

# Mobile Based Equation Solver

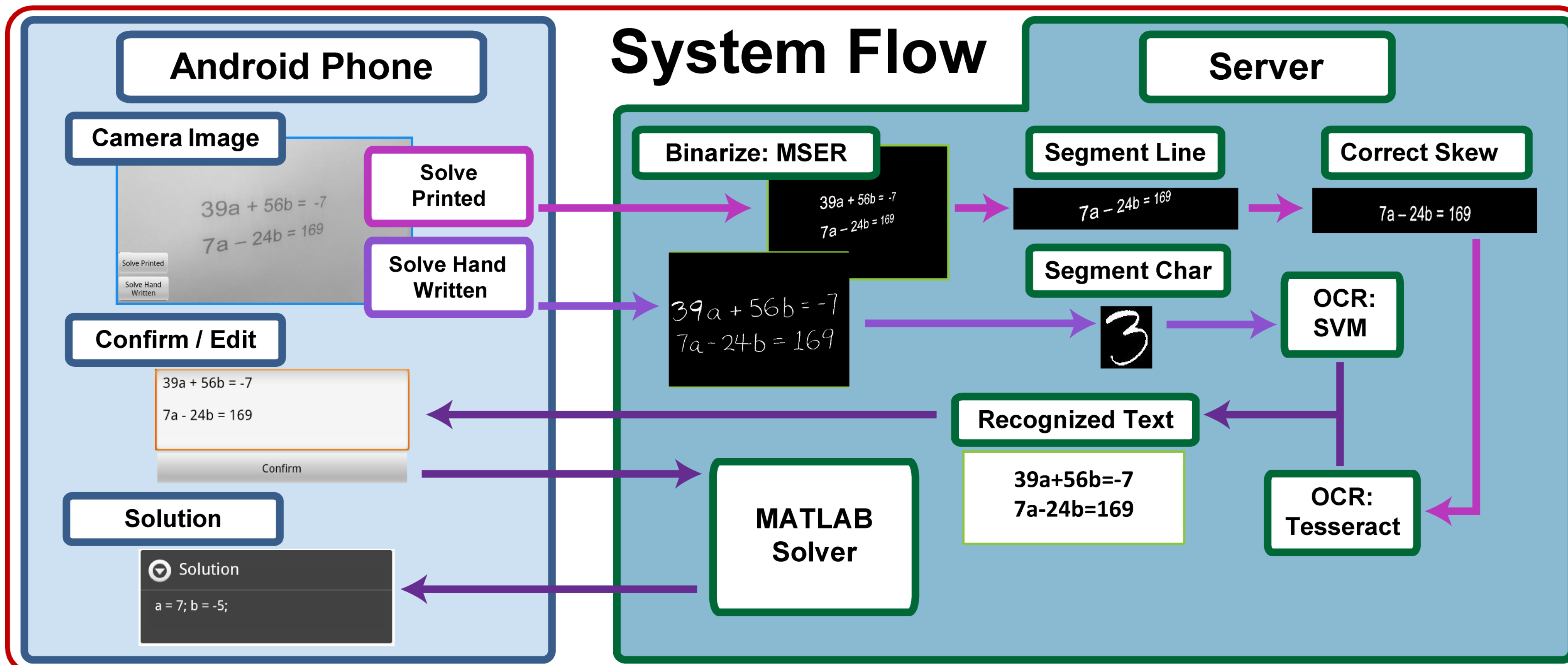
Aman Sikka

Department of Electrical Engineering, Stanford University

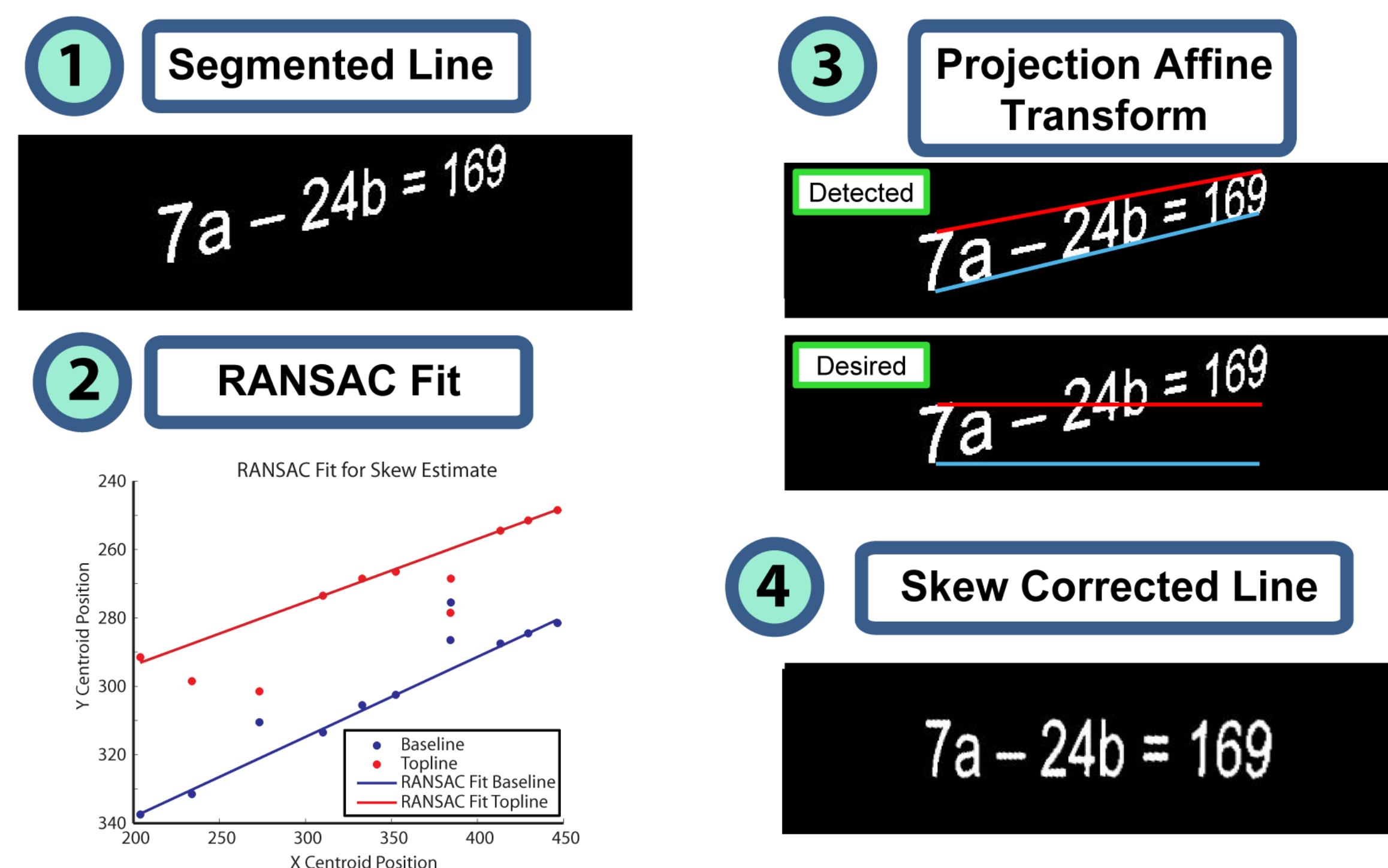
Benny Wu

Department of Applied Physics, Stanford University

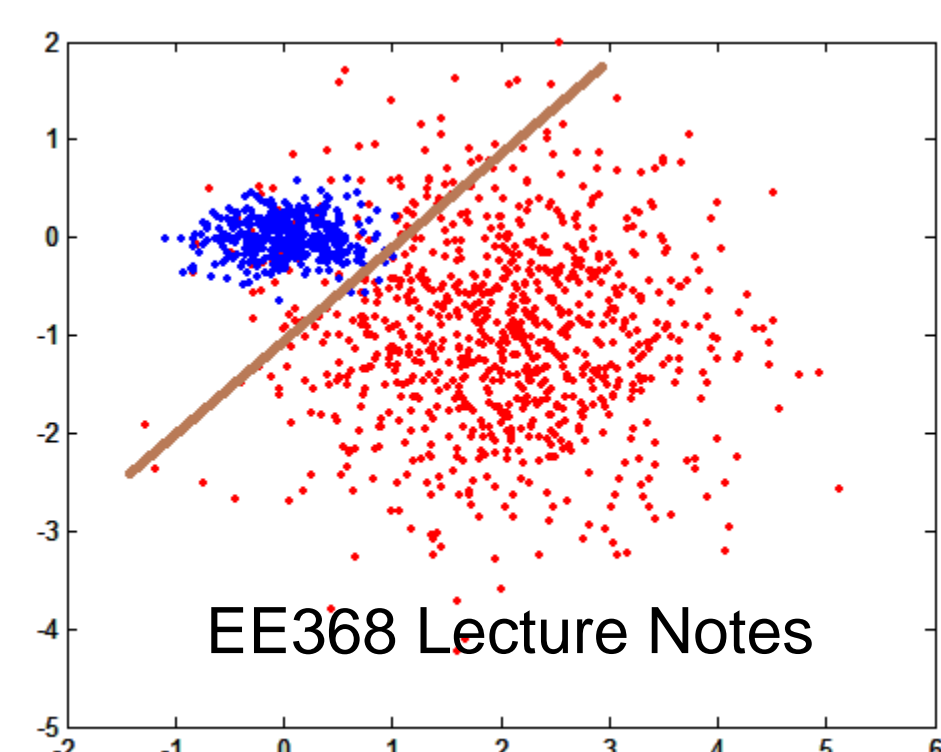
