

MAKERS' MOMENT

CHESS POSITION RECOGNITION

CPR



OR:

WHEN YOUR BRAIN ISN'T SMART ENOUGH FOR NEURAL NETWORKING

- AN ONGOING TALE FROM REAL LIFE.



DEEP GREEN FEATURE REQUEST

JI

From:
Subject: vedr. skakanalyse
Date: 27 April 2016 at 15.46
To:

Hej Joachim.
Tak for dit svar på LinkedIn.

Jeg skrev som sagt til dig, da jeg læste en artikel om dit skakprodukt. Jeg er selv en forretningsmand, der har lavet alt muligt, blandt andet har jeg for nylig udviklet en velgørenhedsapp. Min ide og så har jeg haft et udvikler firma på det tekniske.

Nok om det. Jeg har en stor interesse for skal og er en habil hobbyspiller. Jeg bruger en del tid på at se skak videoer på nettet samt at læse skakbøger om forskellige emner. Mit problem når man læser en skakbog er, at der er en masse diagrammer og så efterfølgende er der beskrevet en masse varianter. De fleste stormestre kan sikkert i hovedet gennemgå varianterne, men normalle hobbyspillere og klubspillere kan kun i begrænset omfang se varianterne med mindre man har et bræt foran sig. Det tager tid og de færreste gør dette. Det er her min ide kommer ind i billedet. (jeg har vedhæftet et billede af en tilfældig side i en skakbog).

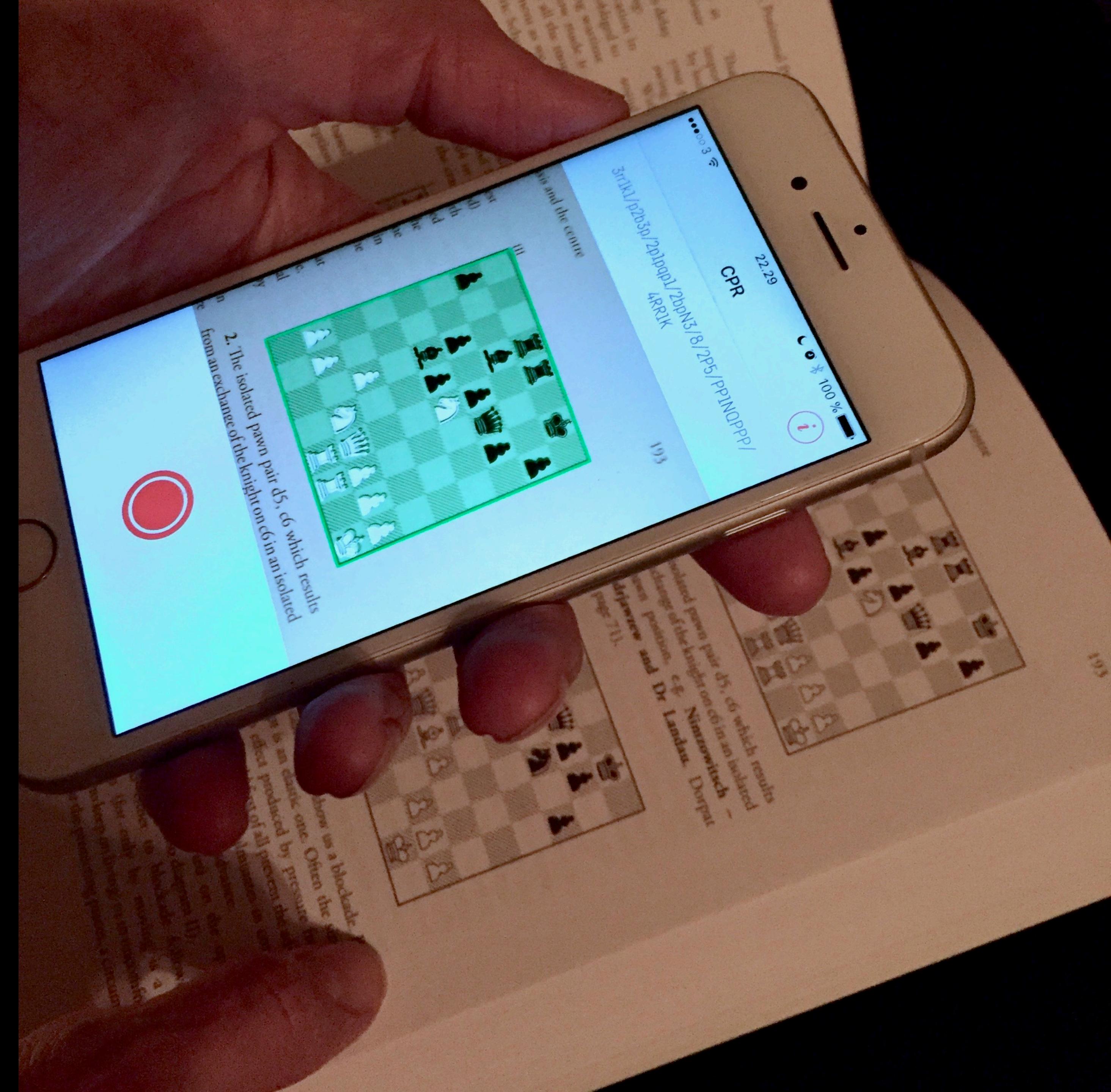
Man tager sin mobil, åbner sin analyse app og tager et foto af det skakdiagram som man gerne vil analysere. Når billedet er taget trykker man på en knap i appen således at billedet nu ændres til et skakbræt med den position som på billedet, men nu kan man rykke brikkerne. Det betyder, at man kan rykke brikkerne som en af de beskrevede varianter. Når man har kigget den variant kan man gå tilbage til udgangspunktet og kigge den næste igennem osv. Når man er færdig læser man videre indtil man næste gang støder på et diagram som man gerne vil kigge nærmere på.

