OBJECT RECOGNITION IN ART DRAWINGS

TRANSFER OF A NEURAL NETWORK

Rujie Yin
Duke University

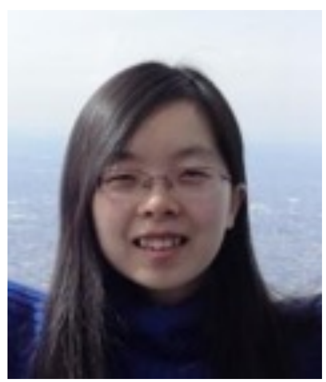
ICASSP 2016, 23 March, Shanghai


Ingrid Daubechies


Mauro Maggioni


Elizabeth Honig


Eric Monson


Rujie Yin

"Brueghel Family: Jan Brueghel the Elder." The Brueghel Family Database. University of California, Berkeley. http://janbrueghel.net/
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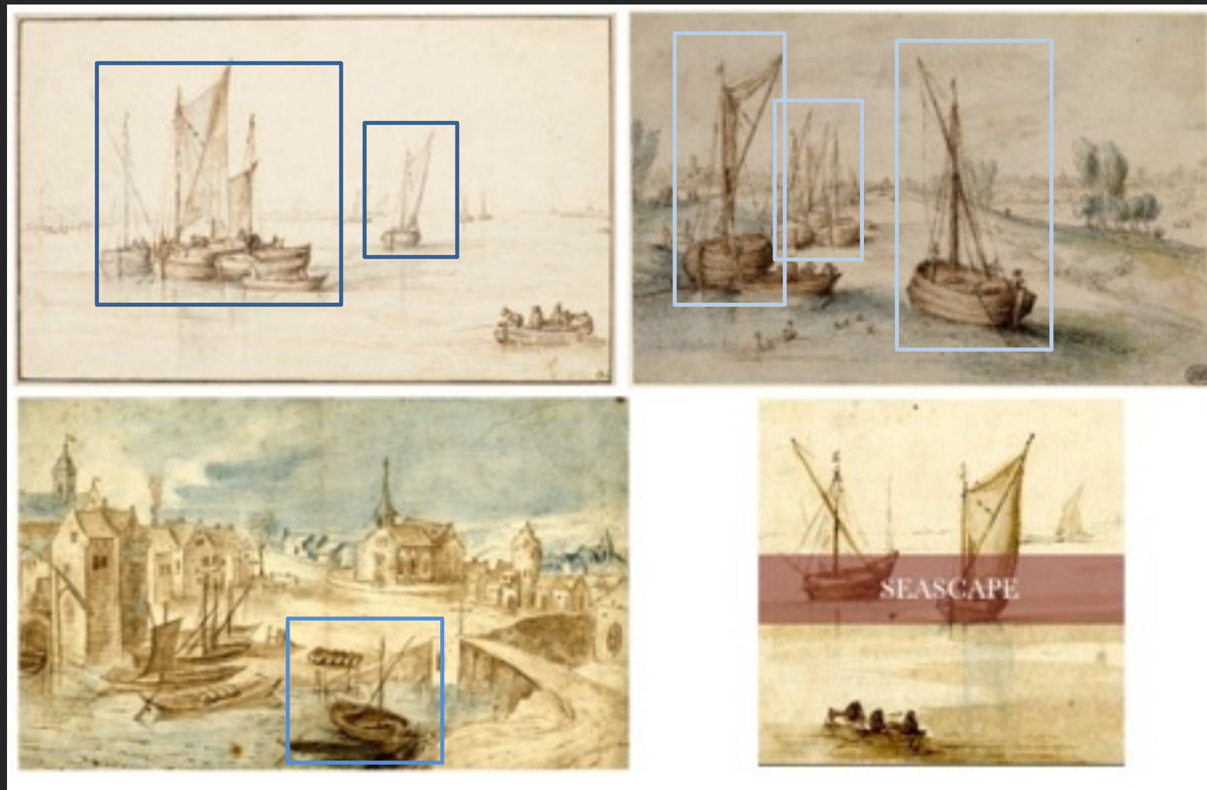