**Motivation:** Solve hand written and printed equations without needing a calculator.



## Skew Correction: Affine Transforms



## Support Vector Machine (SVM)

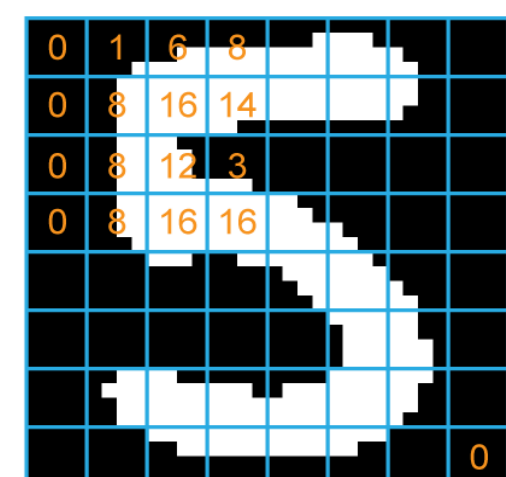


- Similar to multidimensional MAP detector.
- Created training database using our own hand writing.
- Used libSVM[1] to calculate prediction model.

Segmented Char



Binary 32x32



64-Vector

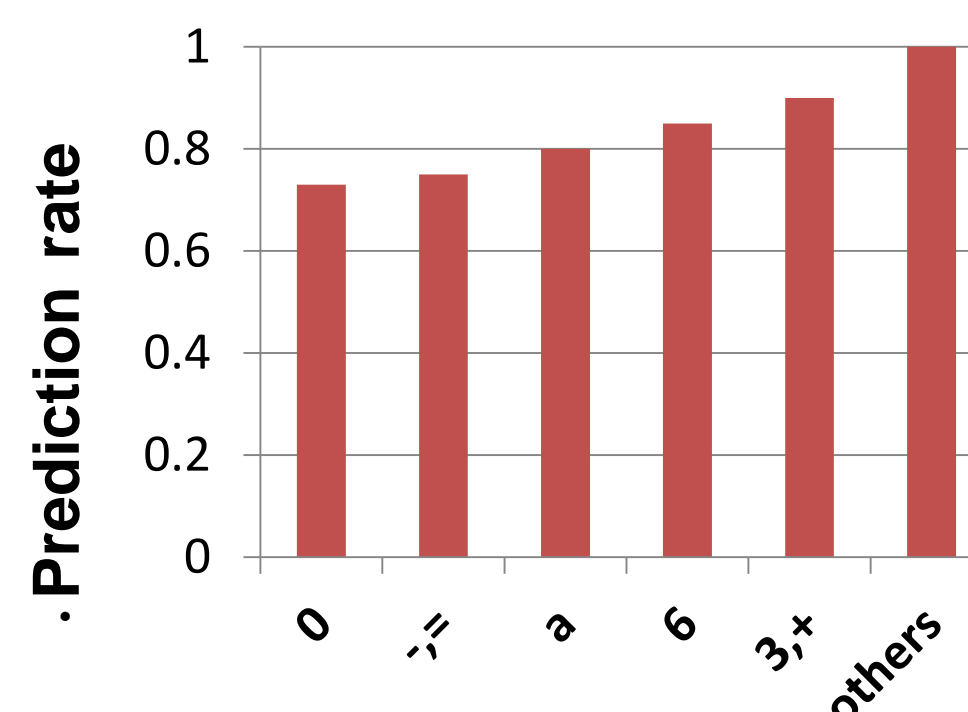
Divide 32x32 image into 4x4 regions.  
Convert into 64-vector  
1:0 2:1 3:6 4:8...64:0