Jeg håber du forstår grundprincippet i ideen. Der kan sikker tilføjes mange features osv. Men grundideen er at man kan lave et billede af et skakdiagram om til et hvor brikkerne kan rykkes. Der er altså ikke tale om en skakcomputer, database osv., men om et hjælpemiddel til at læse skakbøger bedre og hurtigere.

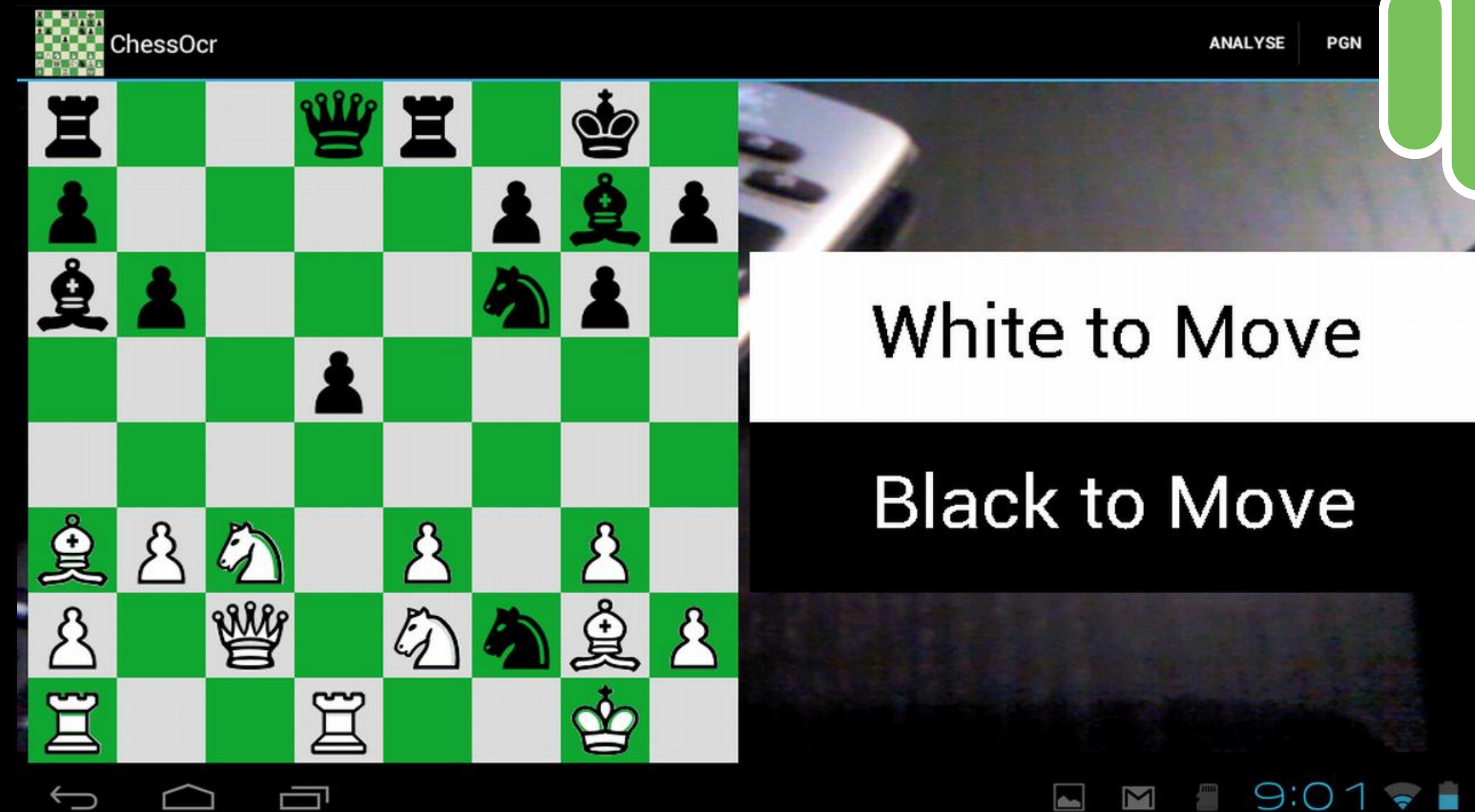
Lad mig høre hvad du tænker om dette. Jeg vil meget gerne mødes med dig, hvis du er positiv til en lille snak.

