Bengali Number Recognition by Deep Learning

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ABOUT OUR TOPIC

COMPLETE SUPERVISED LEARNING

CLASSIFICATION

IMAGE PROCESSING

MACHINE LEARNING

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DATASET

- Total images of 1547.

- Started from 0 to 9.

- About 80% images are taken for Training Set.

- 20% images are taken for Test set.
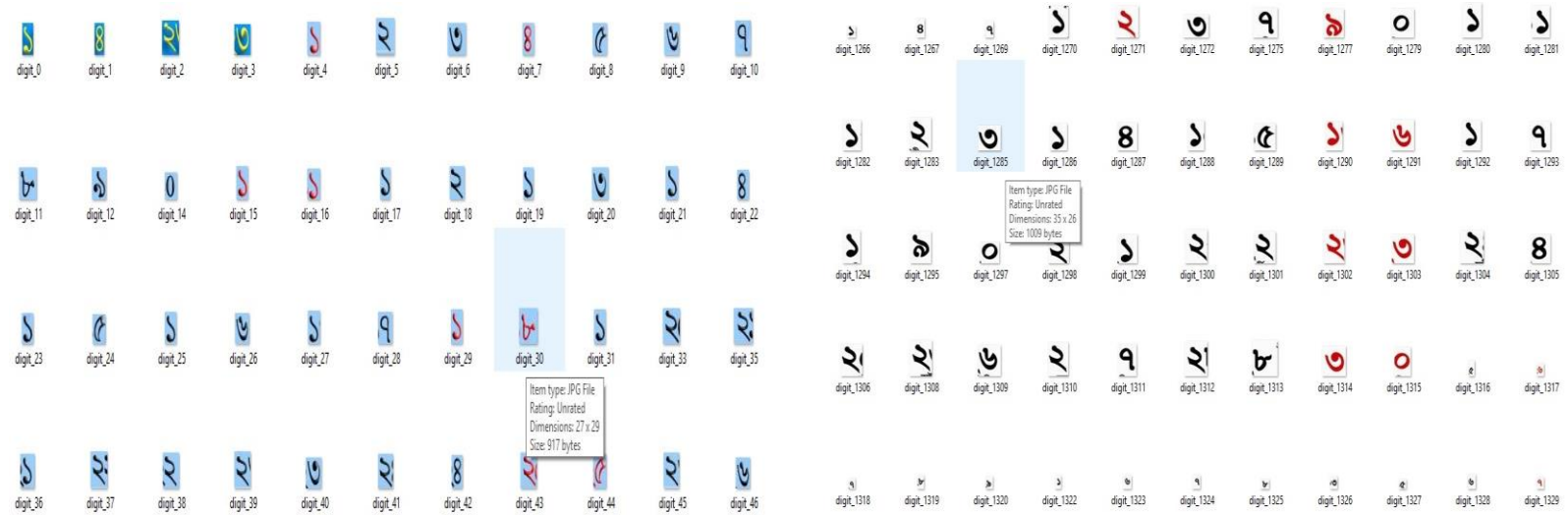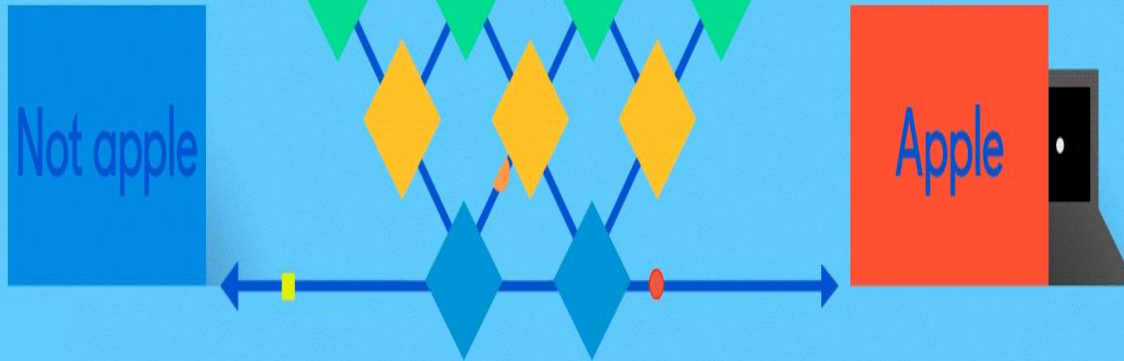

Figure 1: Training and Test set.

