Malayalam Text Recognition System

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What is it ?

Optical character recognition (also optical character reader, OCR) is the mechanical or electronic conversion of images of typed, handwritten or printed text into machine-encoded text, whether from a scanned document, a photo of a document, a scene-photo (for example the text on signs and billboards in a landscape photo) or from subtitle text superimposed on an image (for example from a television broadcast)

What We Do?

We plan to develop an OCR system that reads printed or written Malayalam characters from images to text in an editable document form.

Why We Do?

Currently many languages have an OCR dedicated to it, but we are yet to have an official OCR application for Malayalam.

Existing Technology

Lekha OCR by Space Kerala

- Uses Hu Moments
- Uses SVM classifier
- Accuracy: 85 - 90 %

How We Do?

This is the pipeline of what we plan to do as of now.

- Black Magic

How We Do?

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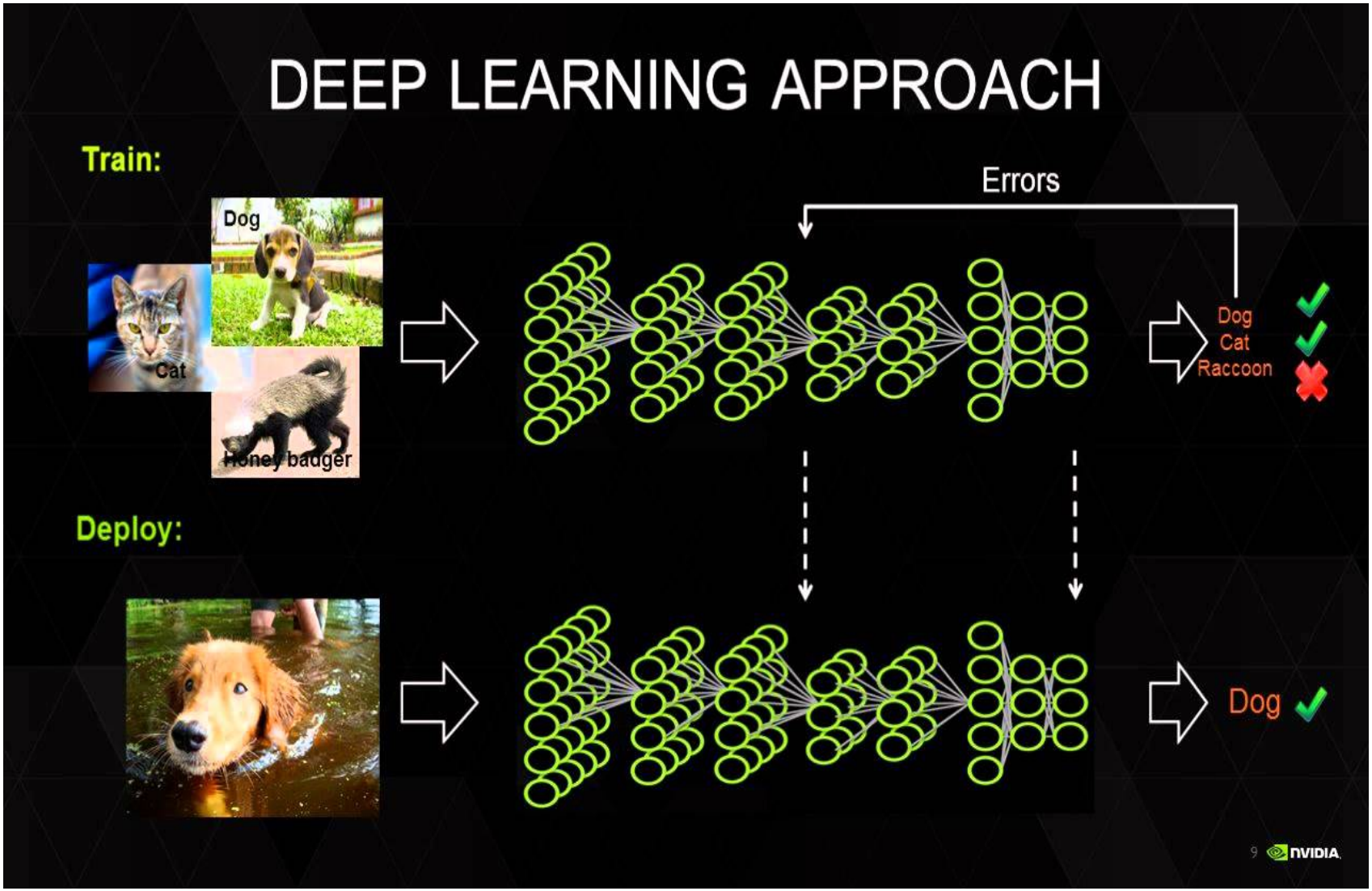
- ~~Black Magic~~
- Deep Learning !!!