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SEE ALL DRAWINGS
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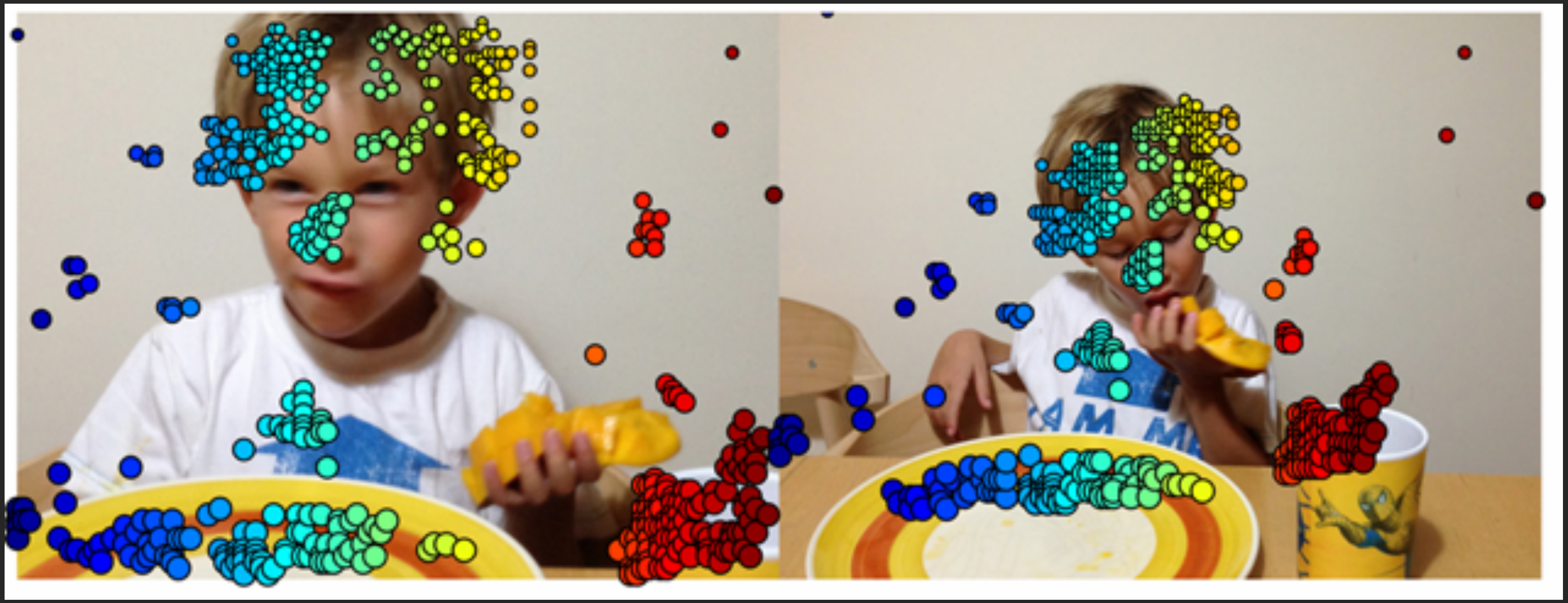
compute SIFT → match feature with bounded spatial distortion*

*Y. Lipman et al, 2014

where SIFT falls

compute SIFT → match feature with bounded spatial distortion* *Y. Lipman et al, 2014



where SIFT falls

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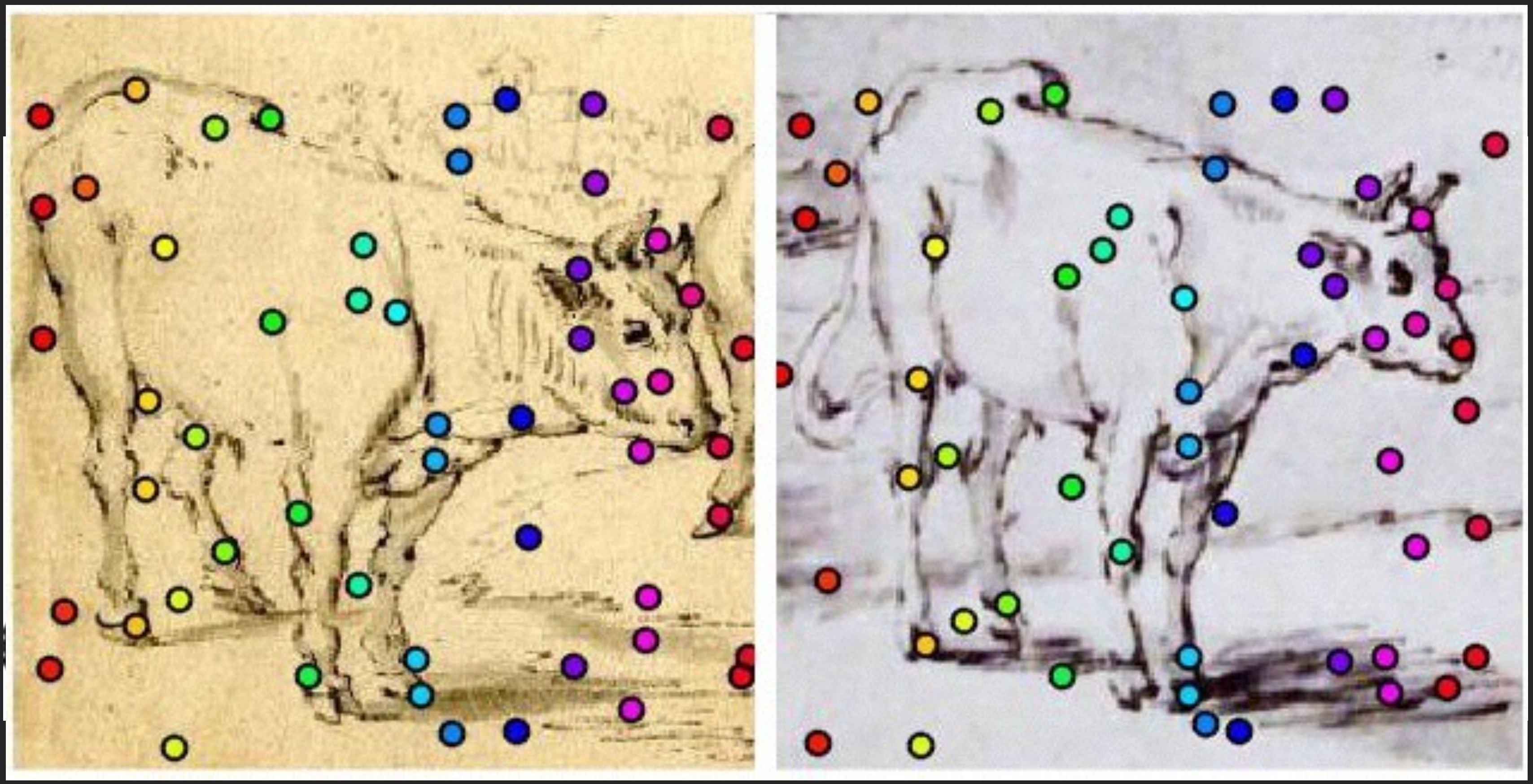
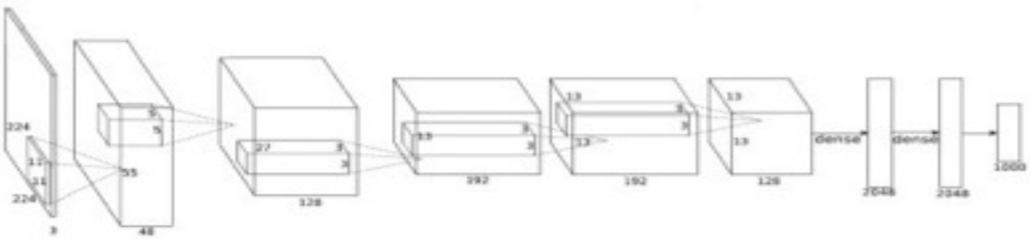