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ABOUT PROJECT

> Why Deep Learning?

> A system for image recognition.

> Convolutional Neural Network.

- ➤ Convolution.
- ➤ Max Pooling.
- ➤ Flattening.
- ➤ Fully Connected Layer.

> We used:
- ➤ Theano
- ➤ Tensorflow
- ➤ Keras
- ➤ OpenCV

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WORK PROCESS
Convolutional Neural Network

Convolution •Create Vector Features.

Max Pooling •Take the Most Prominent Features from Convolution.

Flattening •Create 1D Array of Dominant Features.

Fully Connected Layer •Use ANN Technique to Predict the Object.
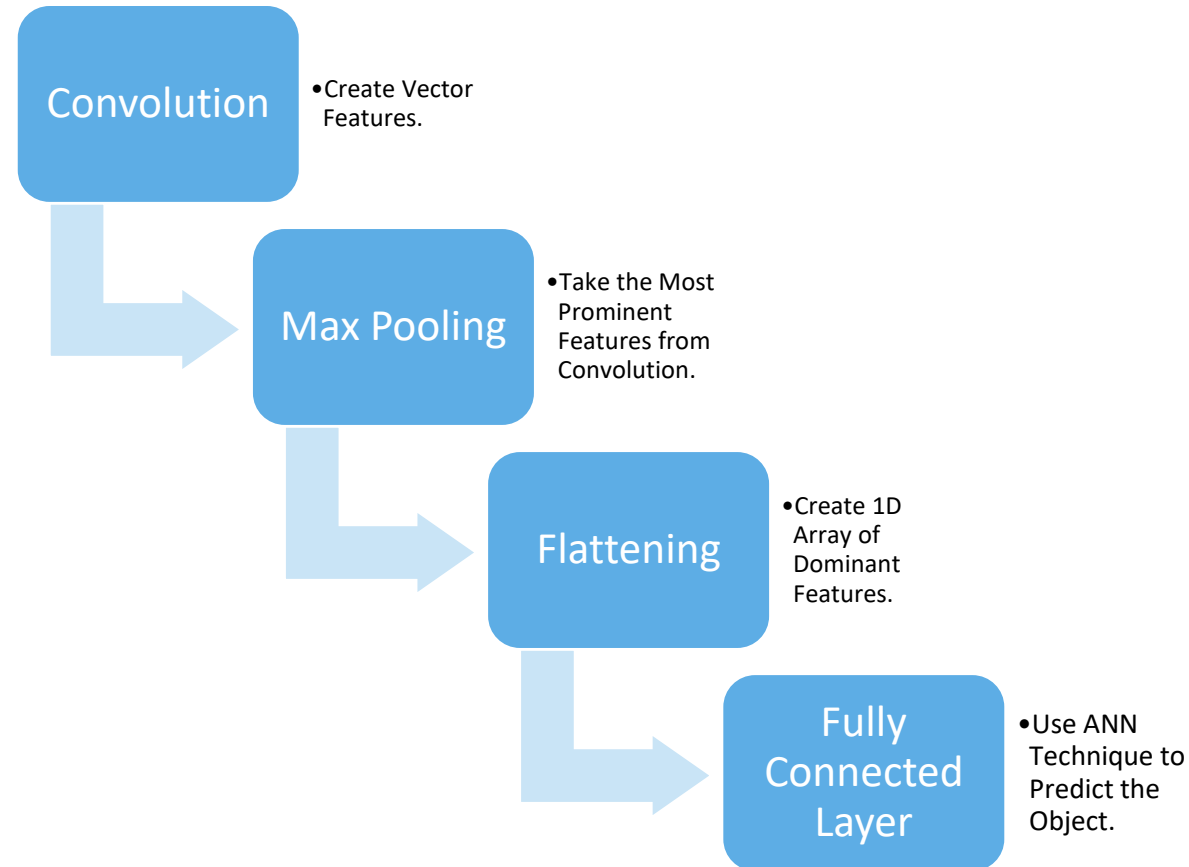
Figure 2: Steps of Convolutional Neural Network

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WORK PROCESS (CONTINUE)

