Competition 4: Attacking CAPTCHA

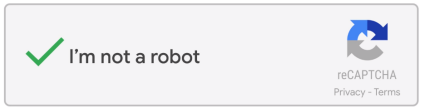
Shan-Hung Wu & DataLab
Machine Learning

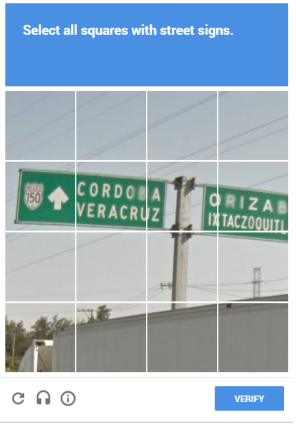
Outline

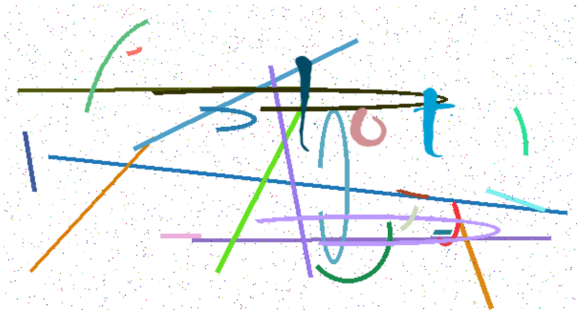
- Why CAPTCHA?
- Tasks and datasets
- Evaluation
- Hints from TA

What is CAPTCHA?

- **C**ompletely **A**utomated **P**ublic **T**uring test to tell **C**omputers and **H**umans **A**part
- Tells humans from bots





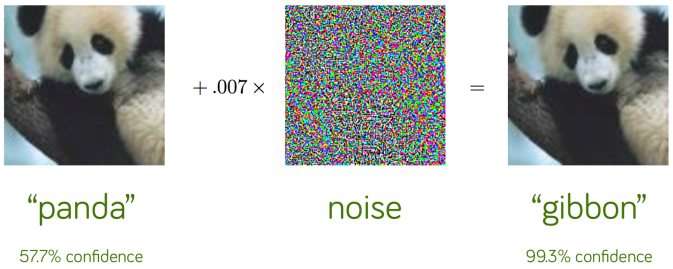


Why CAPTCHA?