where SIFT falls

- flexibility
- automatic feature learning
- human perception

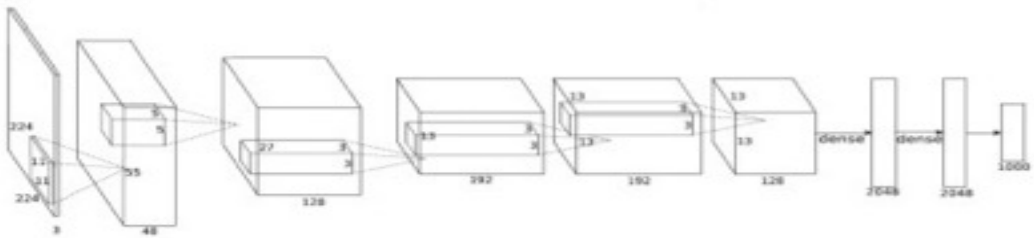


Alex-Net, NIPS 2012

call for

Neural Network

- flexibility
- automatic feature learning
- human perception



Alex-Net, NIPS 2012

clarifai

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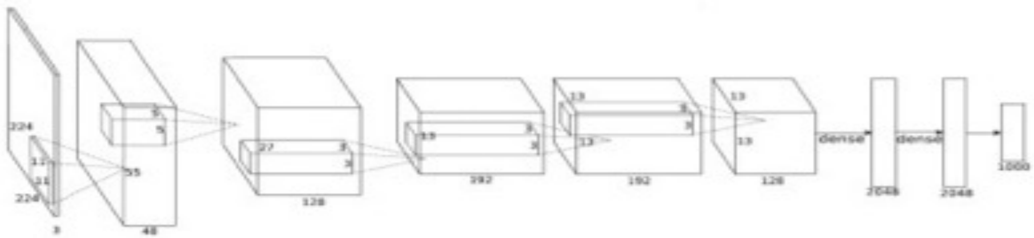

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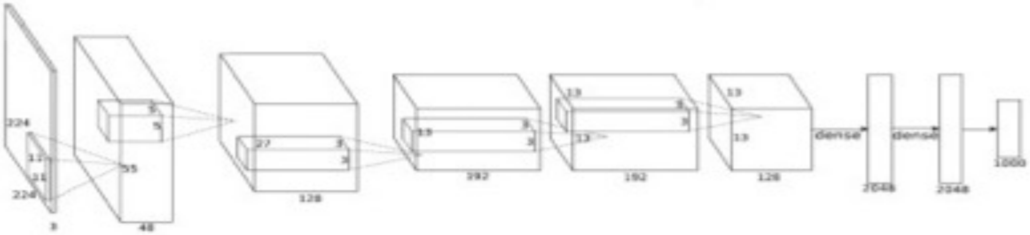
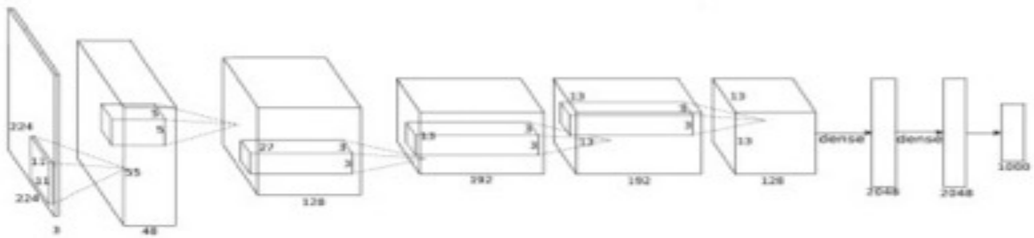


Alex-Net, NIPS 2012

call for

Neural Network

- different categories
- different low-level features



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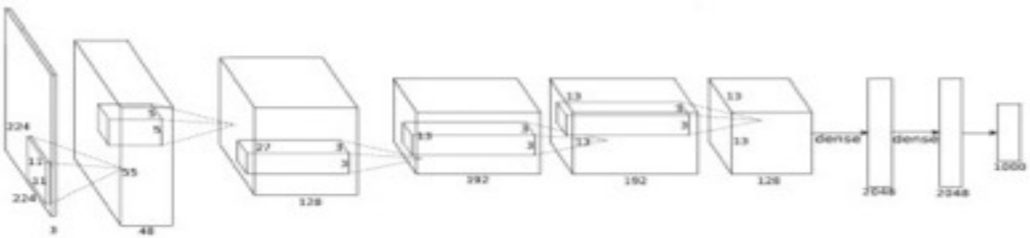
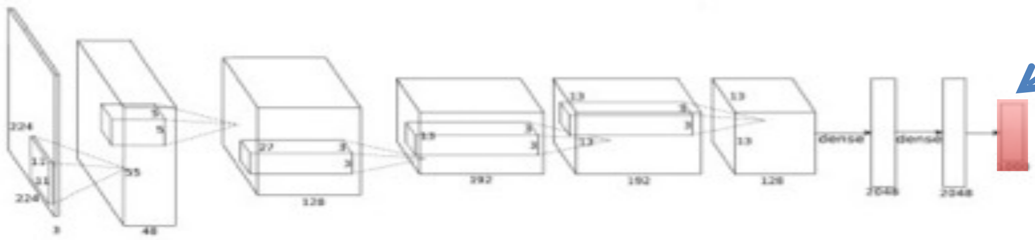


