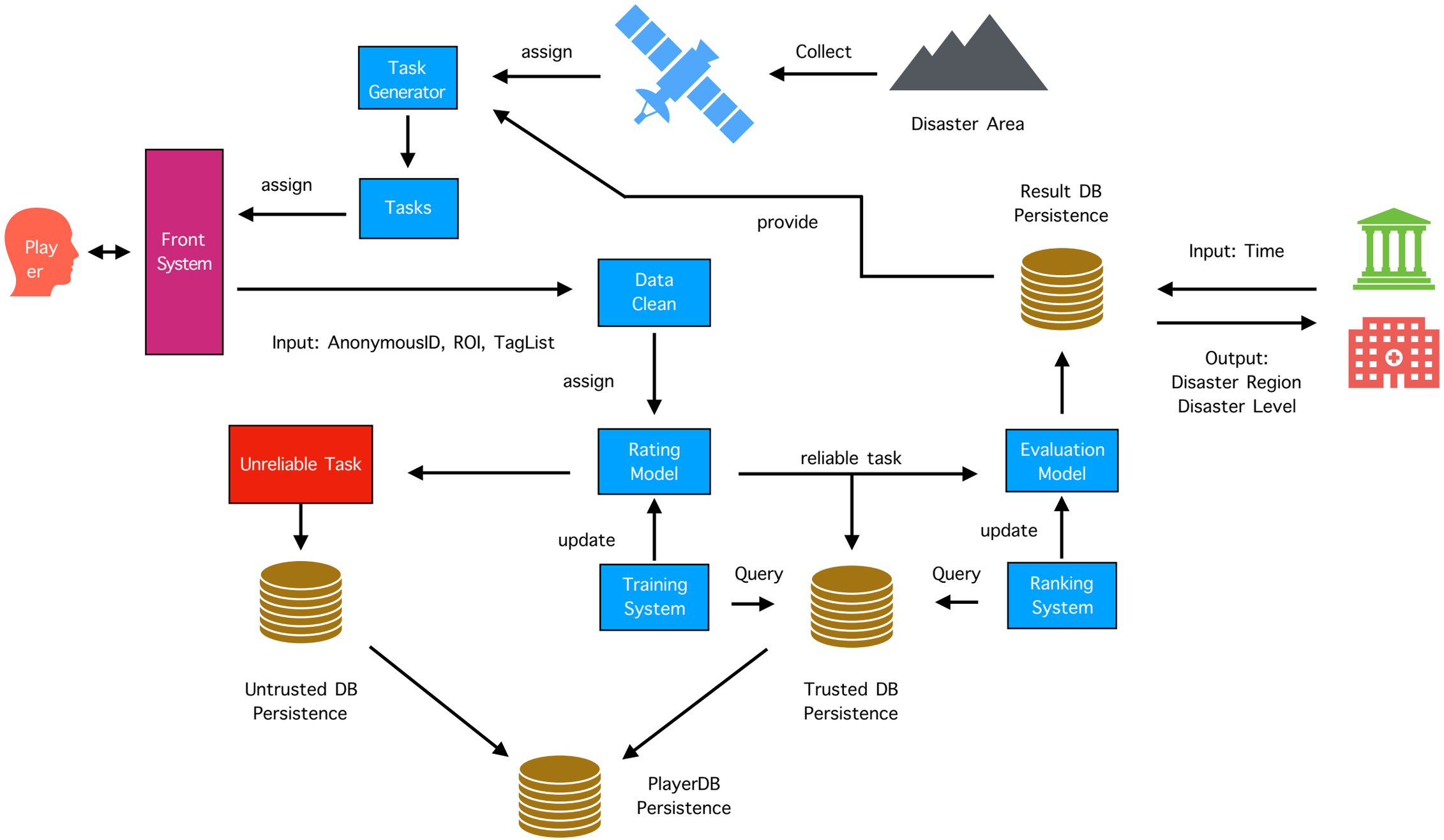
  Node.js / Python

- Database

  MongoDB

Design

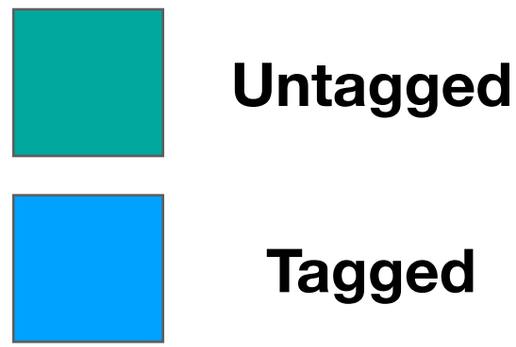
System Design: Architecture



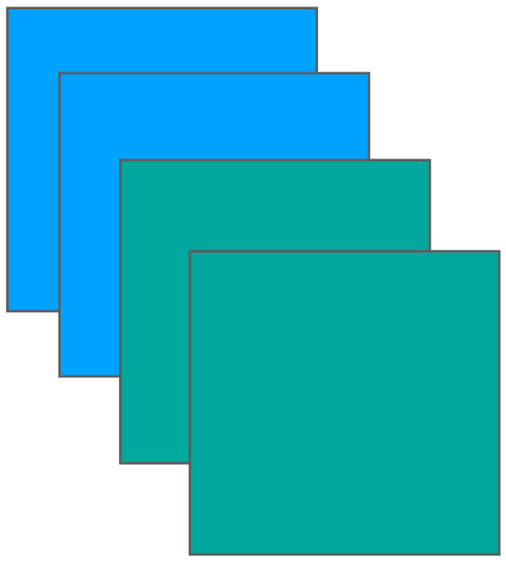
System Design: Theory Foundation

- Details in the paper report.