Why Deep Learning ?

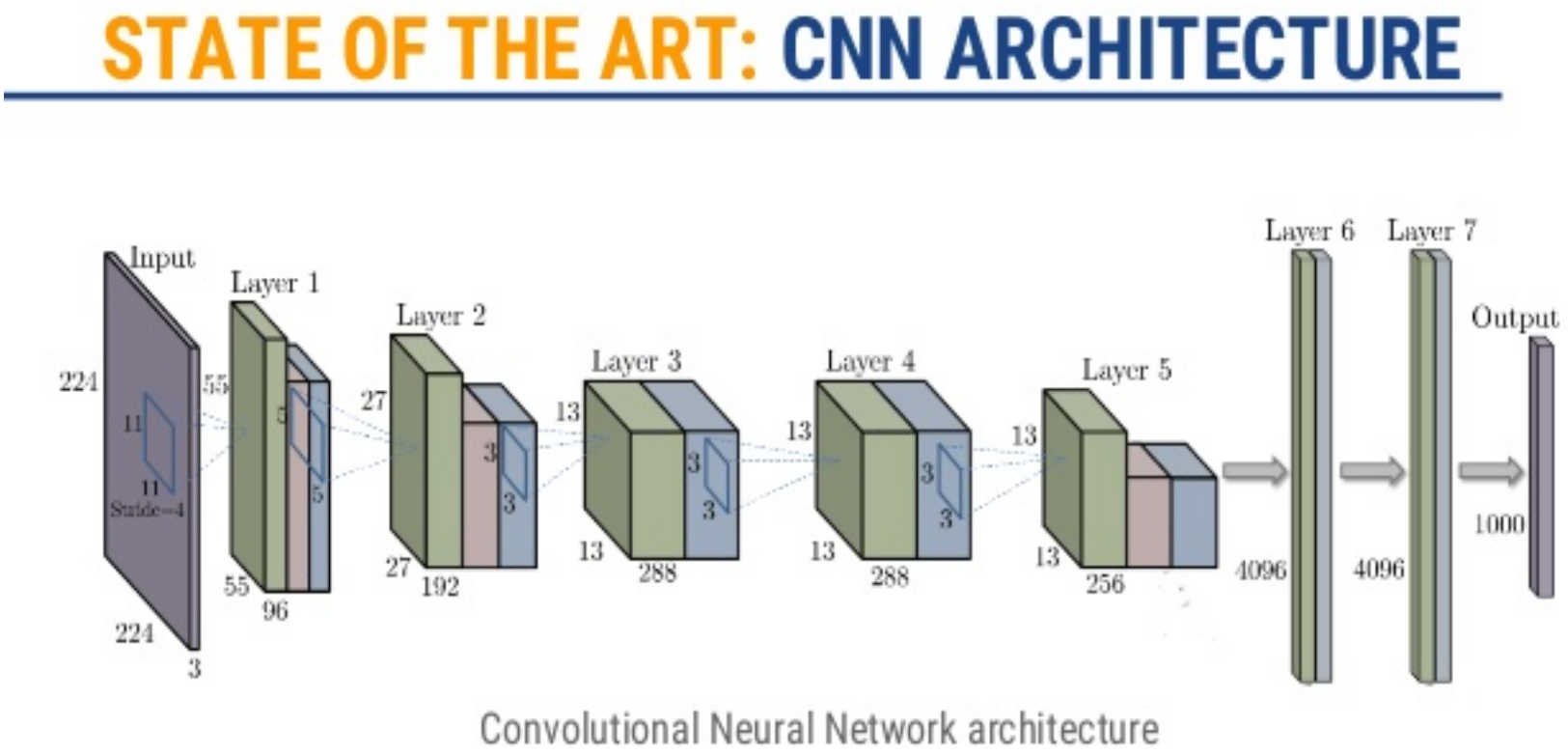
- Deep learning is the fastest-growing field in machine learning. It uses many-layered Deep Neural Networks (DNNs) to learn levels of representation and abstraction that make sense of data such as images, sound, and text.

How We Do?


DEEP LEARNING APPROACH
Train:
Dog
Cat
Honey badger
Errors
Dog
Cat
Raccoon
Deploy:
Dog
9
NVIDIA

