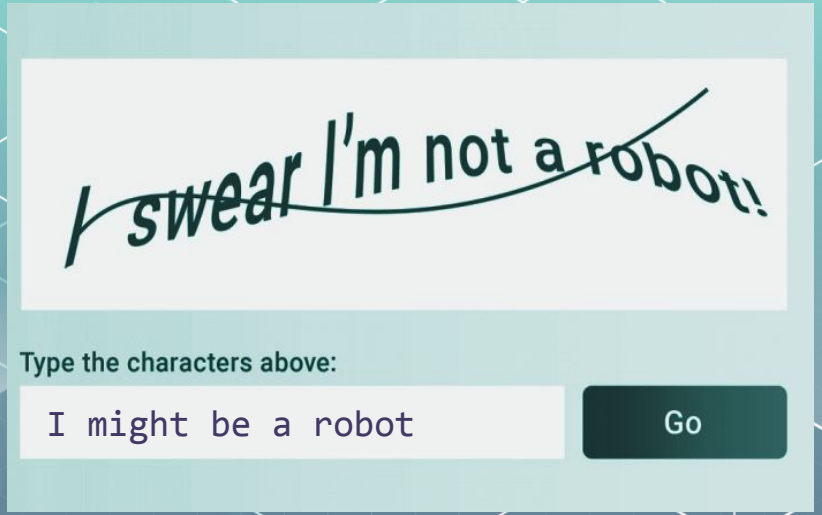


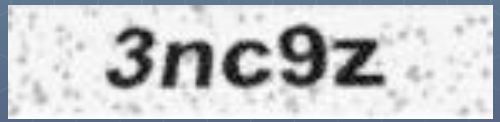
Breaking CAPTCHA

By,
Ray Zhao

Background

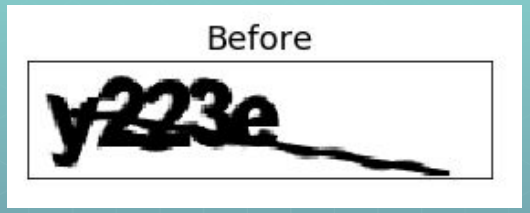
What is CAPTCHA?

- CAPTCHA is an acronym for Completely Automated Public Turing test to tell Computers and Humans Apart.



- Can we teach a machine to read and predict the text-based CAPTCHA?

Captcha Data



- This version of CAPTCHA consists on 5 characters of either numbers or lowercase alphabet letters.
- Placement of characters are the same throughout the data