Step 1: Convolution
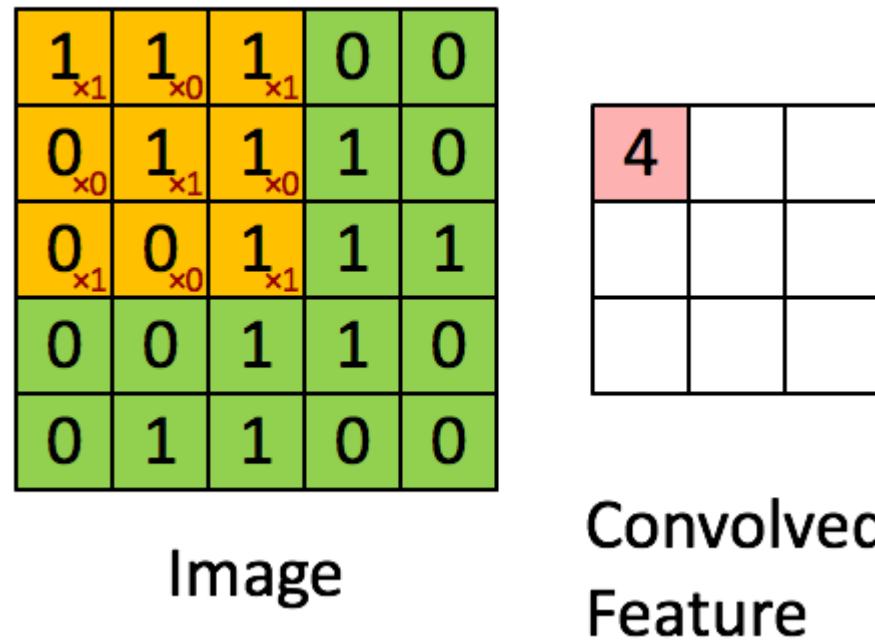
Figure 3: Animated Figure of Convolution Procedure.

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WORK PROCESS (CONTINUE)

Step 2: Max Pooling
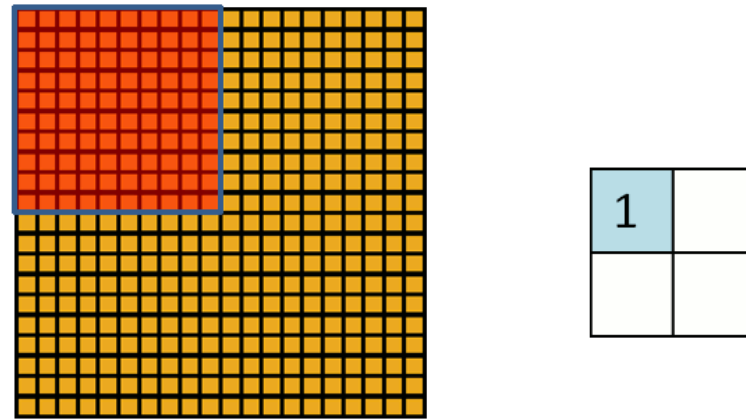
Convolved feature

Pooled feature

Figure 4: Animated Figure of Max Pooling Procedure.
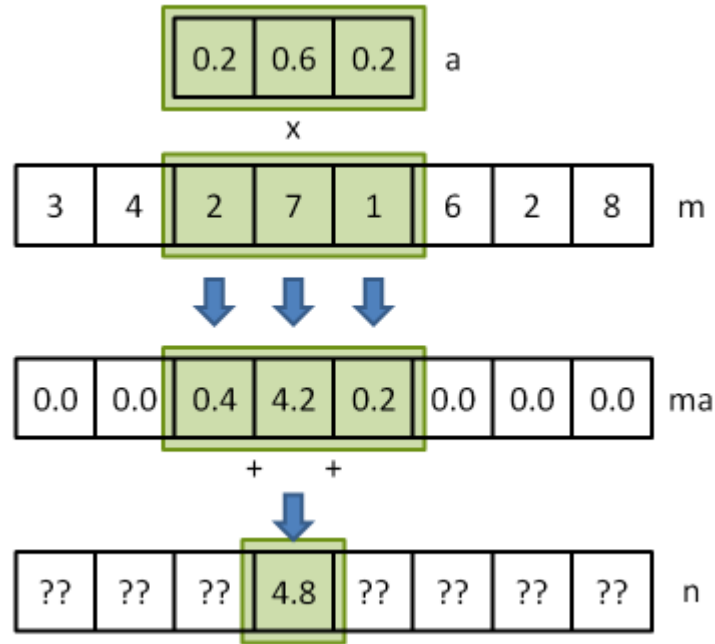
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WORK PROCESS (CONTINUE)

Step 3: Flattening

Figure 5: Figure of Flattening Procedure.