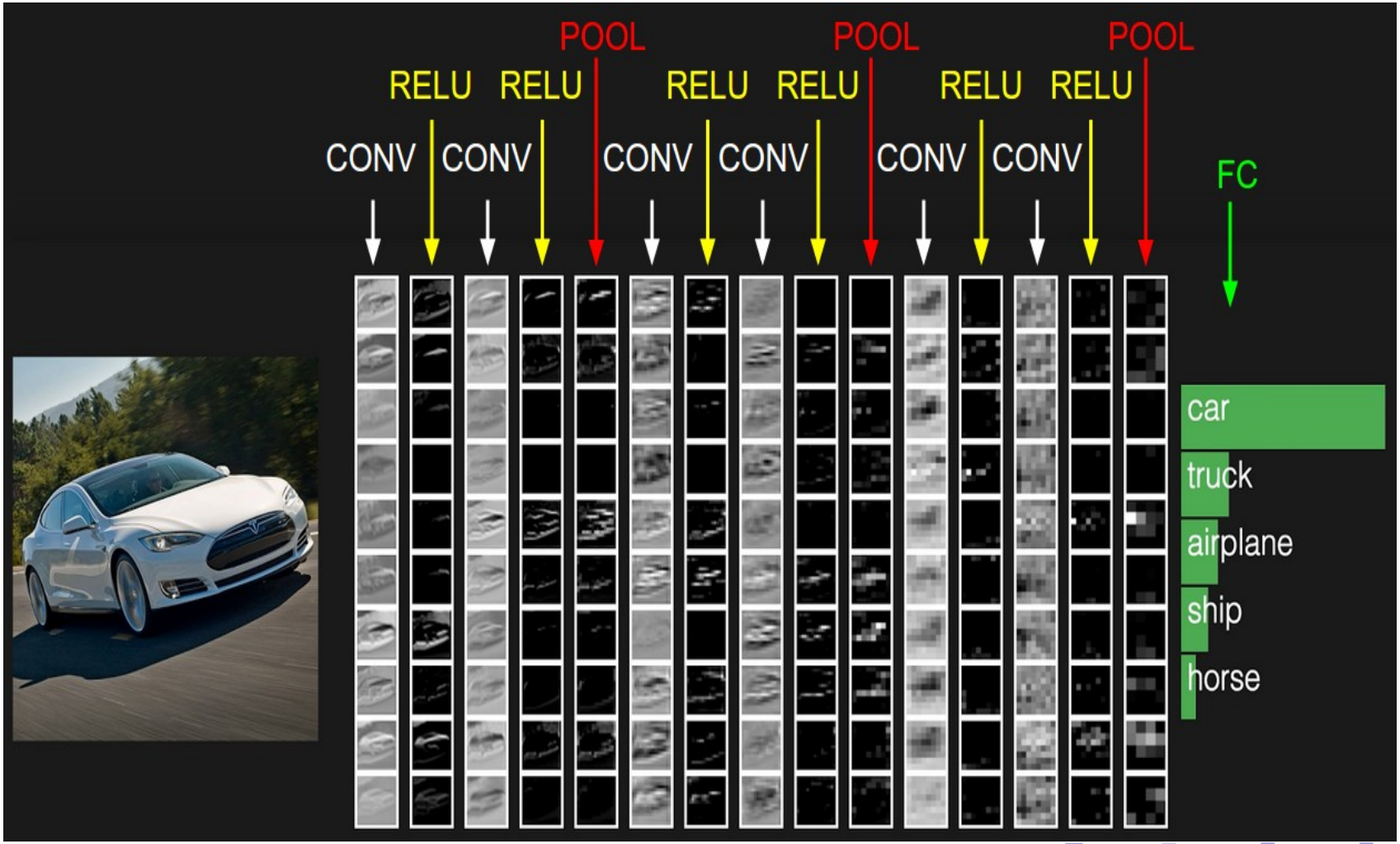
What We Use?

Convolutional Neural Networks (CNNs)