System Design: Cold Start

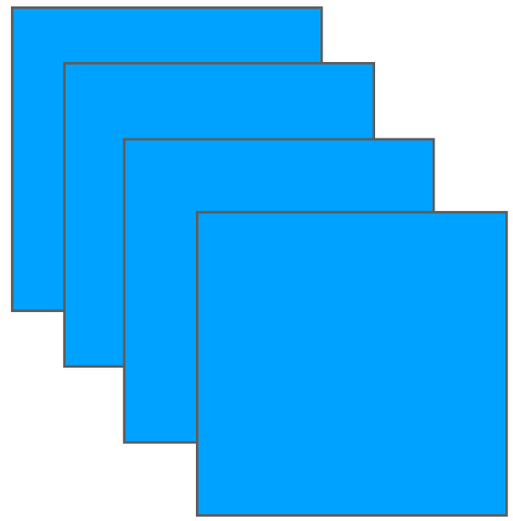


Tagging



New Player

Task



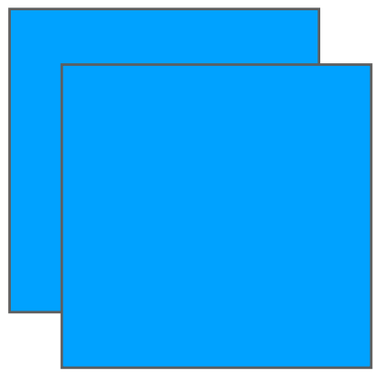
If reliable

aggregate

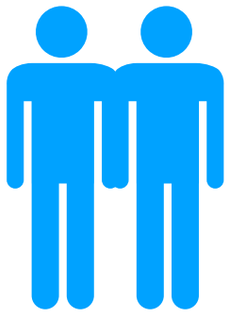
untagged images

Initial Trusted Results

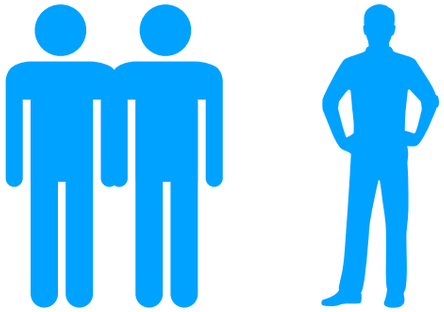
+



Trusted Results



Become



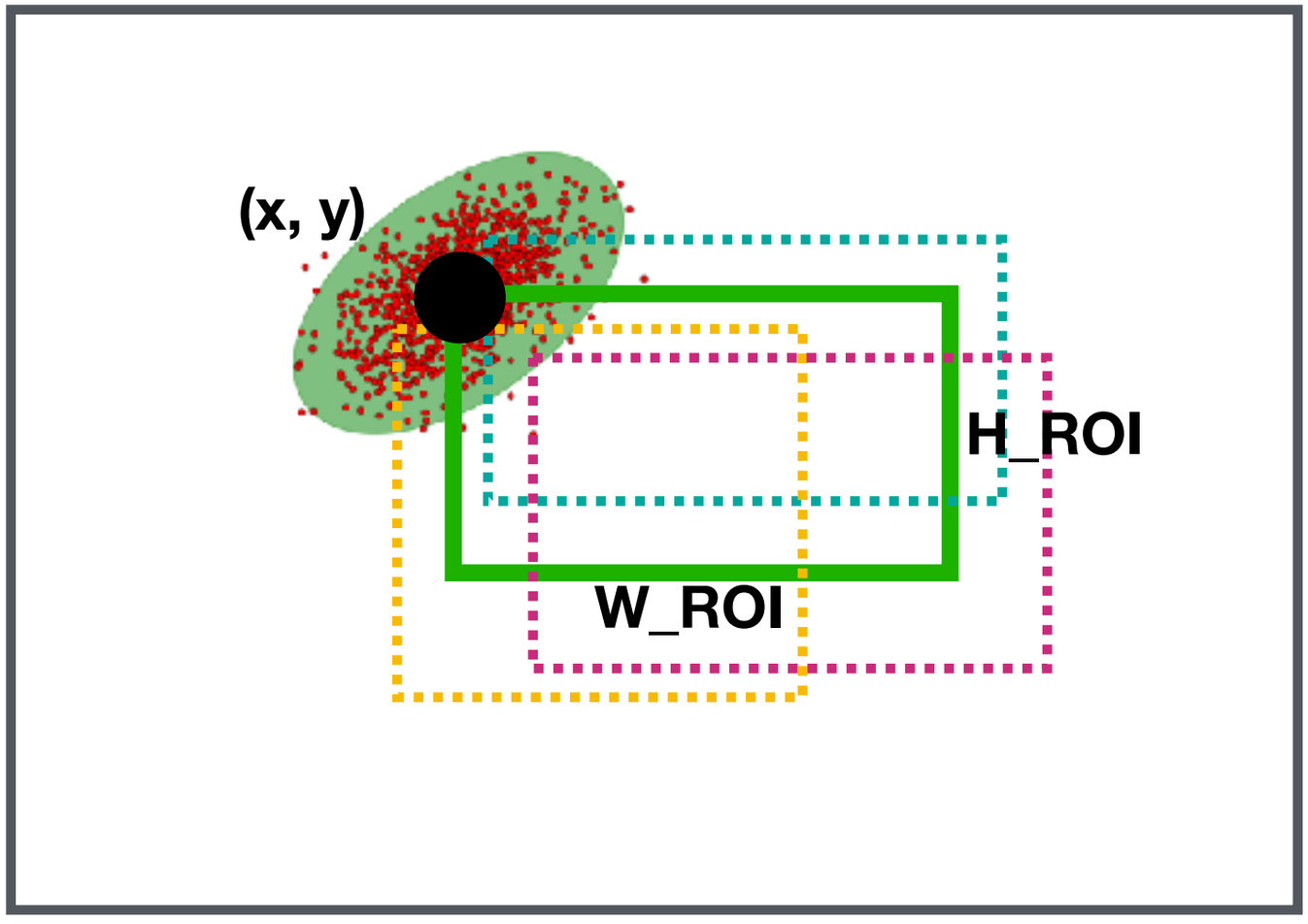
Minimum Initial Trusted Group

Trusted Group

Evaluations

Evaluations: Tech Criteria

– Generate **random data** and test the Rating Model through **accuracy** and **recall**, even **ROC** curve.



Evaluations: Social & Ethics Aspects (1)

– Leakage of data

– Besides leak to ordinary users, the employees of UNICEF should have no right to access the entire database.