Med venlig hilsen,

DREAM USE CASE



NOTHING OFF-THE-SHELF



(PAID TRIP TO)
WWDC 2016



SESSION 715

NEURAL NETWORKS AND ACCELERATE

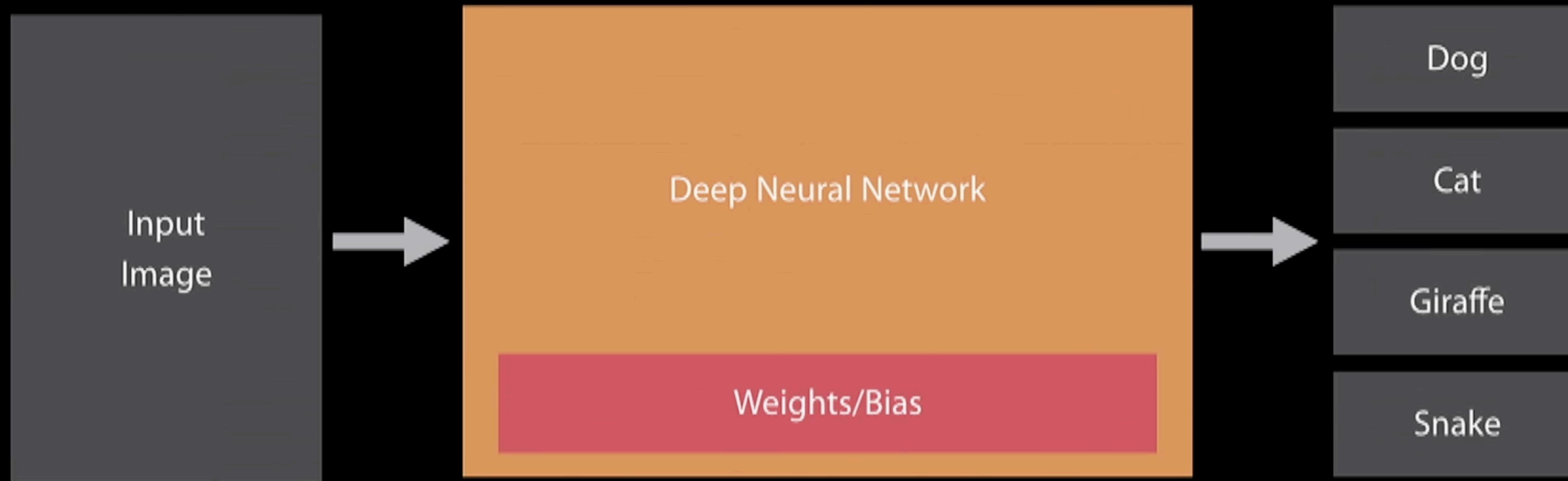
Agenda

- Lossless compression: `Compression`
- Accelerate - Machine learning: `BNNS`
- Accelerate - Numerical integration: `Quadrature`
- Vector extensions: `simd`