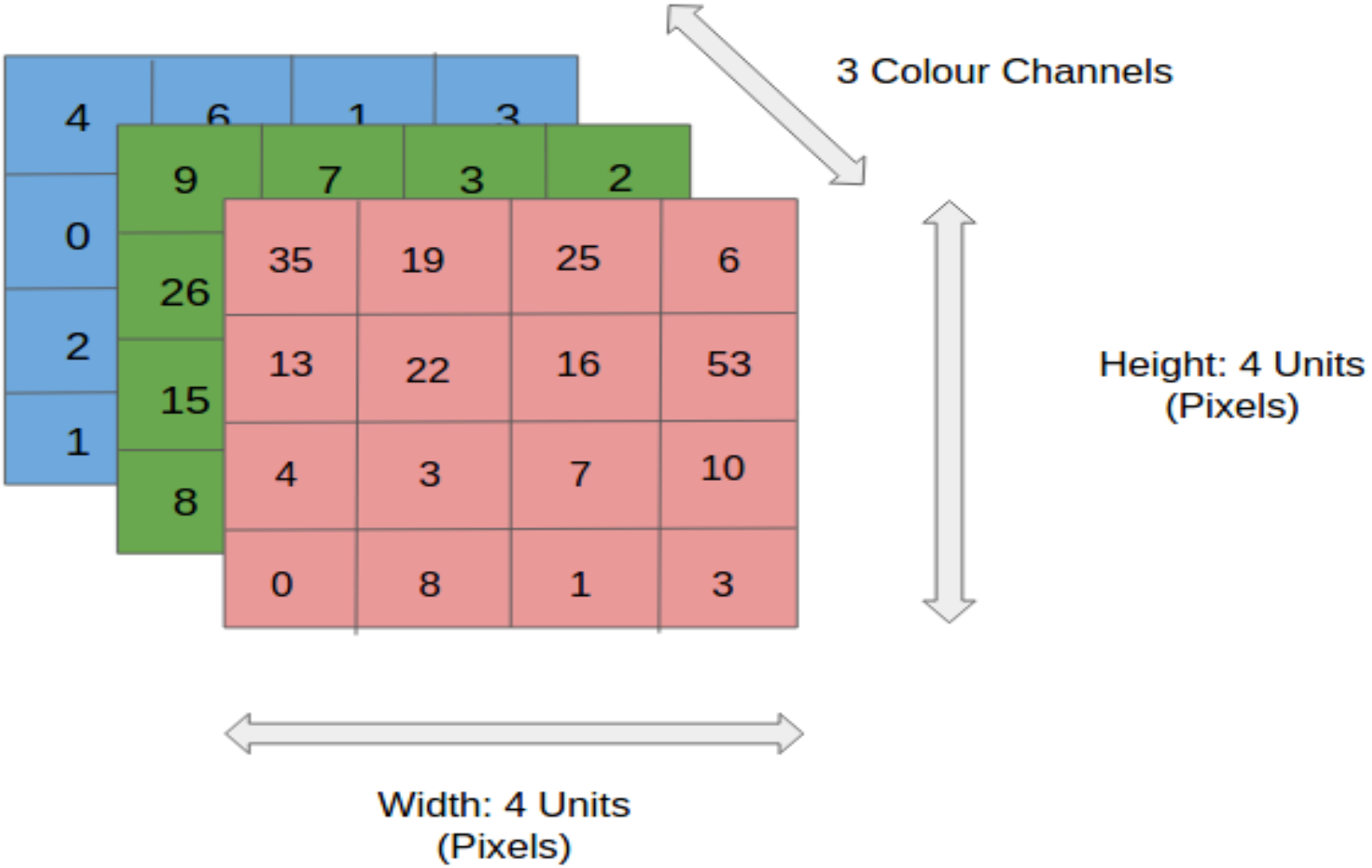
What We Use?

CNNs For Object Classification



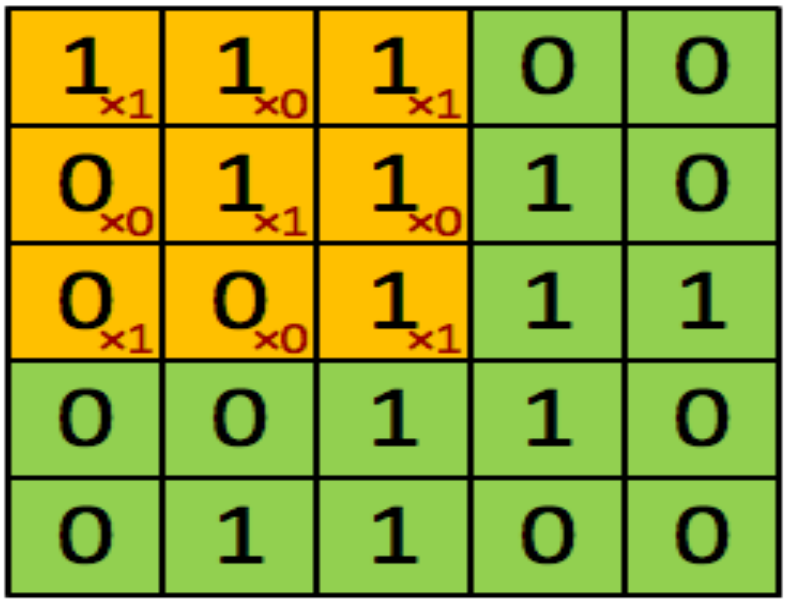
The Image

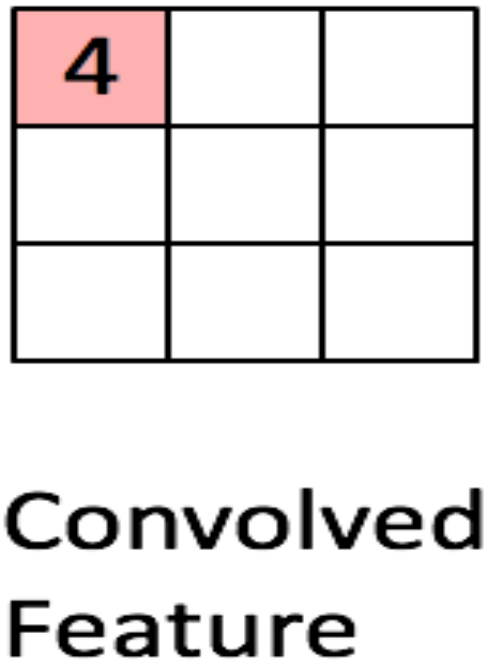
Convolutional Neural Networks (CNNs)