Alex-Net

transfer learning

- different categories
- different low-level features

adapt output categories



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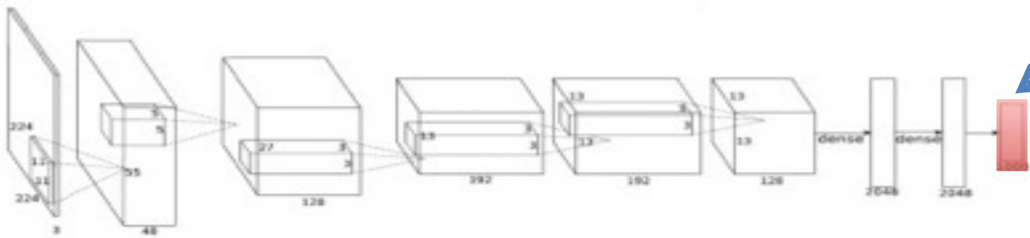

Alex-Net

- ○ Learning and transferring mid-level image representations

  M Oquab et al, 2014

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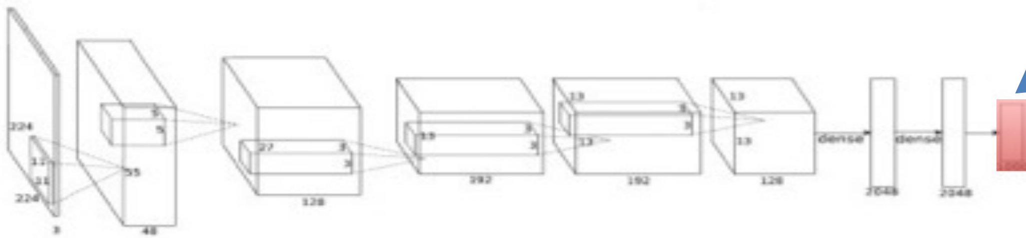

Alex-Net

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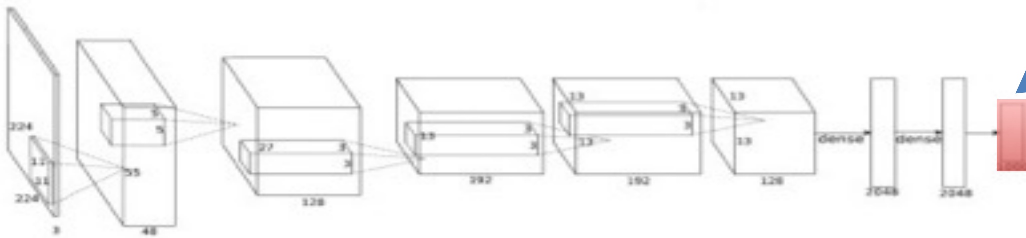

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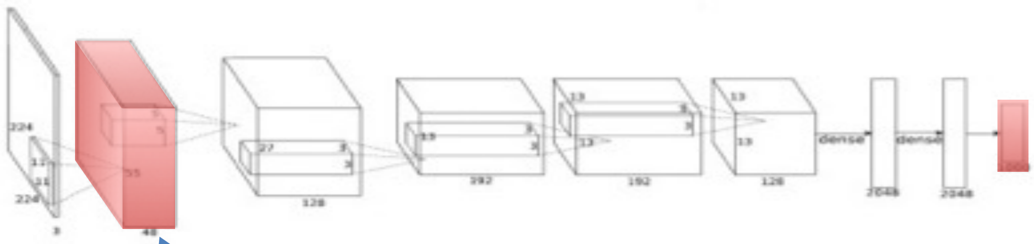
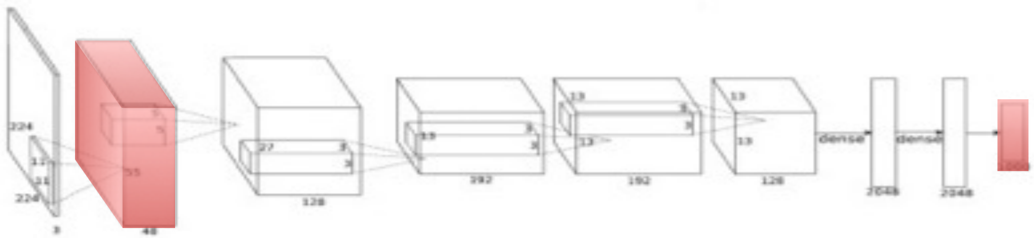


