SUDOKUS AS CAPTCHA

Keep away of malicious bots and solve sudokus in a matter of seconds

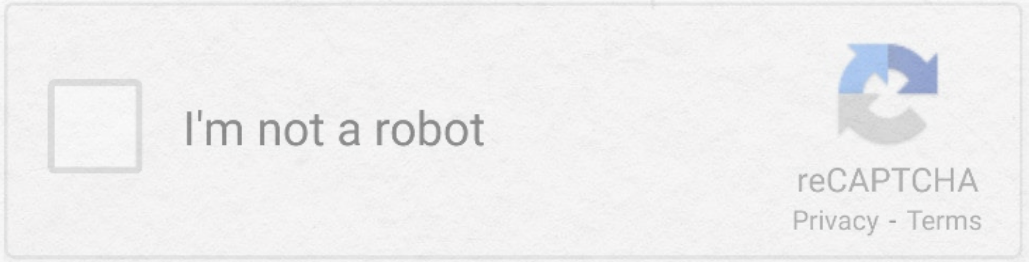
THE PROBLEM

Google is running out of images for CAPTCHAs.

For many users, these have been an annoying and time-consuming necessity of the internet—often leaving them wondering how to avoid CAPTCHA. For the companies using them, however, CAPTCHA tools have been a reassuring security measure.

Google has decided to use Sudokus to keep bots away. Most of bots can't bypass Sudokus, but neither some humans can.

This can be extraordinarily frustrating for users—which impacts user engagement and conversions.



THE CHALLENGE

This project is about creating a secret computer vision algorithm that can solve sudokus quickly and allows users to continue with their activities.

OUR TEAM

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RITTHUJA

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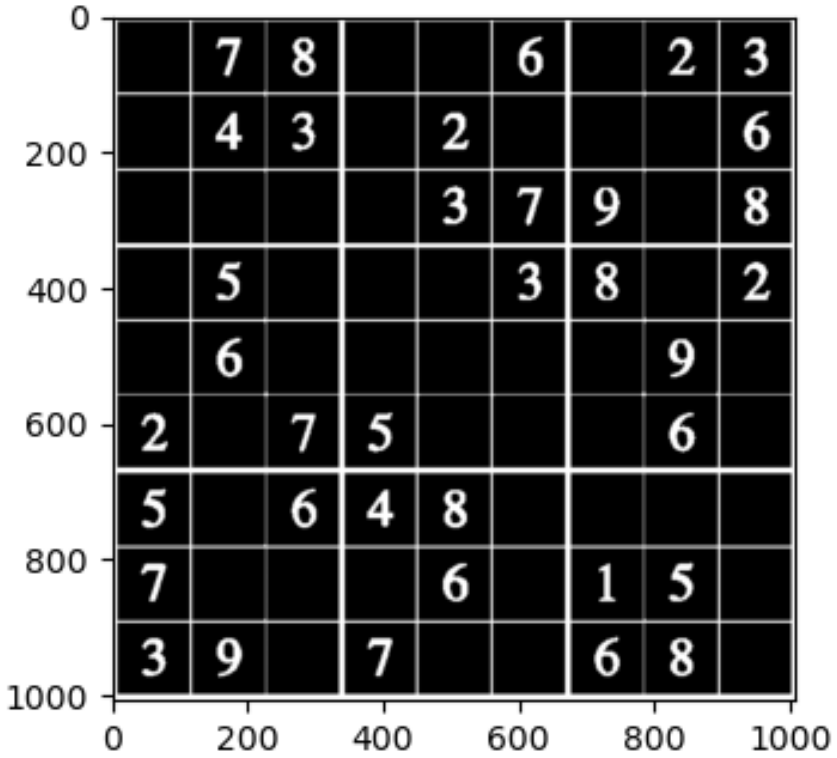
THE SOLUTION

	7	8			6		2	3
	4	3		2				6
				3	7	9		8
	5				3	8		2
	6						9	
2		7	5				6	
5		6	4	8				
7				6		1	5	
3	9		7			6	8	