Applying Convolution

Convolutional Neural Networks (CNNs)





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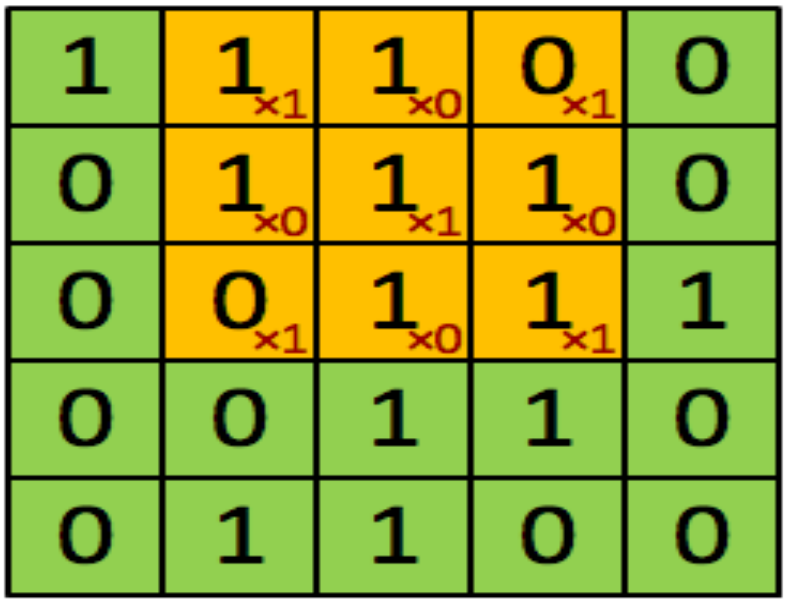

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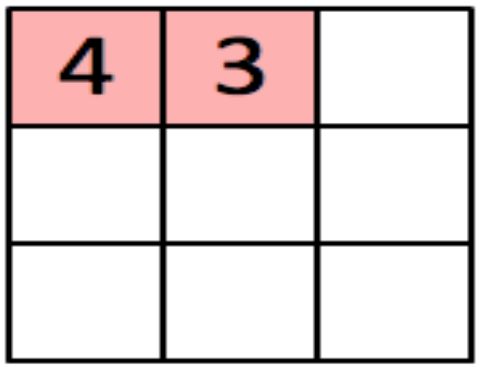
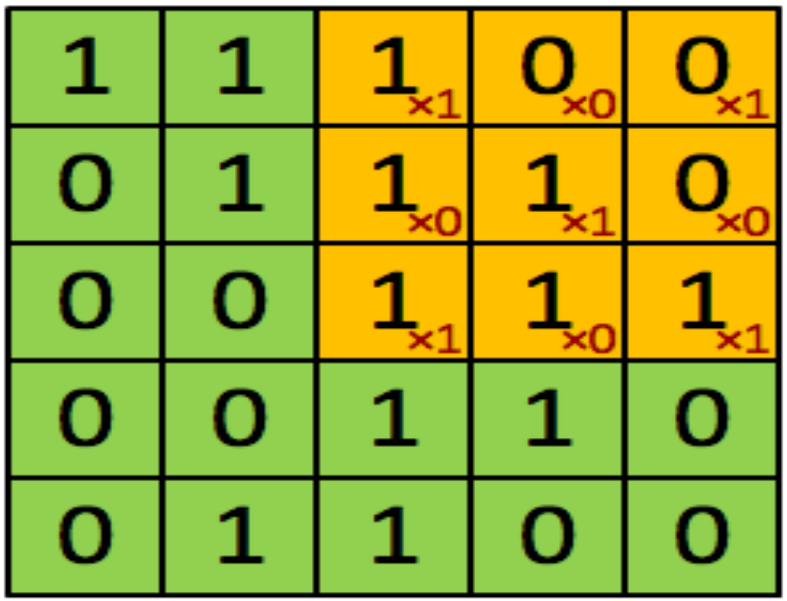


Convolved Feature

Applying Convolution

Convolutional Neural Networks (CNNs)



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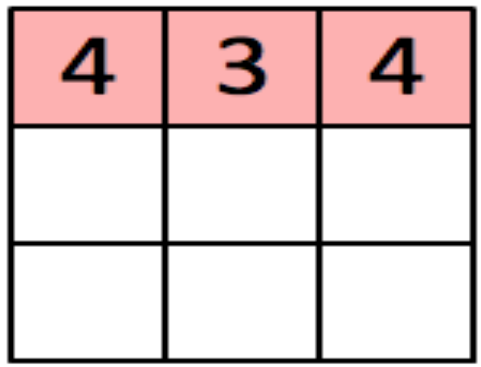