Alex-Net

adapt low-level features

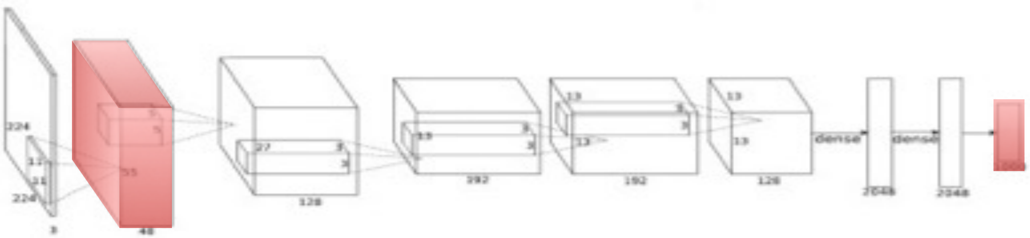
transfer learning



Alex-Net

transfer learning

- 100 samples / category



Alex-Net

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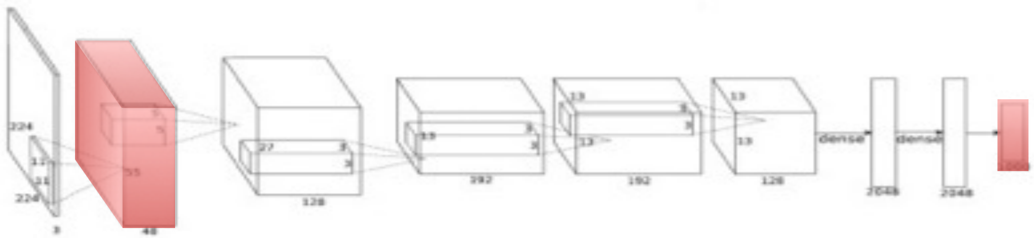

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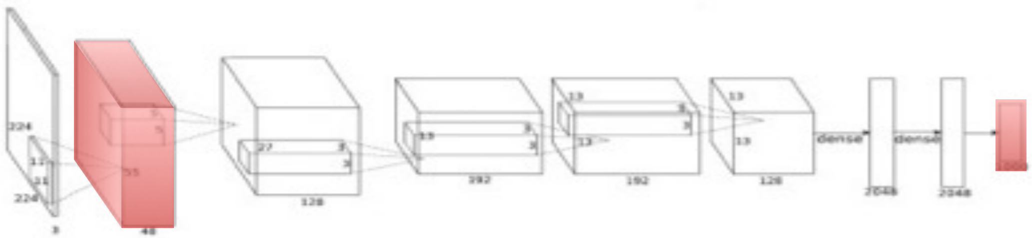

Alex-Net

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transfer learning

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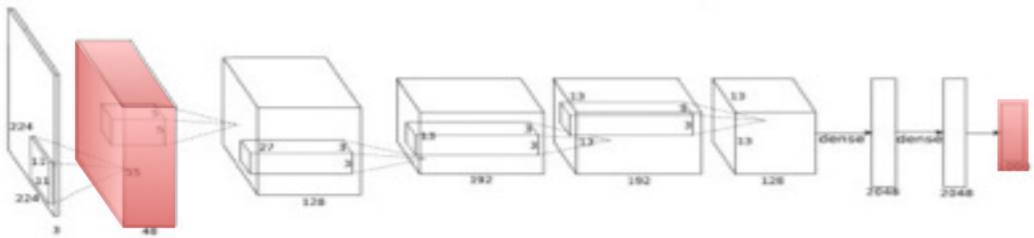
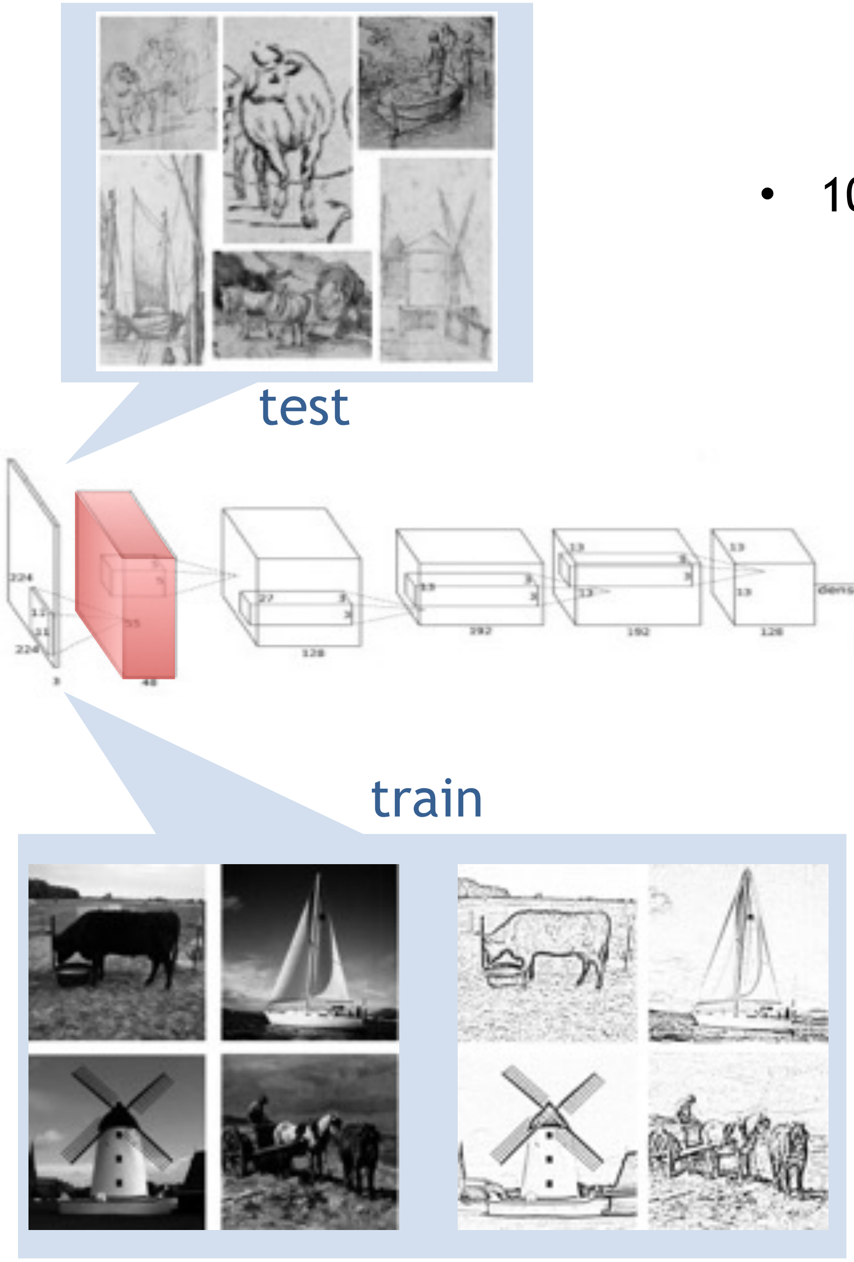