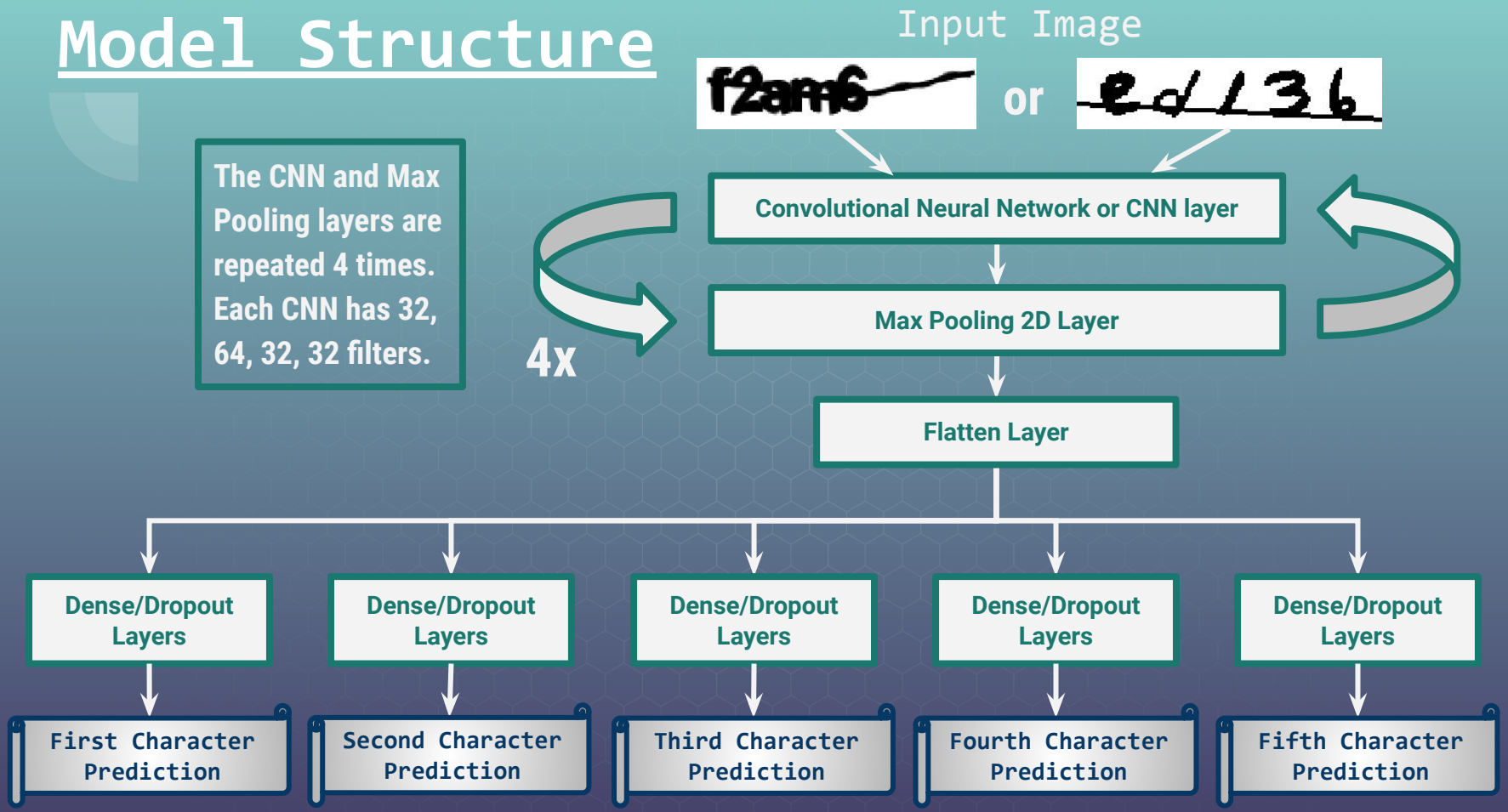
- Rotate and shift CAPTCHAs
- Prevents model from memorizing character location

Hand Drawn CAPTCHA

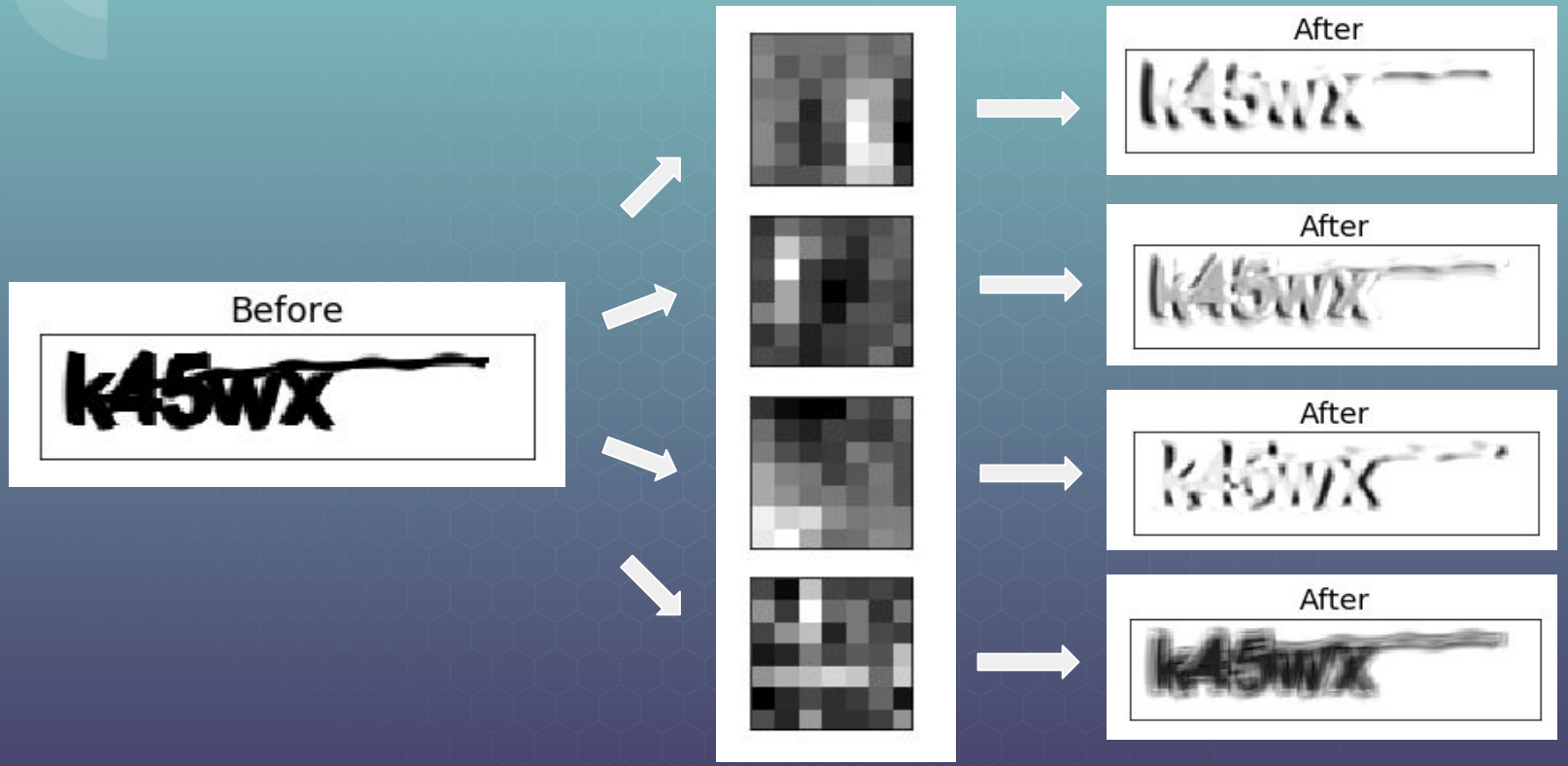
- The EMNIST dataset is an extension of the MNIST digits dataset that has alphabetical letters.