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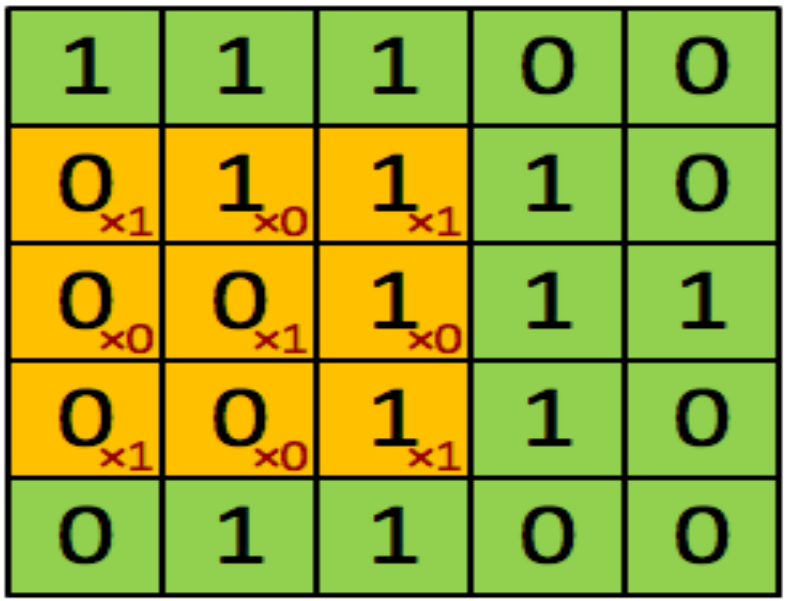

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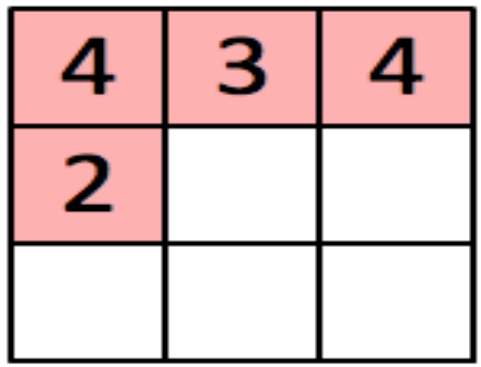

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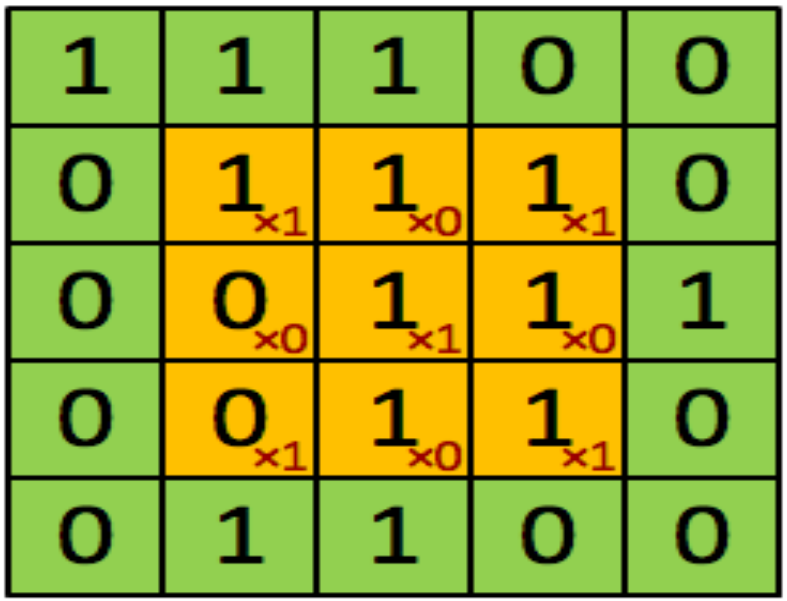

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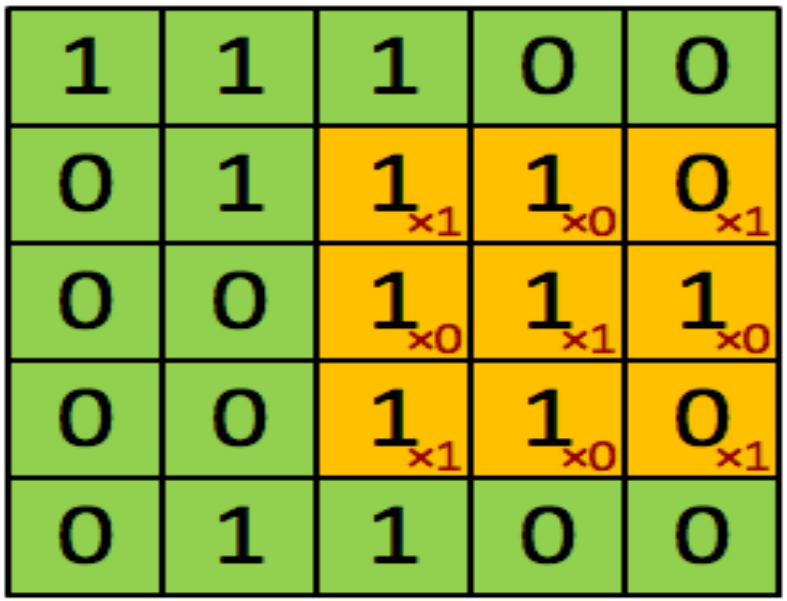