Alex-Net

train

- 1000 samples / category

transfer learning

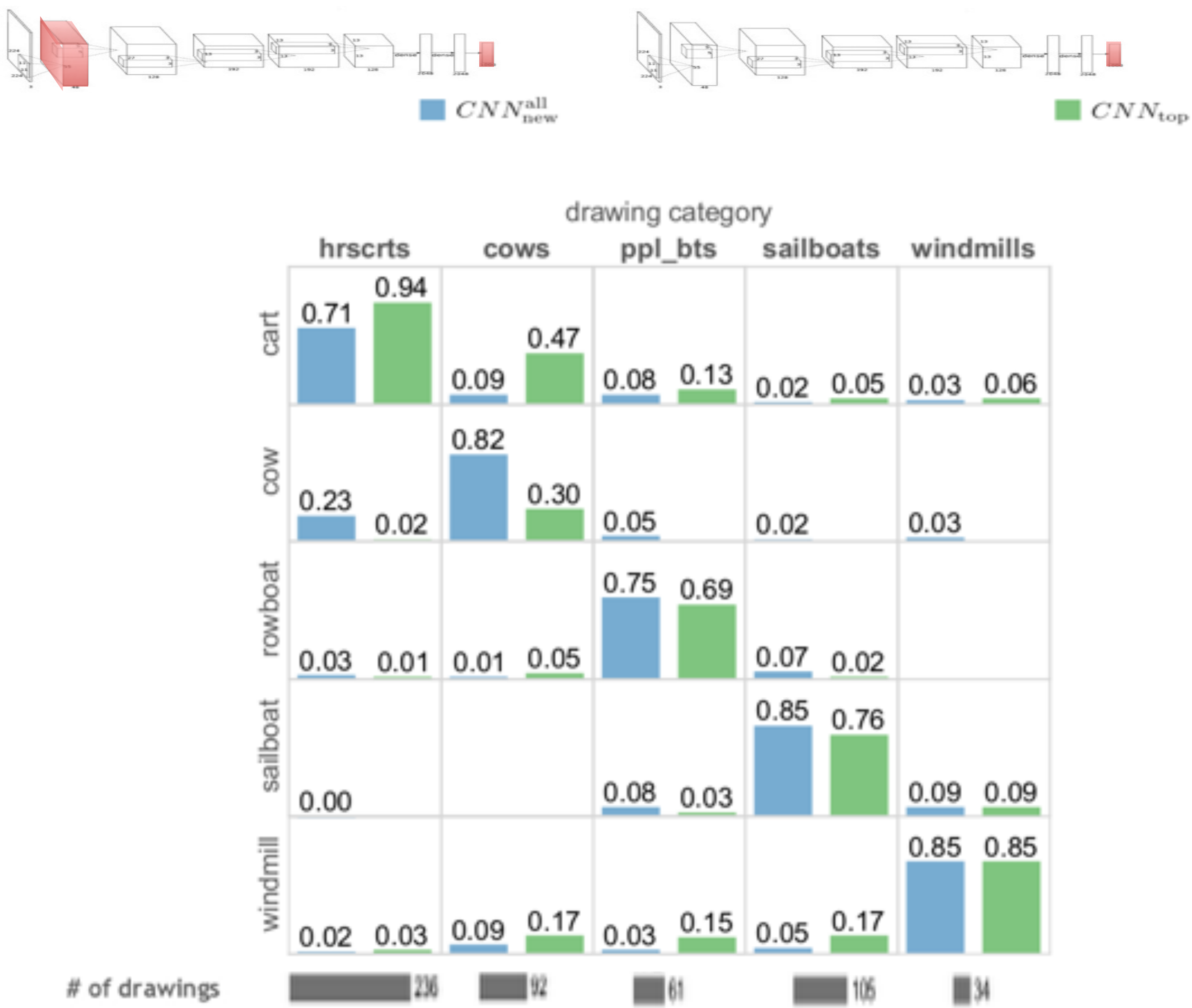


- 100 samples / category

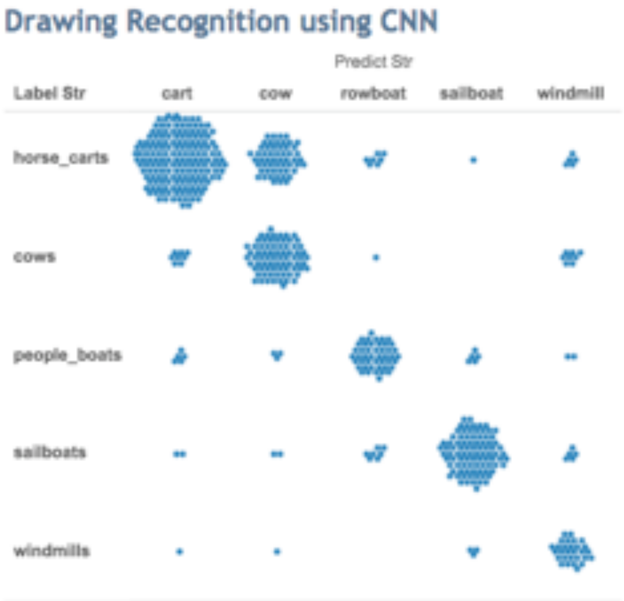
Alex-Net

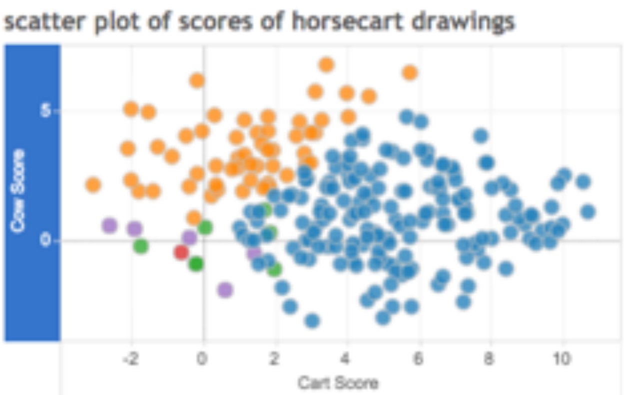
- 1000 samples / category