Model Prediction

• Compare to training model.  
• Output most likely candidate.

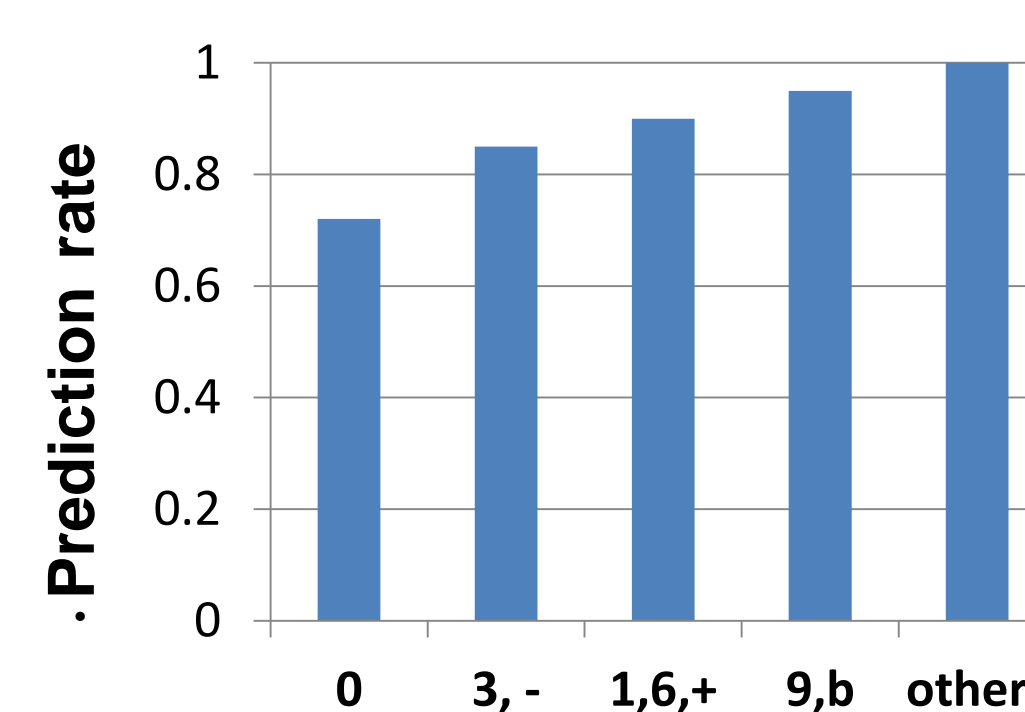
## Experimental Results

### Printed Text Recognition



- Tesseract performed very poorly for hand written text. Decided to use machine learning algorithm (SVM).

### Hand Writing Recognition



- Cannot easily correct for perspective distortion in hand written text with RANSAC.
- SVM will likely perform better with larger database.

## Future Work

- Increase SVM training dataset to make classification more robust.
- Increase vocabulary of SVM.
- Input correctly identified text into training database on-the-fly.

## References and Acknowledgements

- Sam Tsai, our mentor, for providing guidance and for being extremely prompt in replying to our questions..
- [1] Chih-Chung Chang and Chih-Jen Lin, LIBSVM, National Taiwan University