Evaluations: Social & Ethics Aspects (2)

The number of players

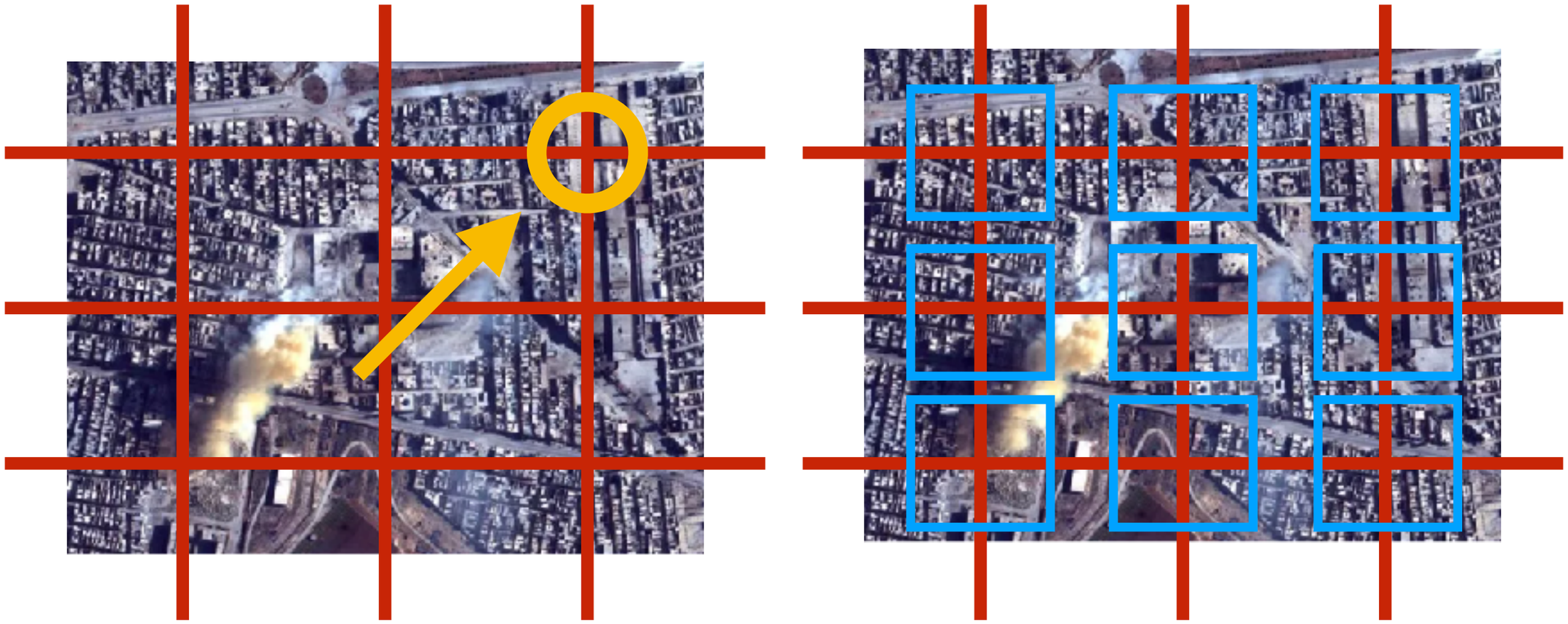
A. more users: more tags (higher accuracy of our level of disaster)
B. more users: trustworthy (higher trusted value which can filter malicious groups)

IPR (Intellectual Property Rights)

Evaluations: Social & Ethics Aspects (3)

Potential problem for leakage solution: Information Loss

Solution:



We apology for mistakes that we forgot moving this part from limitation to evaluation chapter in the paper…😰

Limitations

Limitations (1): Evaluation Outdated

Each evaluation get invalid if region image outdated.

Limitations (2): Game Play and Playability

– Users may meet the situation that there is no available ROI in several continuous rounds.

– E.g. Lake, forest, mountain, desert, some city area, nothing to tag.