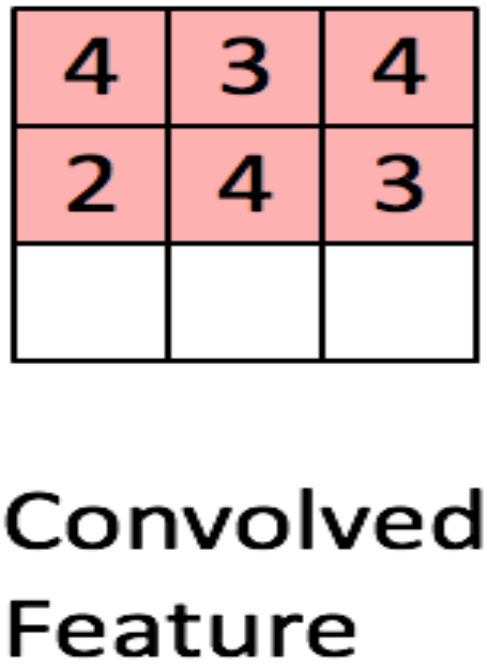

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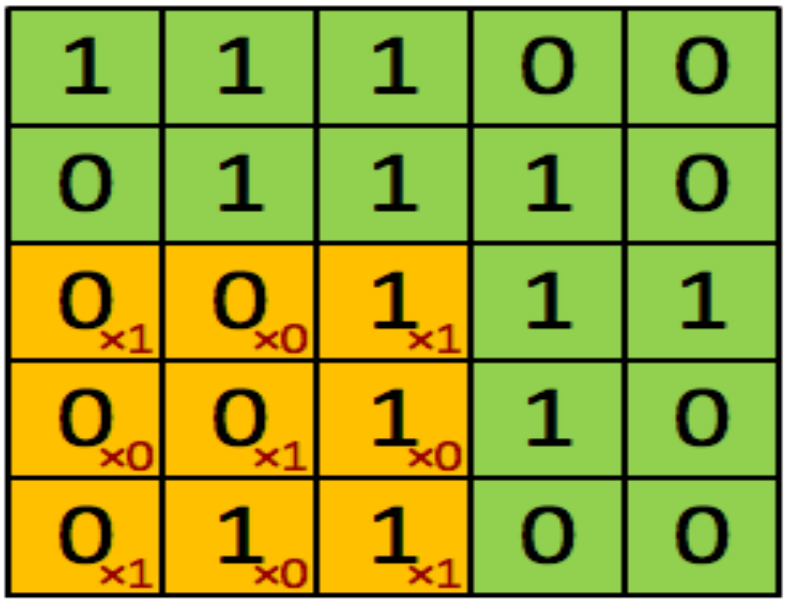

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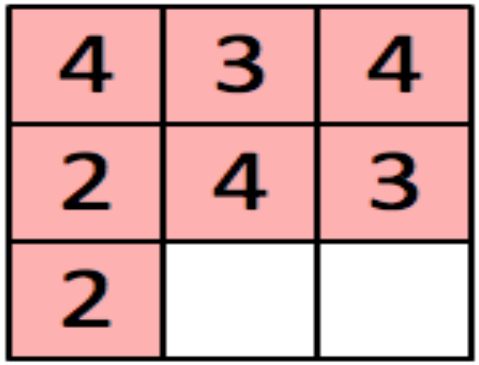

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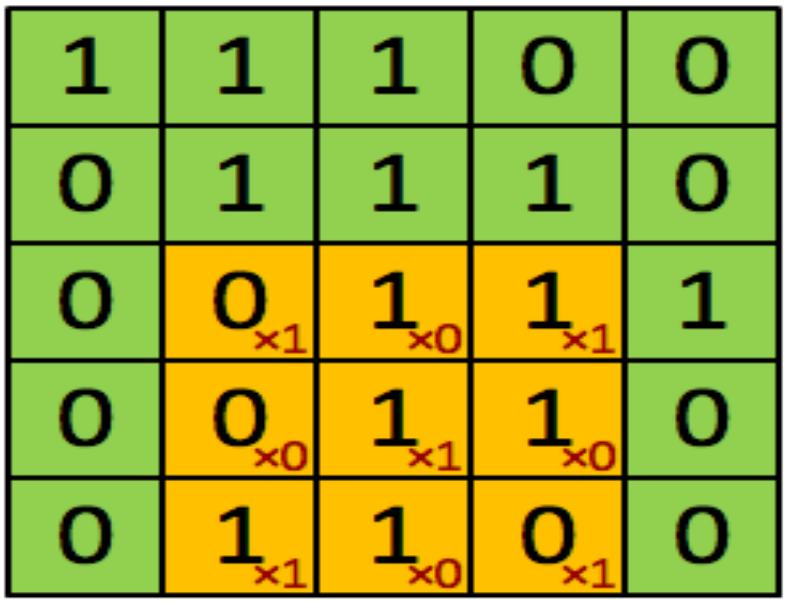

