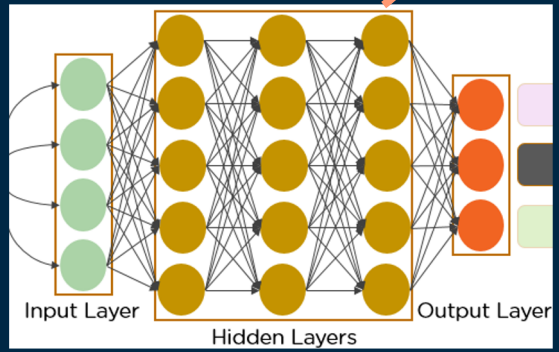
IS Datathon

Team 5

Wang-Han Li
Chung-Hao Lee
Fabienne Yang

HEARST

Goal



Keywords:

- headshots
- portraits
- srs
- steve swartz
- steven r. swartz

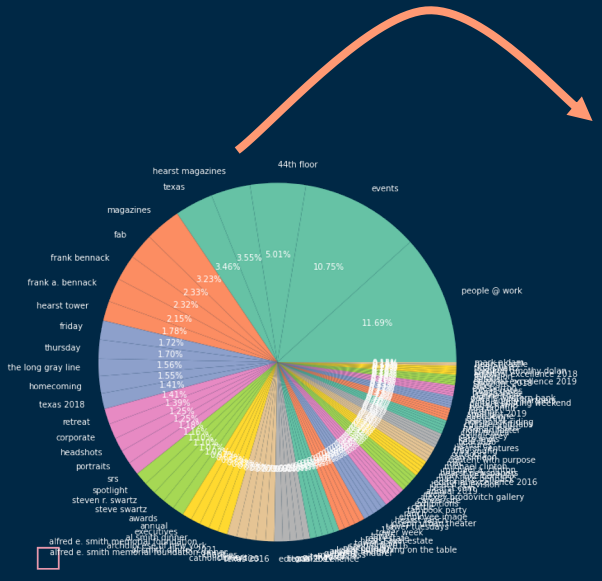
Input

CNN Model

Output

Keyword Exploration

Filter out four digit Year and keyword counts < 93 (1% data points)



Keyword	Ranking	Count
people @ work	1	7,059
events	2	6,493
44th floor	3	3,025
hearst magazines	4	2,143
texas	5	2,090
magazines	6	1,950
fab	7	1,408
frank bennack	8	1,401
frank a. bennack	9	1,301
hearst tower	10	1,076
⋮		
editorial excelle..	103	113
details	104	112
television	105	108
editorial excelle..	106	102
scouts	107	101
cardinal timothy..	108	95
tina swartz	108	95
hearst castle	110	94
scenery	110	94
mark aldam	112	93

0 1000 2000 3000 4000 5000 6000 7000

Count

1388 keywords

112 keywords

Data Processing

Step1: Split keywords

Portraits,Headshots,2017,Steven R. Swartz,revised 2022

Portraits	Headshots	2017	Steven R. Swartz	revised 2022

Step2: Convert keywords to lowercase

Portraits	Headshots	2017	Steven R. Swartz	revised 2022

portraits	headshots	2017	steven r. swartz	revised 2022

Step3: Filter out year and low frequency keywords

portraits	headshots	~~2017~~	steven r. swartz	~~revised 2022~~

portraits	headshots	steven r. swartz

Step4: Connect image with keywords

portraits, headshots, steven r. swartz

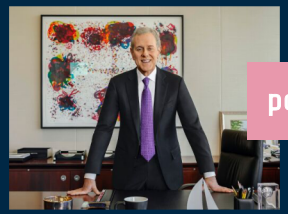
Build Image Classification Model

Step5: Split dataset

80 % Training set

20% Test set

Step6: Train CNN model

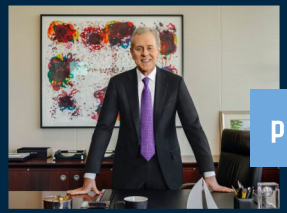


portraits, headshots, steven r. swartz

CNN Model

Step7: Prediction output (image tagging)

CNN Model



portraits, headshots, steven r. swartz

Step8: Compute accuracy

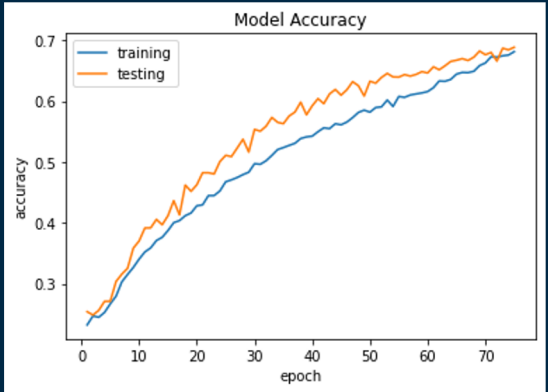
prediction: portraits, headshots, steven r. swartz

match!