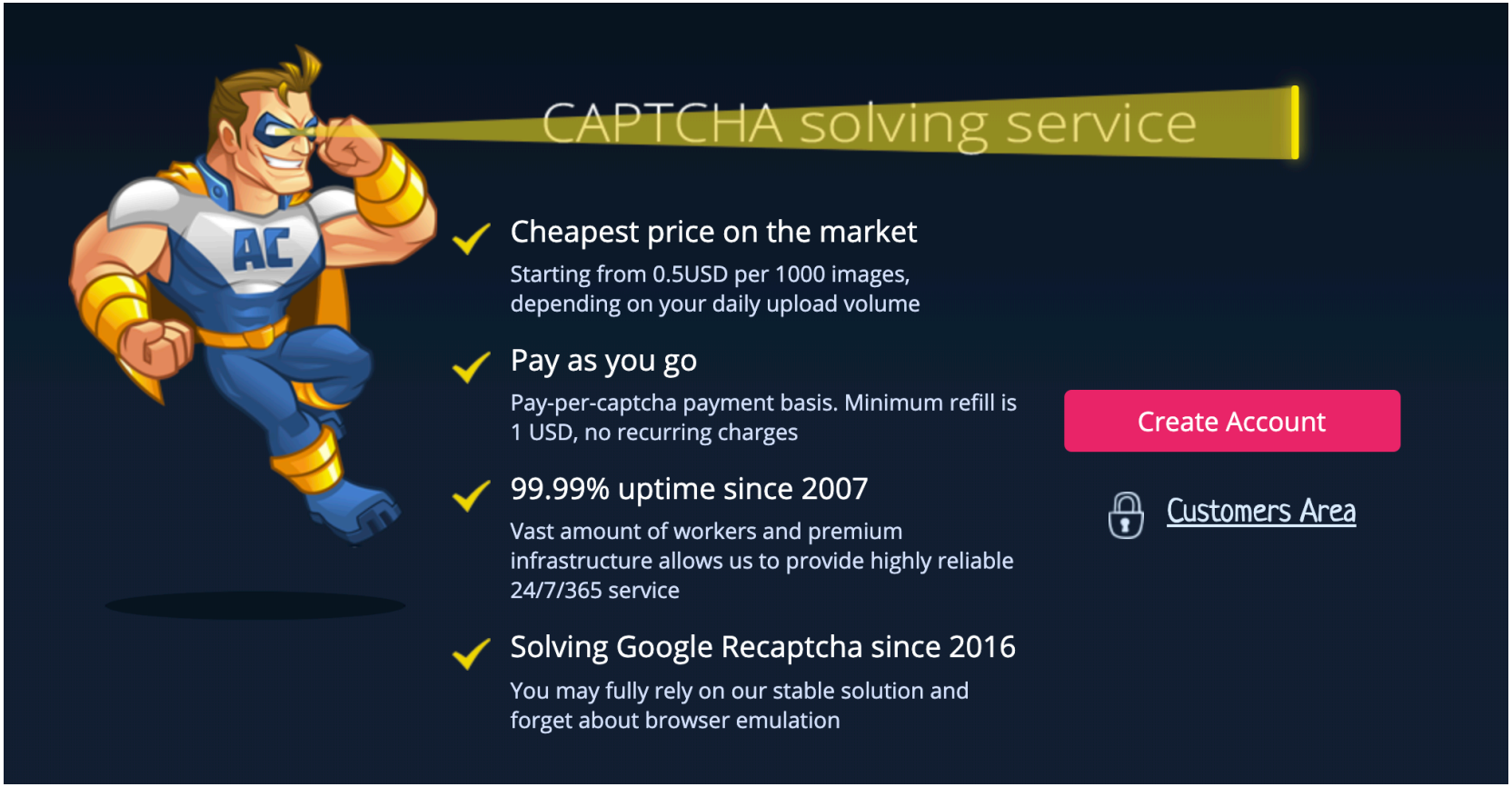
- Spam accounts
- Brute-forcing passwords
- Booking bots
- Free web service collectors
- Fake comments or votes
- and more…

Are CAPTCHAs Secure?

- Google has used ML and AI to enhance CAPTCHAs
- Based on adversarial attacks



Can AI/ML Used to Break CAPRTCHA?



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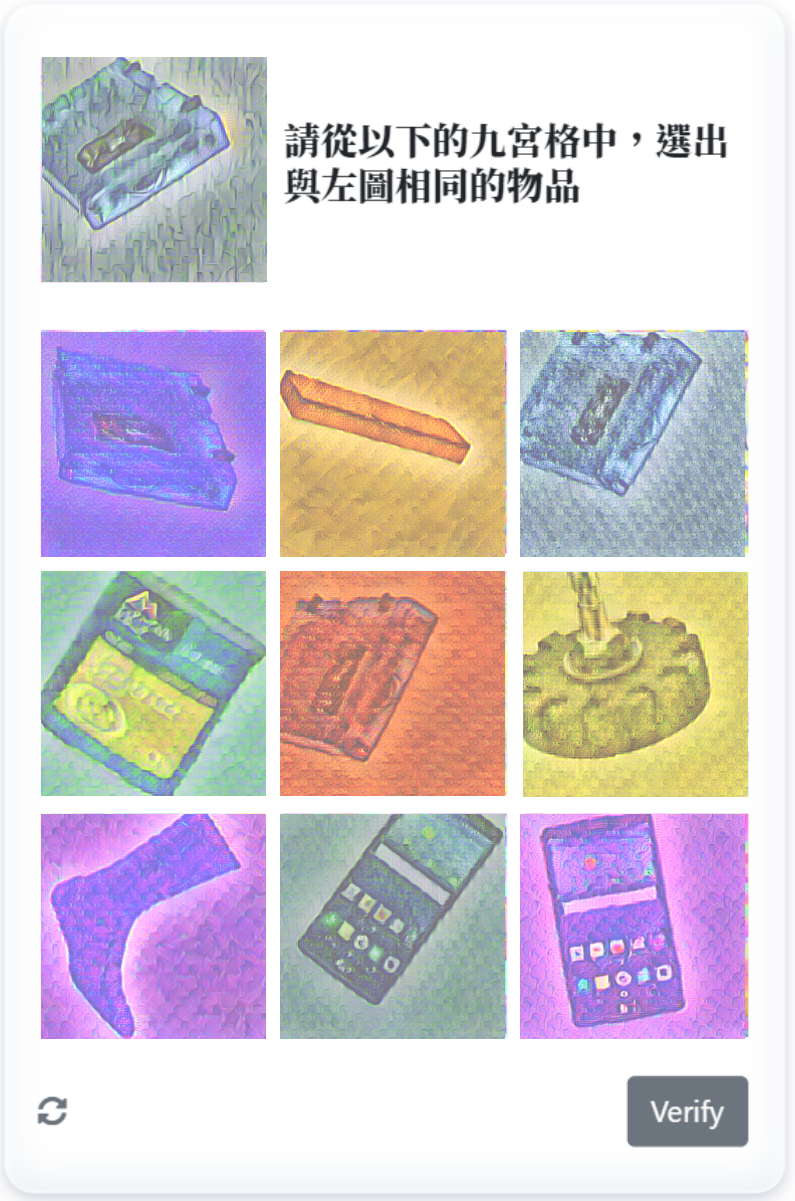
Mission