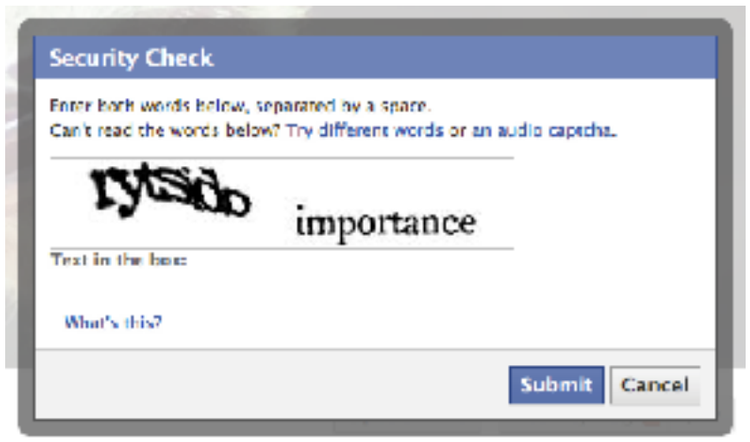
Future Extensions & Interactions

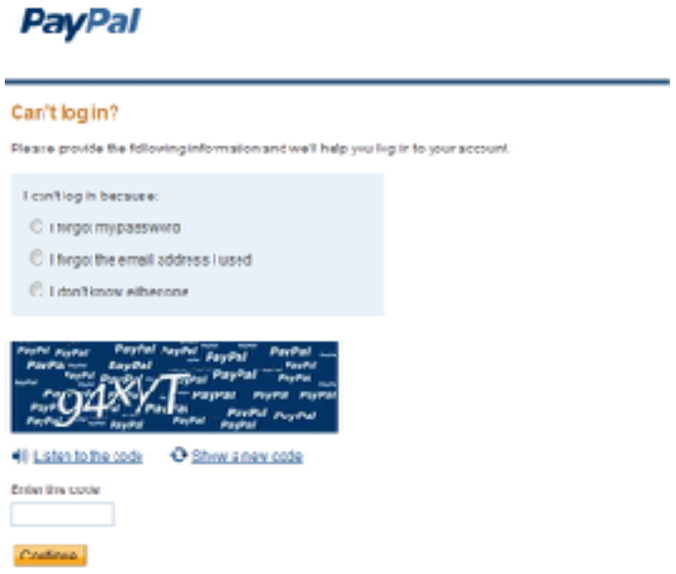
Future Extensions & Interactions

1. General System with Replaceable Rating Model: malicious detection algorithm can be replaced by any other machine learning algorithm with enough data.