correct answer: portraits, headshots, steven r. swartz

Model Performances

Best model has highest testing accuracy: 68.86%



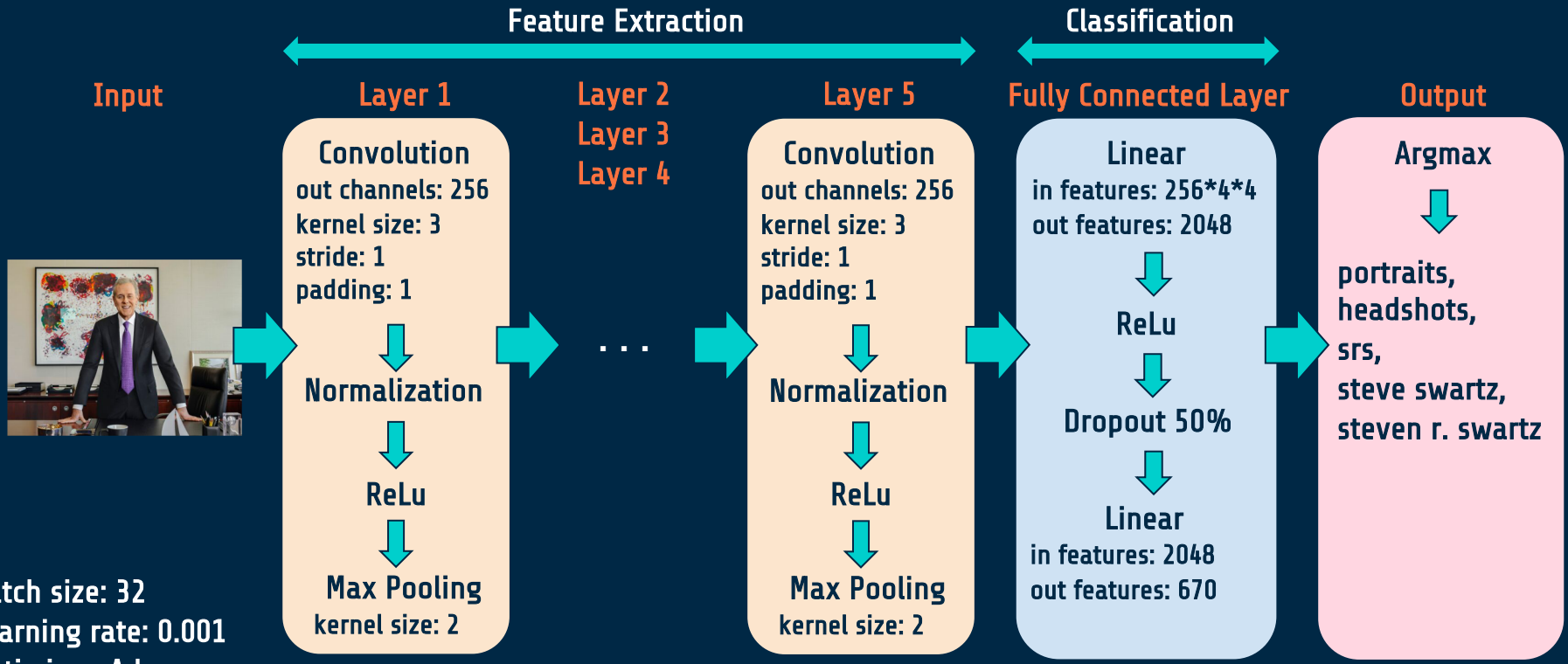
	Dropout	Augmentation	Keywords filtering	Accuracy
Best model	●	●	●	68.86%
Model A	○	○	○	65.83%
Model B	●	○	●	64.69%
Model C	○	●	○	51.31%

Output examples:

portraits, headshots, steven r. swartz

people @ work, the long gray line, events, homecoming, 44th floor

Structure of Our Best CNN Model



Batch size: 32
Learning rate: 0.001
Optimizer: Adam
Epoch: 75

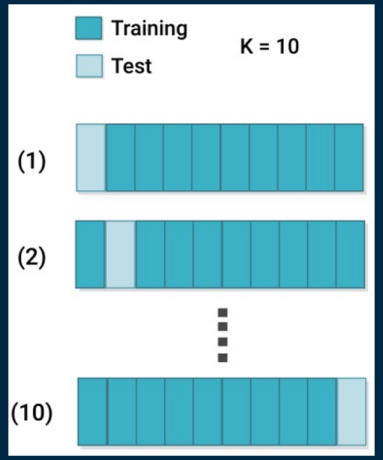
Next Step: Improve Model Accuracy

- Add more convolutional layers

Number of Layers	Testing Accuracy
3	49.38 %
4	63.28 %
5	68.86 %

- Transfer learning

- Use k-Fold cross-validation



Summary

1. Successfully created an image classifier help editors better search and describe media at scale.

1. Change hyperparameters can enhance the model performance.
    a. **Dropout** increased accuracy by **3.03 %**
    b. **Augmentation** increased the accuracy by **4.17 %**
    c. **Keyword filtering** increased the accuracy by **17.55 %**
    d. **5 layers model** increased the accuracy by **19.48 %** (compared to 3 layers model)

1. Trial and error method and some practices to find the best model.

Thank You

https://github.com/lch99310
https://www.linkedin.com/in/lch99310
chunghao.lee@marylandsmith.umd.edu

https://github.com/whl0217
https://www.linkedin.com/in/wang-han-li-5b789913b
wang-han.li@marylandsmith.umd.edu

https://github.com/FabienneYang
https://www.linkedin.com/in/fabienne-yang/
fabienne.yang@marylandsmith.umd.edu