transfer learning



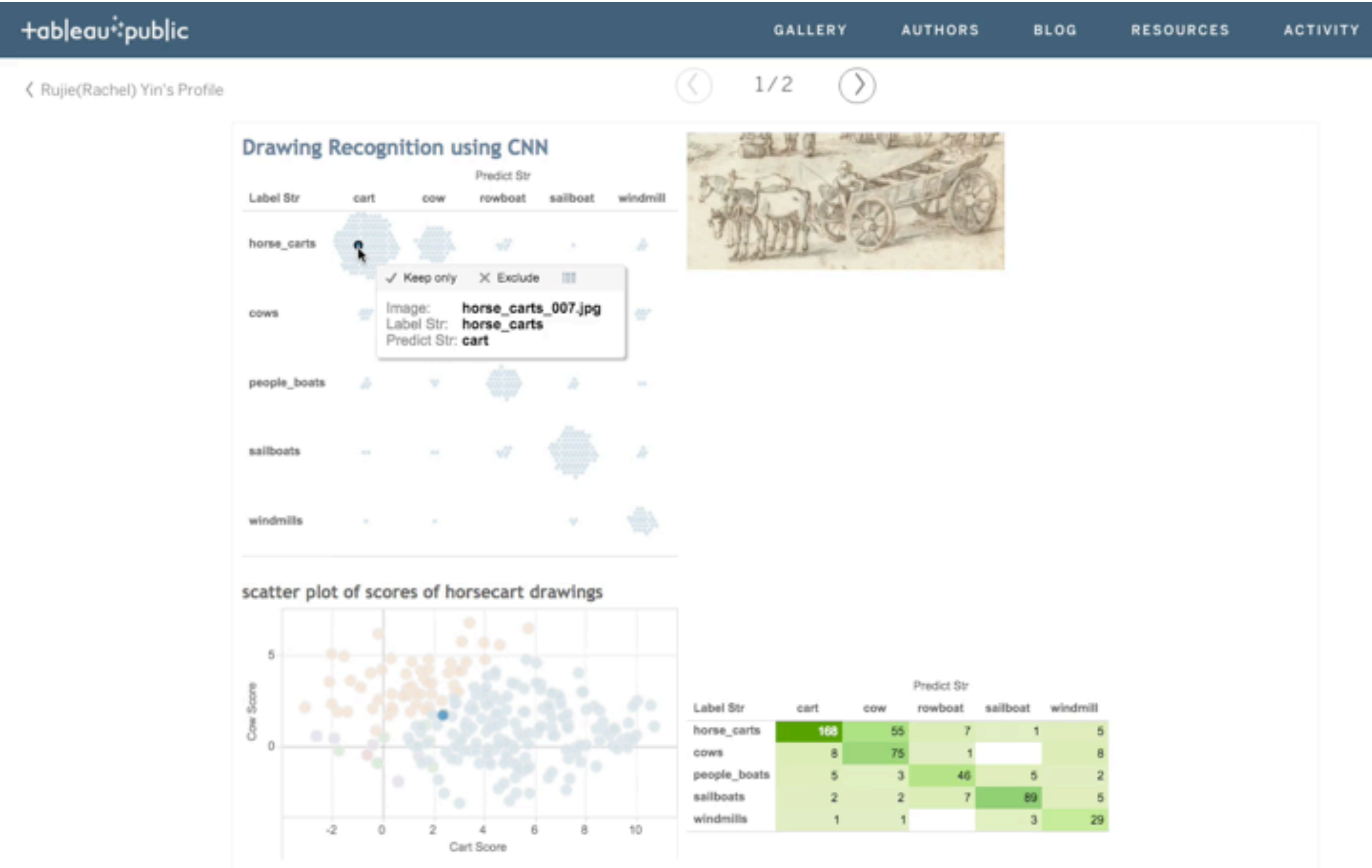
transfer learning





	Predict Str				
Label Str	cart	cow	rowboat	sailboat	windmill
horse_carts	168	55	7	1	5
cows	8	75	1		8
people_boats	5	3	46	5	2
sailboats	2	2	7	89	5
windmills	1	1		3	29