- Hand drawn CAPTCHAs were created by concatenating random individual handwritten numbers and letters.
- Then a line was added at a random angle

Model Structure



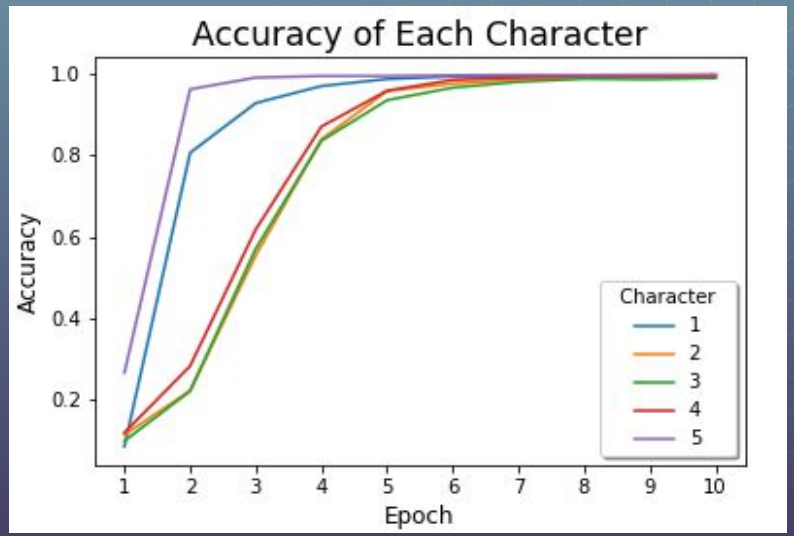
What’s happening in the CNN layers?