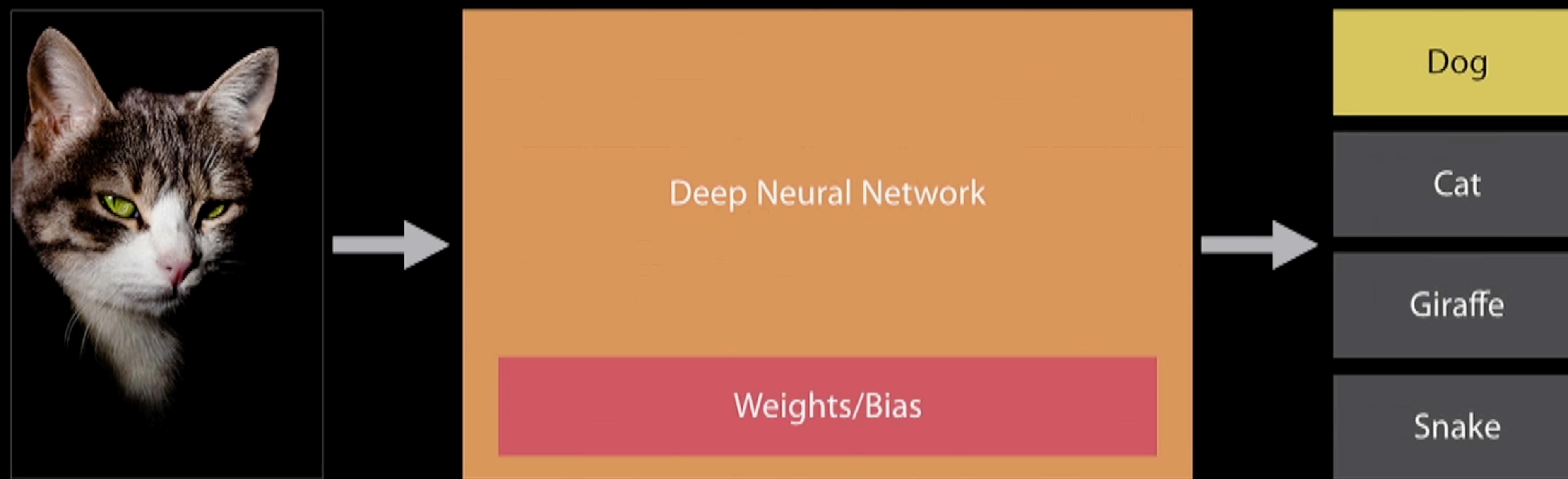
Deep Neural Network

Training



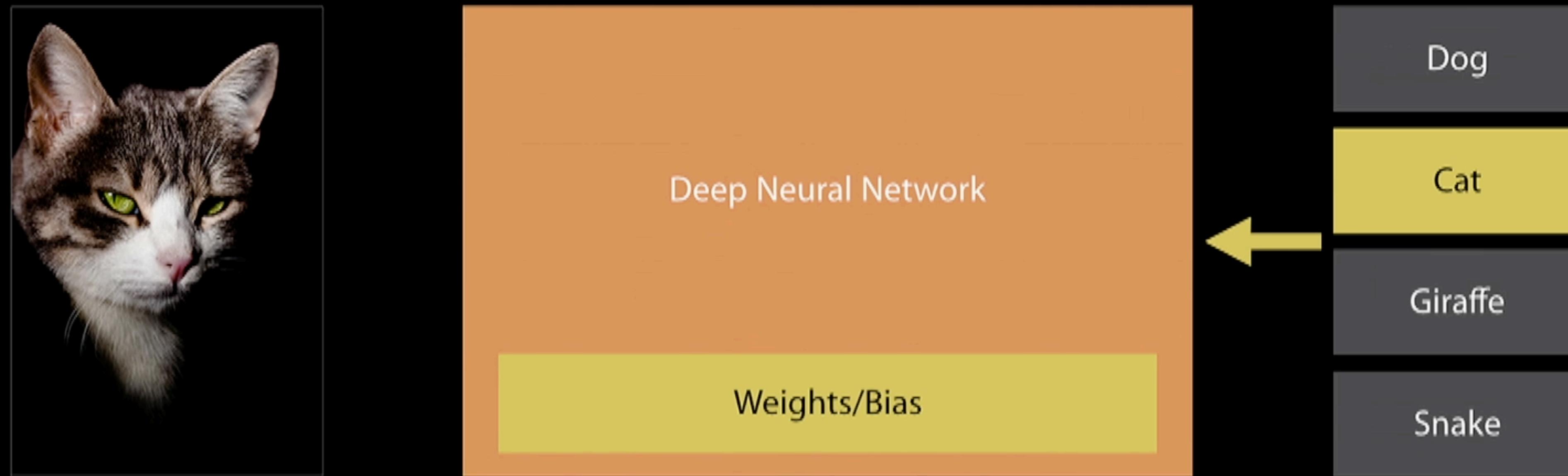
Deep Neural Network

Training



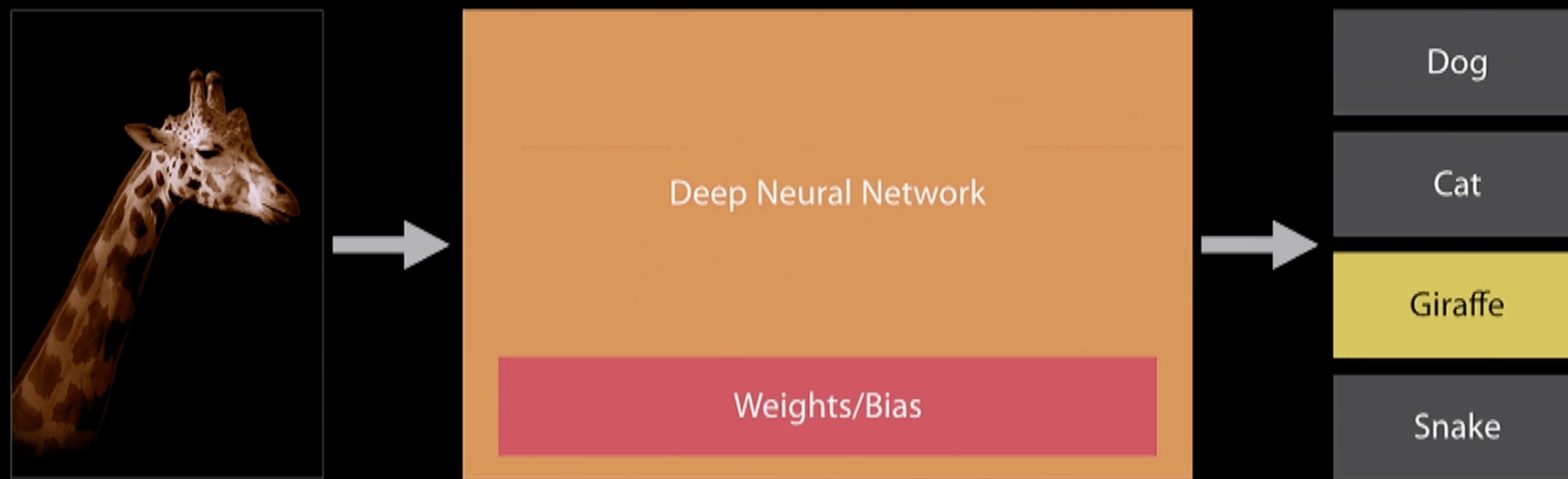
Deep Neural Network

Training



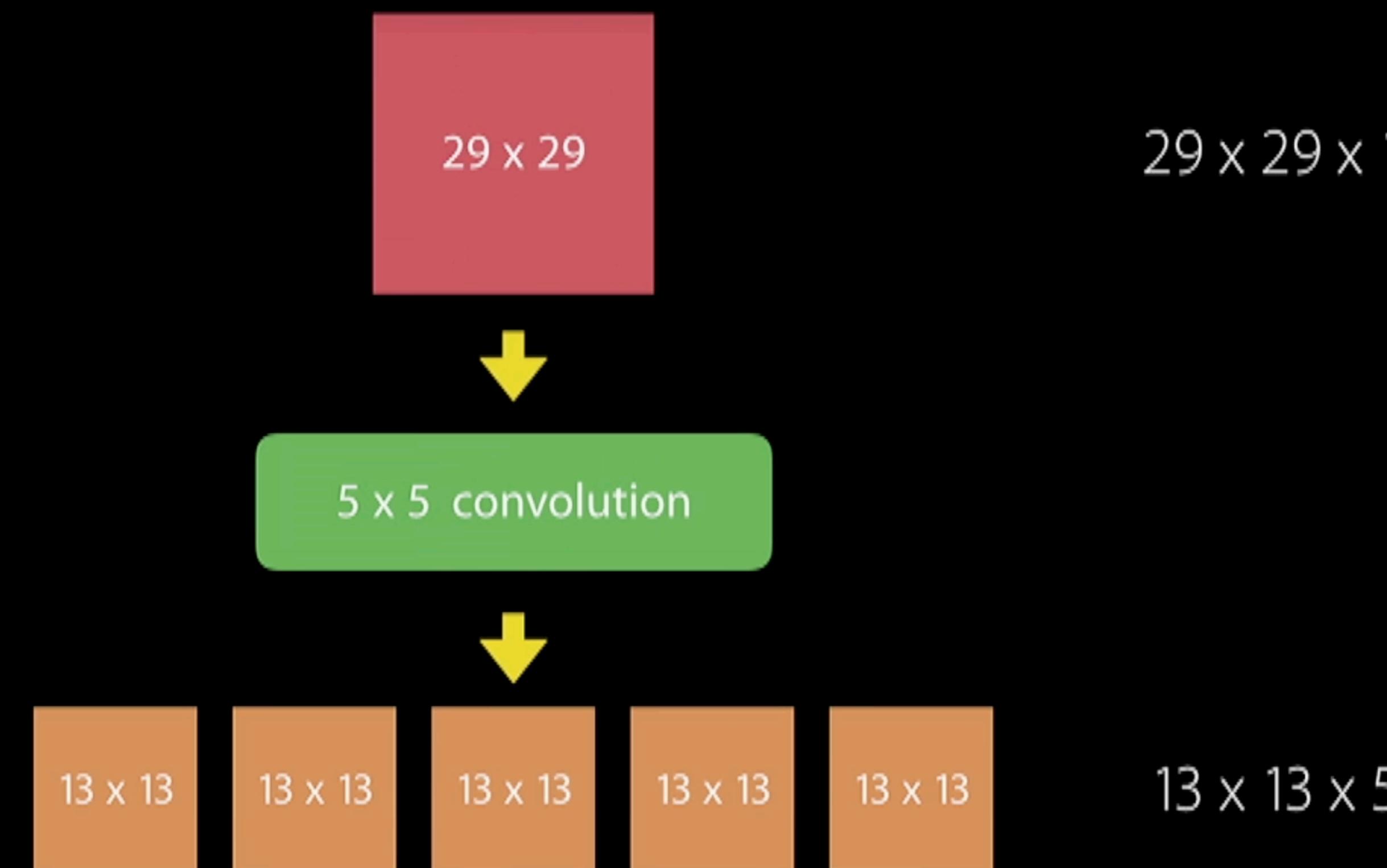
Deep Neural Network

Inference

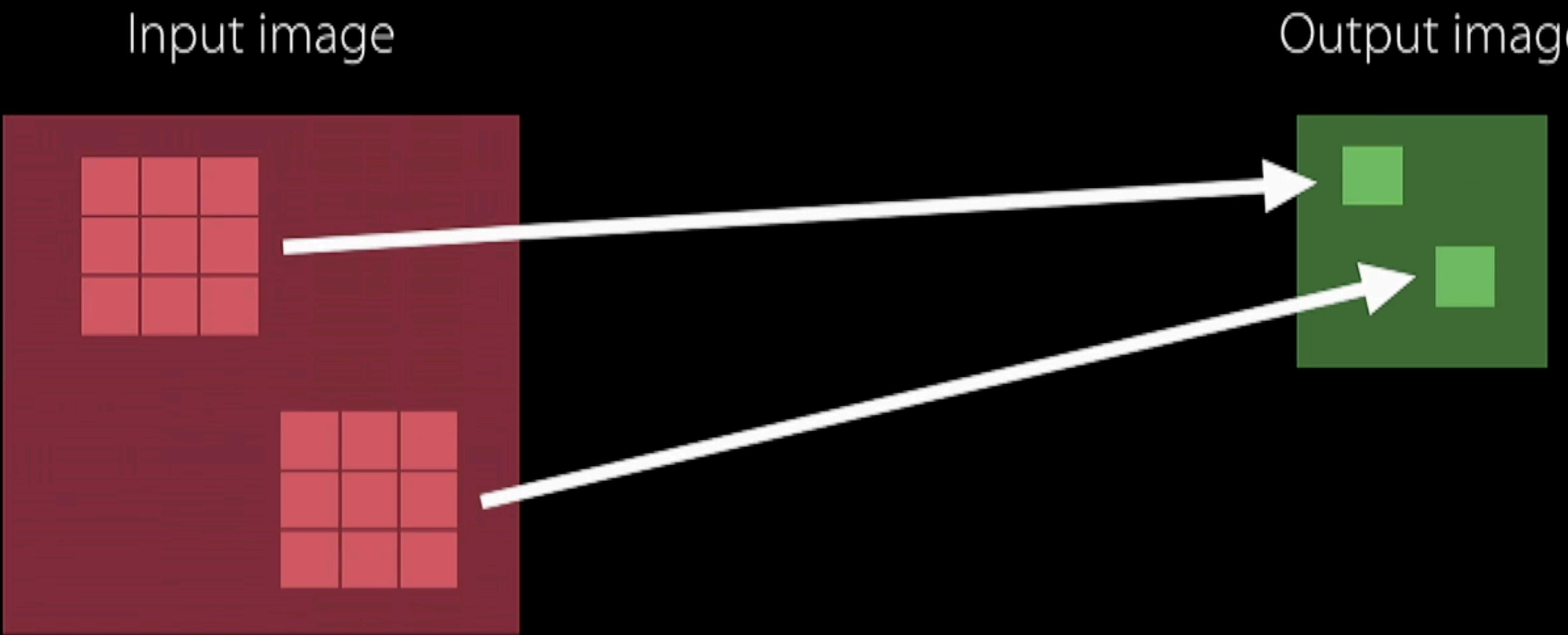


Digit Recognition Network

Example