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WORK PROCESS (CONTINUE)

Step 4: Fully Connected Layer
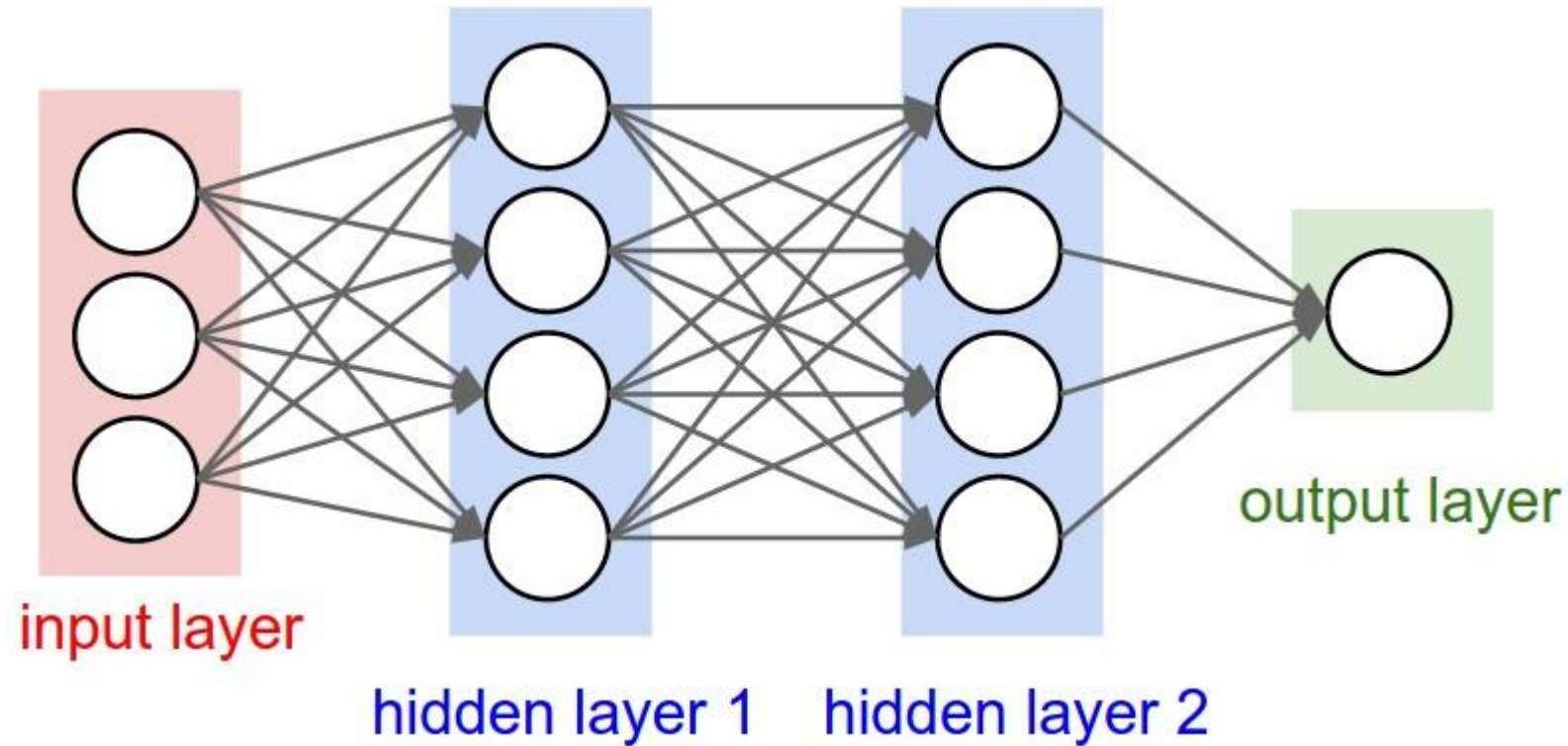
Figure 6: Figure of Fully Connected Layer.