2. Collaborative Computing for Playability: Collaborative computer vision computing improves playability.

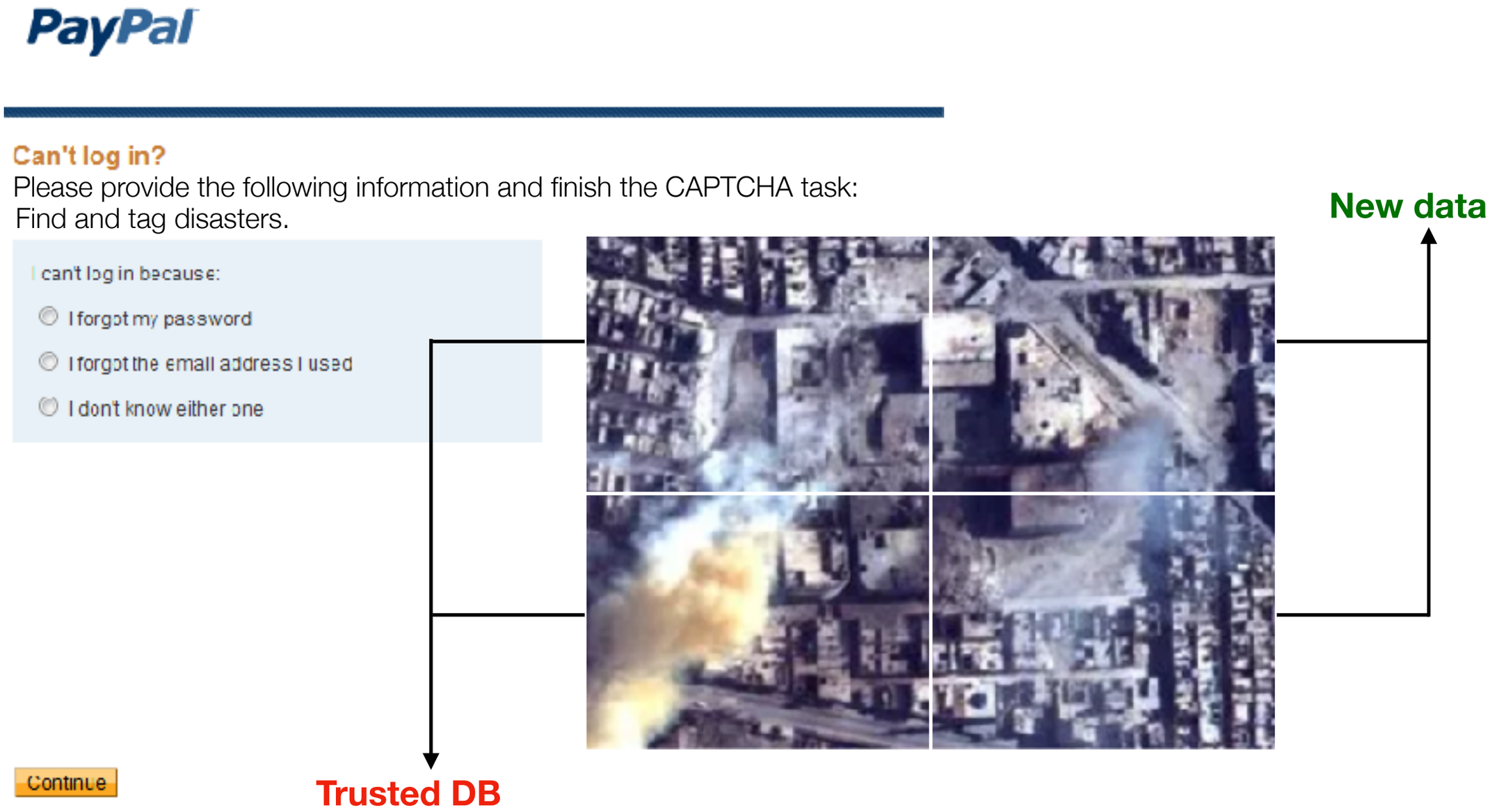
3. CAPTCHA Integrated System: the grate wastes of the computing power of humankind.





Future Extensions & Interactions

4. CAPTCHA Integrated System:



Conclusions

Pros Cons

1. GWAP–based Image Tagging HC System
   + Only requires **two initial persons**
   + Participants play game **individually without registration**
   + Web–based, **cross all platforms**
   + Theoretical **proved**, with theoretical criterial

2. Social & Ethics
   + Incentivization: **Altruism**
   + Leakage & Privacy: **Fragments**
   + Malicious Player: **Model Algorithm**

3. Limitations
   + Evaluation **outdated**
   + Playability for **senseless area**

4. Further Extensions & Interactions
   + The General System
   + Machine Vision Improvements
   + CAPTCHA Integration

Achievements Summary

– **Efforts Perspective:**
  + Changkun Ou:
    * Designed the HC system backends and solve technical problems
  + Yifei Zhan:
    * Built two interactive prototypes of the human computation system
  + Zhe Li:
    * Solve data leakage problem & plug HC system into CAPTCHA system

– **Report Perspective**:
  + Version Control: https://github.com/changkun/hc-ss17-disaster-monitoring

Changkun Ou	Yifei Zhan	Zhe Li
* Proofread & Typesetting * Abstract * Ch3: Design * Ch4 Intro * Ch4.1.1: Model Evaluation * Ch4.2.1: Evaluation Outdated * Ch5.1: Conclusions	* Chapter 2: Functionalities * Ch5 Intro * Chapter 5.2: System Extensions	* Ch1: Introduction * Ch4.1.2: Social&Ethical Issues * Ch4.2.2: Information Loss * Ch4.2.3: Playability * Ch5.3: Other Interactions