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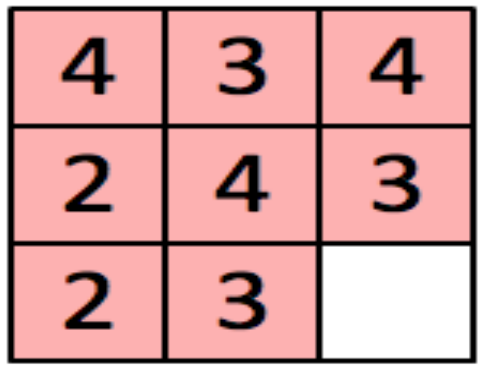

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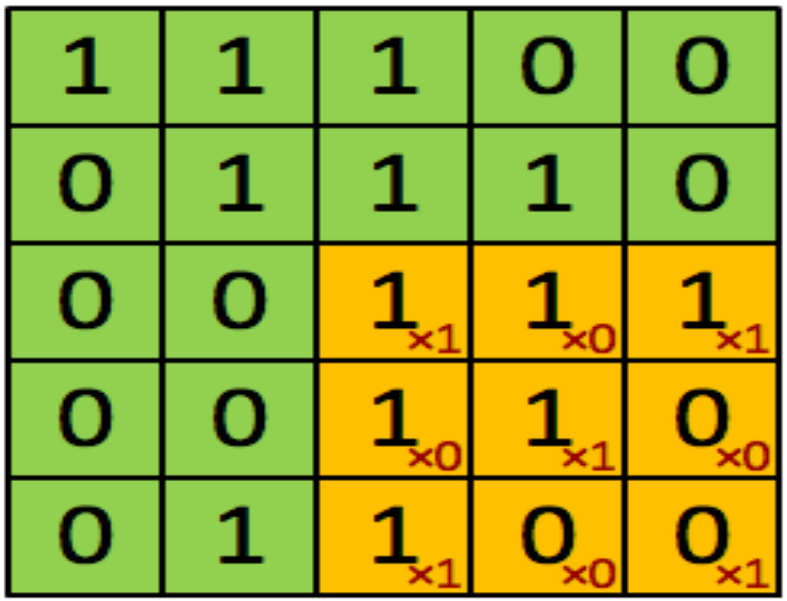

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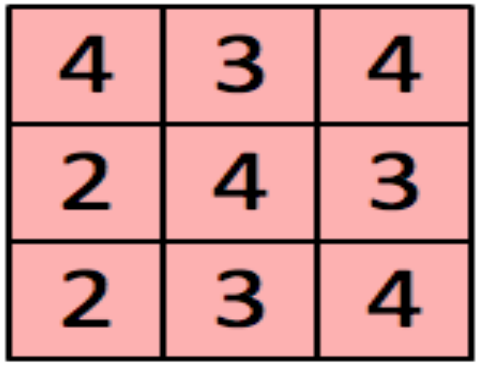

Convolved Feature

Why CNNs ?

- Convolutional Neural Networks (ConvNets or CNNs) are a category of Neural Networks that have proven very effective in areas such as image recognition and classification. ConvNets have been successful in identifying faces, objects and traffic signs apart from powering vision in robots and self driving cars.

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- ConvNets work because they exploit feature locality. They do it at different granularities, therefore being able to model hierarchically higher level features. They are translation invariant thanks to pooling units. They are not rotation-invariant per se, but they usually converge to filters that are rotated versions of the same filters, hence supporting rotated inputs.

Project Structure

- Preparing The DataSet

Project Structure

- Preparing The DataSet
- Learning With A CNN Architecture

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- Preparing The DataSet
- Learning With A CNN Architecture
- Estimating Accuracy

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- Preparing The DataSet
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- Tuning the parameters

Project Structure

- Preparing The DataSet
- Learning With A CNN Architecture
- Estimating Accuracy
- Tuning the parameters
- Deploying the Model

Technology Stack

- Python
- Keras
- Jupyter-Notebook
- Matplotlib
- GPU

Conclusion

We hope to develop an open source deep learning model for Malayalam OCR.