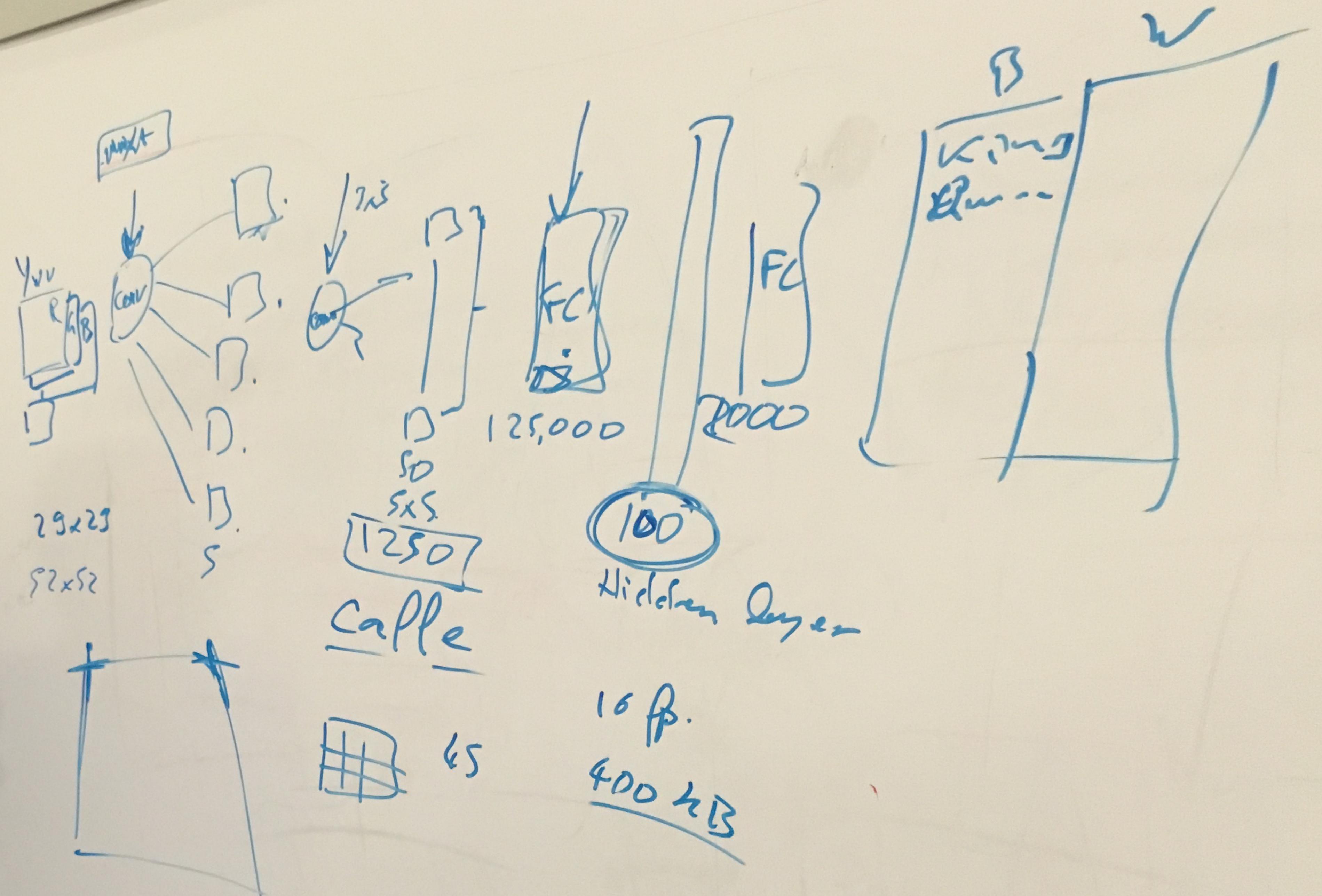


Pooling Layer



$$O(x, y, c) = \max_{i,j \leq k} I(s_x \cdot x + i, s_y \cdot y + j, c)$$

WTF!?



WELP! VOLUNTEERS

The screenshot shows a Mac OS X browser window displaying the bignerdranch.com website. The page is the 'ABOUT' section for Aaron Hillegass. At the top, there's a navigation bar with links for 'WE DEVELOP', 'WE TEACH', 'WE WRITE', 'ABOUT' (which is highlighted in green), 'BLOG', and 'CONTACT'. Below the navigation is a secondary row with links for 'THE BIG NERD WAY', 'THE NERDS', 'TIMELINE', 'CAREERS', and 'NEWS'. The main content area features a large black-and-white photograph of Aaron Hillegass, a man with a beard wearing a cowboy hat and jeans, standing with his arms crossed. To the right of the photo, the title 'Aaron Hillegass' is displayed in a large orange font, followed by the subtitle 'Founder and Chief Executive Officer'. A Twitter link (@aaronhillegass) is shown below. The bio text describes Aaron's early programming career starting at age 10 and his work at the Mitre Corporation and Wall Street. It also mentions his book 'Cocoa Programming for Mac OS X', which has been translated into multiple languages.