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PROPOSED MODEL

1. Detect Canny Age of every Image in the Training Set

2. Training CNN model as per CNN convention.

3. 80% dataset for Training set and 20% dataset for Test set.

4. Creating CNN Classifier Model.

5. Input unique image to recognize the digit.
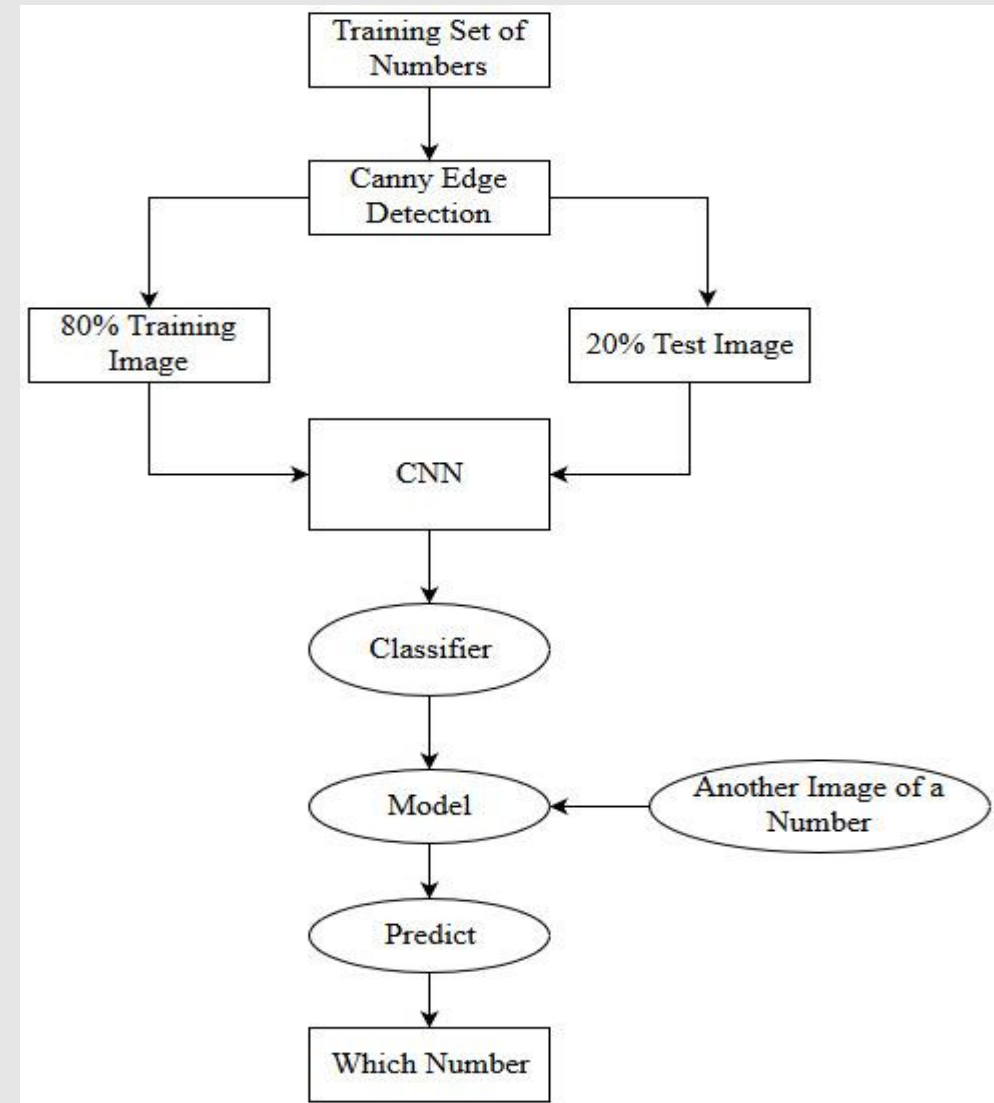
6. Predict the as output.

Figure 7: Proposed Model of Number Recognition.

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RESULT

Model Accuracy

➢ Has provided 84% accuracy.