Tableau Vis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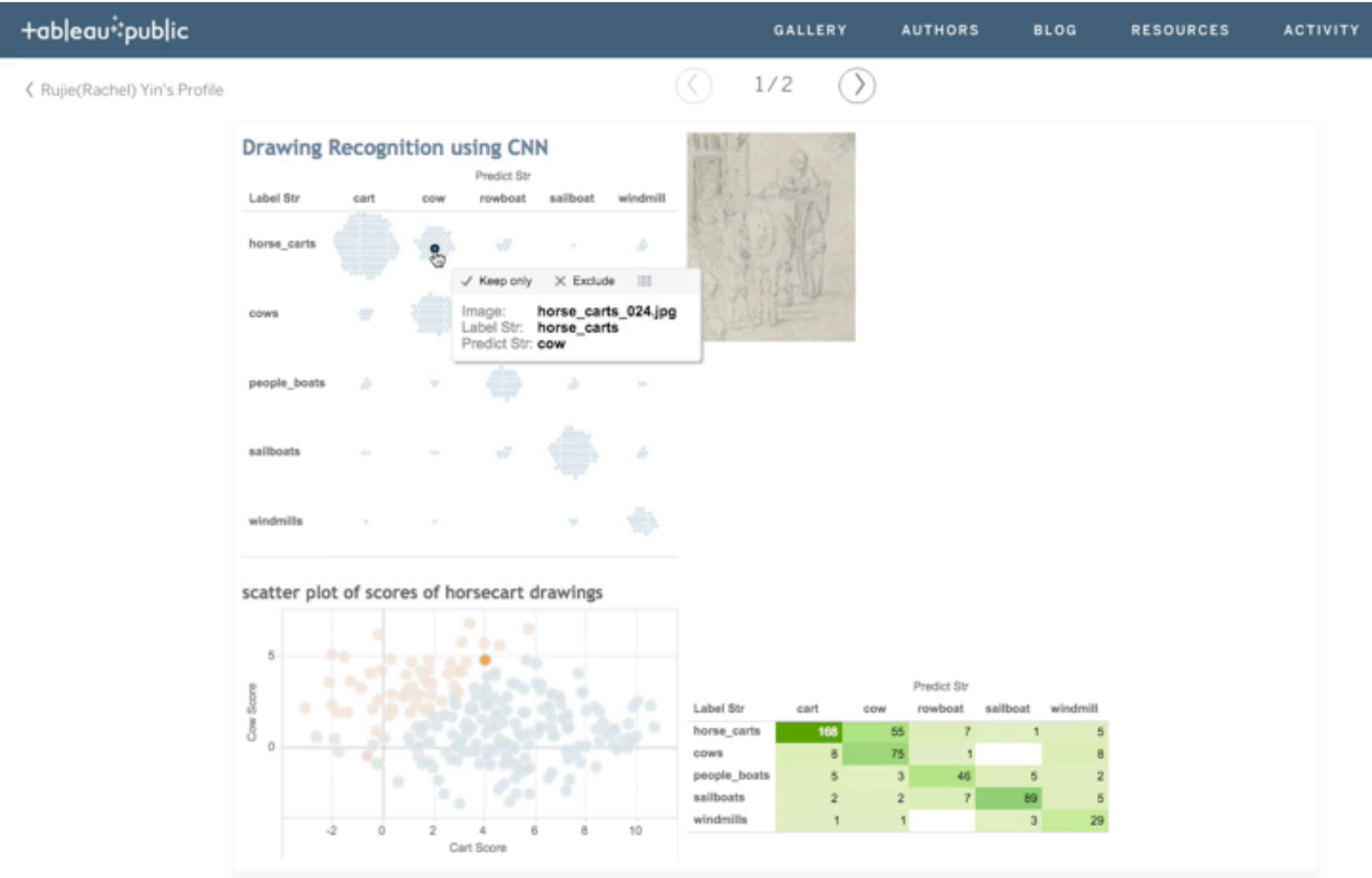
Rujie(Rachel) Yin's Profile
1/2
Drawing Recognition using CNN
Predict Str
Label Str
cart
cow
rowboat
sailboat
windmill
horse_carts
cows
people_boats
sailboats
windmills
Keep only
Exclude
Image: horse_carts_007.jpg
Label Str: horse_carts
Predict Str: cart
scatter plot of scores of horsecart drawings
Cow Score
Cart Score
Predict Str
Label Str cart cow rowboat sailboat windmill
horse_carts 168 55 7 1 5
cows 8 75 1 8
people_boats 5 3 46 5 2
sailboats 2 2 7 89 5
windmills 1 1 3 29

Tableau Vis



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Rujie(Rachel) Yin's Profile
1/2
Drawing Recognition using CNN
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sailboat
windmill
horse_carts
cows
people_boats
sailboats
windmills
Keep only
Exclude
Image: horse_carts_024.jpg
Label Str: horse_carts
Predict Str: cow
scatter plot of scores of horsecart drawings
Cow Score
Cart Score
Predict Str
Label Str cart cow rowboat sailboat windmill
horse_carts 168 55 7 1 5
cows 8 75 1 8
people_boats 5 3 46 5 2
sailboats 2 2 7 89 5
windmills 1 1 3 29

Tableau Vis