- We provide CAPTCHA
- You break it!



Input/Output

- Input:
  - 1 question image
  - 9 candidate images
- Output:
  - 101010000

Tasks

- Task1:
  - Distortion

- Task2:
  - Distortion
  - Style transfer

- Task3:
  - Distortion
  - Style transfer
  - Adversarial attack

Datasets

- For each task:
  - Training set (~20K images, ~50K CAPTCHAs)
  - Validation set (~4K images , ~10K CAPTCHAs)
  - Testing set (~24K images , ~60K CAPTCHAs)

- ***The objects in these sets are different!***
  - If you train a model, make sure it generalizes to ***unseen*** objects

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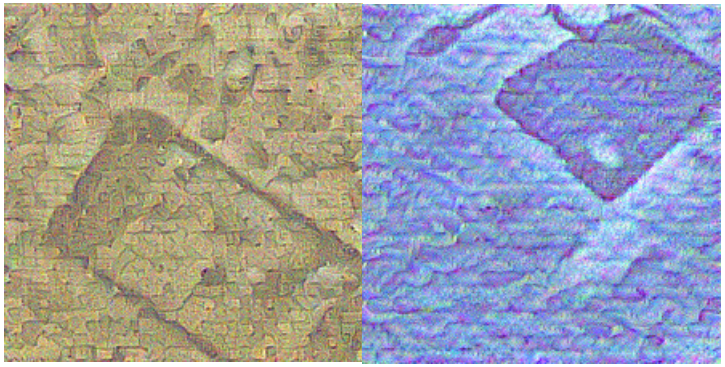
Scoring

- Task 1: 30% (crack)
- Task 2: 15% (crack) + 15% (ranking)
- Task 3: 15% (crack) + 15% (ranking)
- Report: (10%)

Bonus

- Bonus1: 20% (crack)
  - Stronger adversarial attack
  - Other secrets…



- Bionus2: 10% (crack)
  - Input: audio clip
  - Output: #cues (1, 2, or 3)

Evaluation

- What does the “crack” mean?
  - >10% accuracy for image CAPTCHAs
  - >50% accuracy for audio CAPTCHAs

Your Report Must Include…

- For each task:
  - Code and model weights (if any)
    - For reproducibility
  - Methods and steps you've tried
  - How did they perform?
- Conclusion and lesson learned (10%)

- ***Missing a task means 0 score!***

Schedule

- Deadline: 2020/01/14 23:59
- Showoff: 2020/01/16 15:30

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Hints

- Read this adversarial attack paper
- You can try any methods, except
  - Manually solve CAPTCHAs in test set
  - Peek information in the test set

Q&A