➢ Formula of total accuracy-

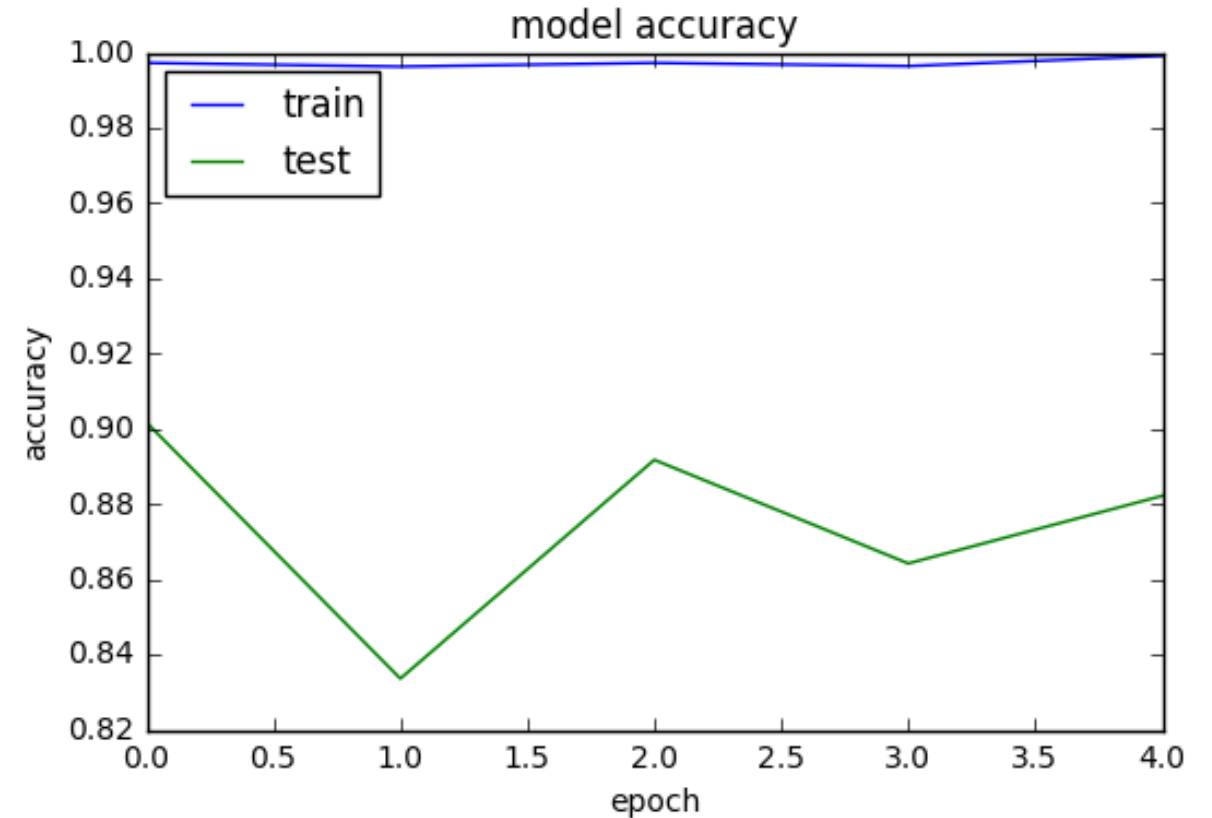$$Accuracy = \frac{TotalRecognized}{TotalInput}$$

Figure 8: Graph of Model's Accuracy.

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RESULT(CONTINUE)

Model Accuracy

➢ Has given 80% or more accuracy for

each test set after implementing CNN

model with Canny Edge Detection.

➢ Providing 83% exactness of our model

work by averaging all the accuracy.

Round	Number of Image	Detection		Accuracy of True Detection	Average Accuracy
		True	False		
1	20	16	4	80%	
2	35	30	5	85%	83%
3	50	42	8	84%	

Table 1: Accuracy of True Detection.

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CONCLUSION

1. Publication target:
   Yes, in future

2. A better knowledge about :
   Image processing and machine learning

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REFERENCES

1. Where did you get the idea (journal, conference, website)
2. Dataset:
 https://www.kaggle.com/debdoot/bdrw/data
3. Basic code:
https://www.udemy.com/machinelearning/learn/v4/content
4.Tutorial we are following :
Machine Learning A-Z™: Hands-On Python & R In Data Science

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Any Question

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