Model Results

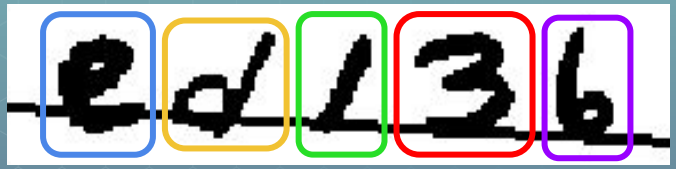
CAPTCHA Data

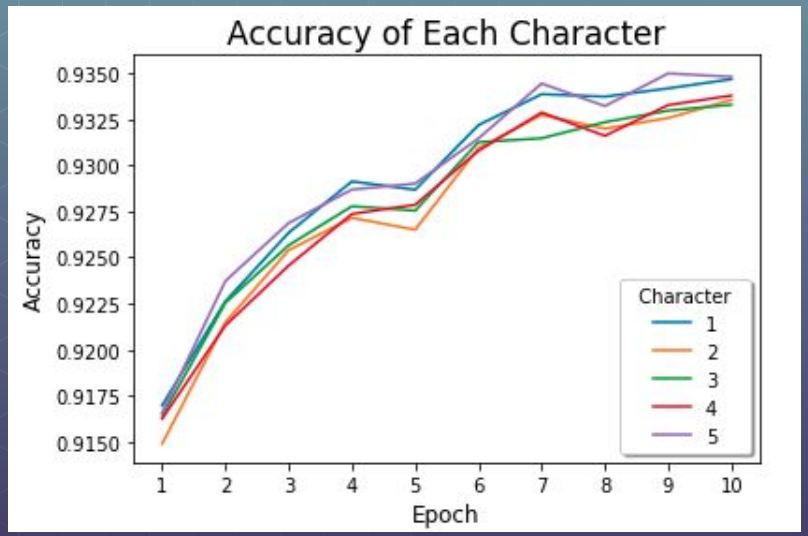
99.8%, 99.5%, 98.9%, 99.6%, 99.8%



‘Handwritten’ CAPTCHA Data

93.5%, 93.4%, 93.3%, 93.4%, 93.5%

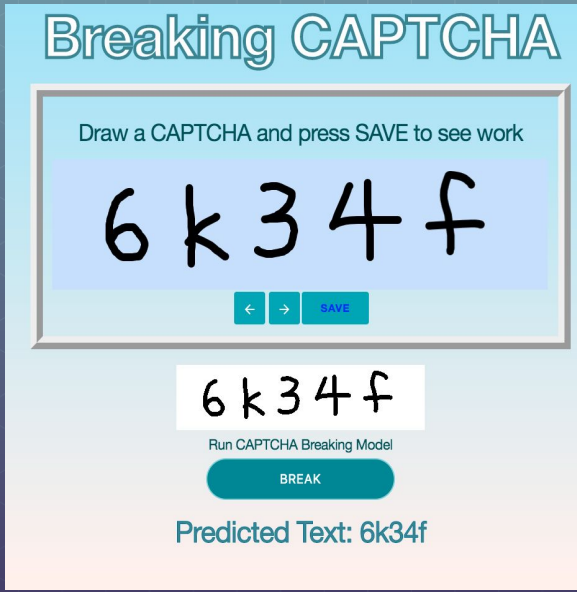


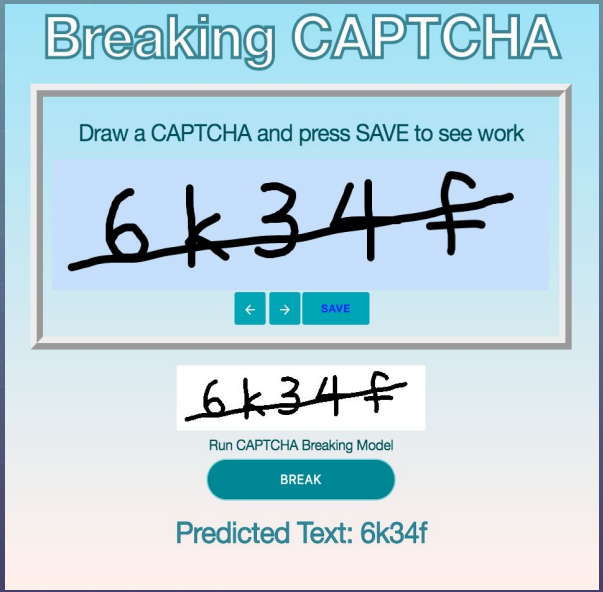


Dash Web App

- Hand draw a captcha for the model to predict
- Press Save to see what you've drawn so far.

- Once you're satisfied, push BREAK to have the model predict.





Conclusion

- Building models to predict CAPTCHA is dependent on the data it is trained on.
- This leads to websites creating new versions of CAPTCHAs to combat people training models to predict CAPTCHAs.
- Link to Web App

Tech Stack

Dash
by plotly

TensorFlow

OpenCV