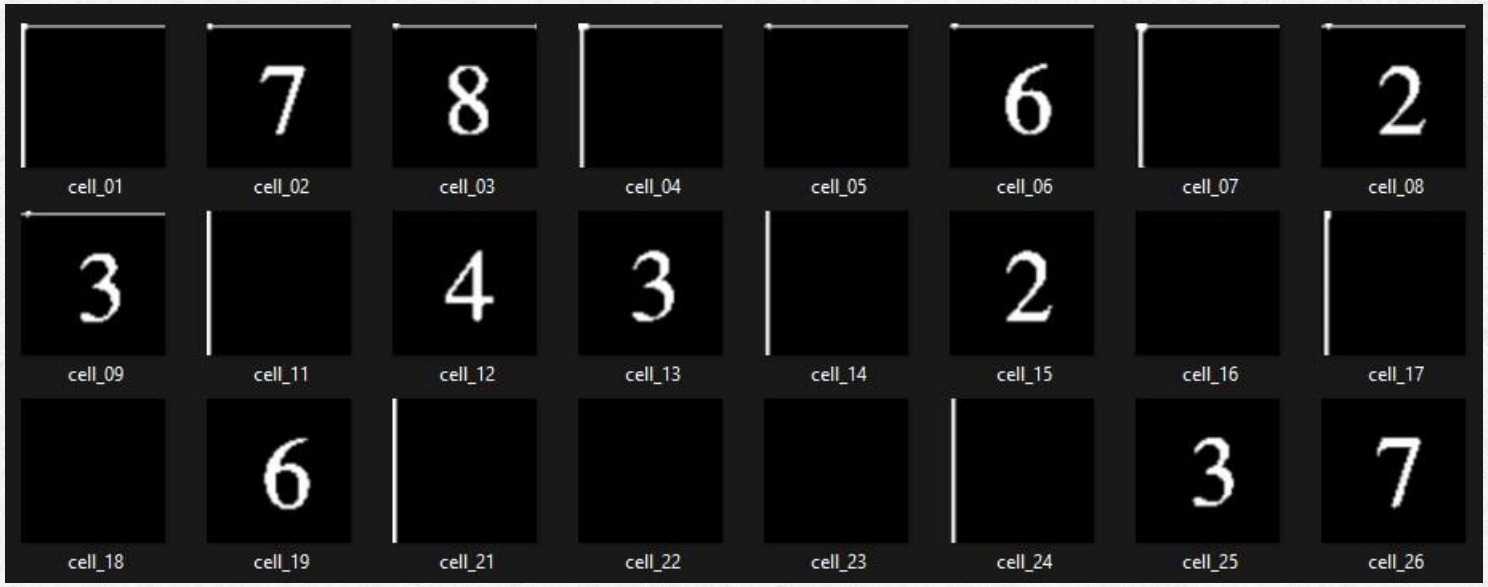
This is the image used as a sample for training the algorithm.

THE SOLUTION



We preprocessed the image and obtained a binary-inversed color image. This makes the image the cleanest possible.

THE SOLUTION



We were able to extract all the 81 cells and to use them in the model.

THE SOLUTION

We were able to find a temporary solution for the given problem, but still need to improve the model.

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Visualizing the board before solving
0 0 0  | 0 0 0  | 0 0 0
0 1 2  | 0 3 9  | 5 6 7
0 3 4  | 5 0 6  | 1 8 2
- - - - - - - - - - - - -
0 0 1  | 0 5 8  | 2 0 6
0 0 8  | 6 0 0  | 0 0 1
0 2 0  | 0 0 7  | 0 5 0
- - - - - - - - - - - - -
0 0 0  | 7 0 5  | 0 0 8
0 8 0  | 0 6 0  | 7 0 0
2 0 7  | 0 8 3  | 6 1 5


Visualizing the board after solving
5 7 6  | 8 1 2  | 4 9 3
8 1 2  | 4 3 9  | 5 6 7
9 3 4  | 5 7 6  | 1 8 2
- - - - - - - - - - - - -
4 9 1  | 3 5 8  | 2 7 6
7 5 8  | 6 2 4  | 9 3 1
6 2 3  | 1 9 7  | 8 5 4
- - - - - - - - - - - - -
1 6 9  | 7 4 5  | 3 2 8
3 8 5  | 2 6 1  | 7 4 9
2 4 7  | 9 8 3  | 6 1 5
```