Aaron Hillegass

Founder and Chief Executive Officer

 @aaronhillegass

Aaron [founded the Ranch in 2001](#), just one highlight in a glowing career that began in childhood. He began programming at the ripe old age of 10 in the basement of the Oregon Museum of Science and Industry. At 19, he started programming professionally, in the Advanced Signal Processing Lab at the Mitre Corporation. There, he wrote the data structures library for Tower Eiffel, before leaving to work on Wall Street to help create mortgage-backed securities (a device that would, fifteen years later, bring our entire economy to its knees).

But Aaron is no stranger to having such a huge impact. He wrote the book widely regarded to be the bible of Mac development: [Cocoa Programming for Mac OS X](#). This guide is now in its fourth edition and has been translated into French, German, Korean, Japanese and Chinese.

CPR

A TEST APP



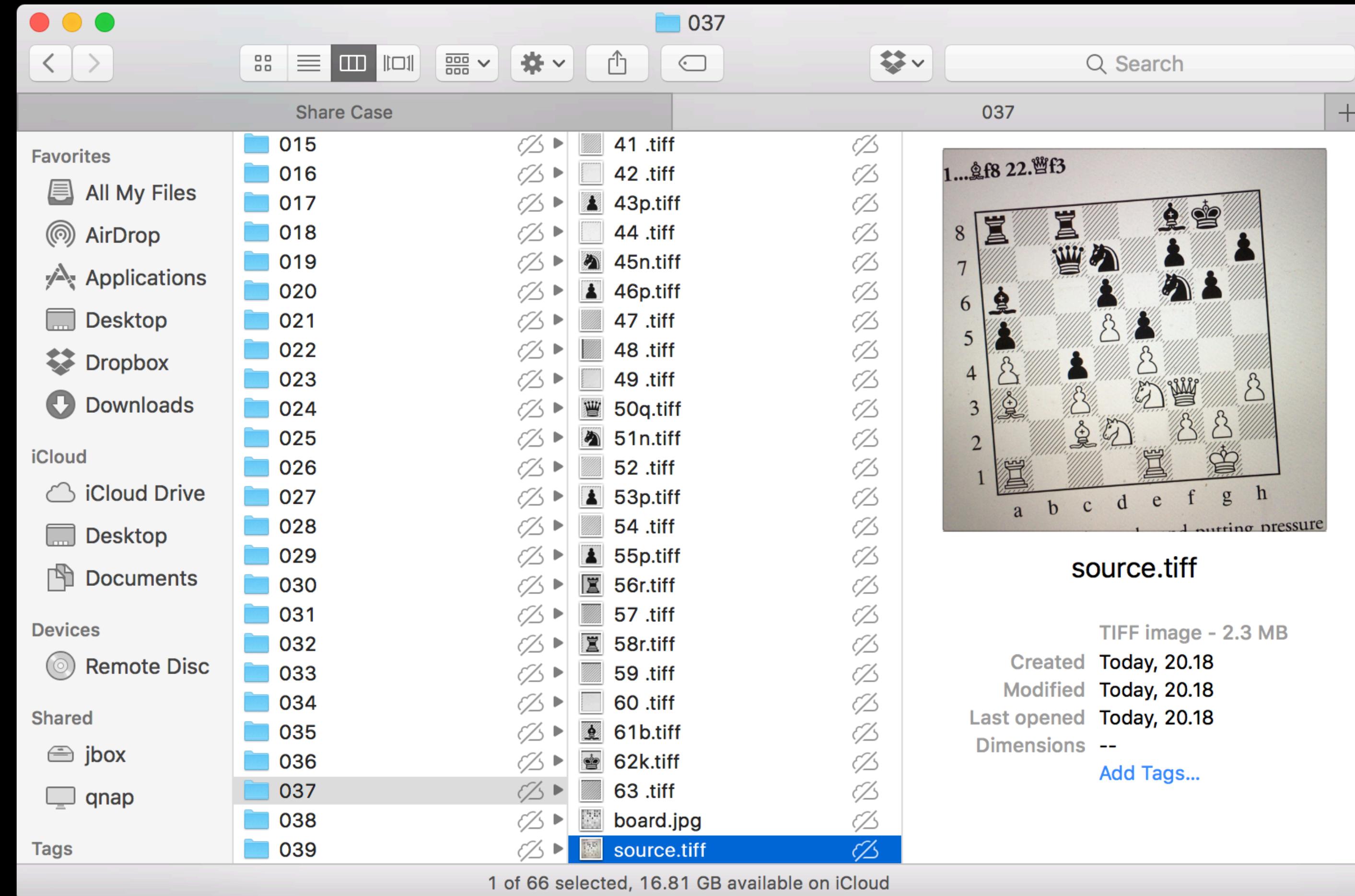
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A TEST APP



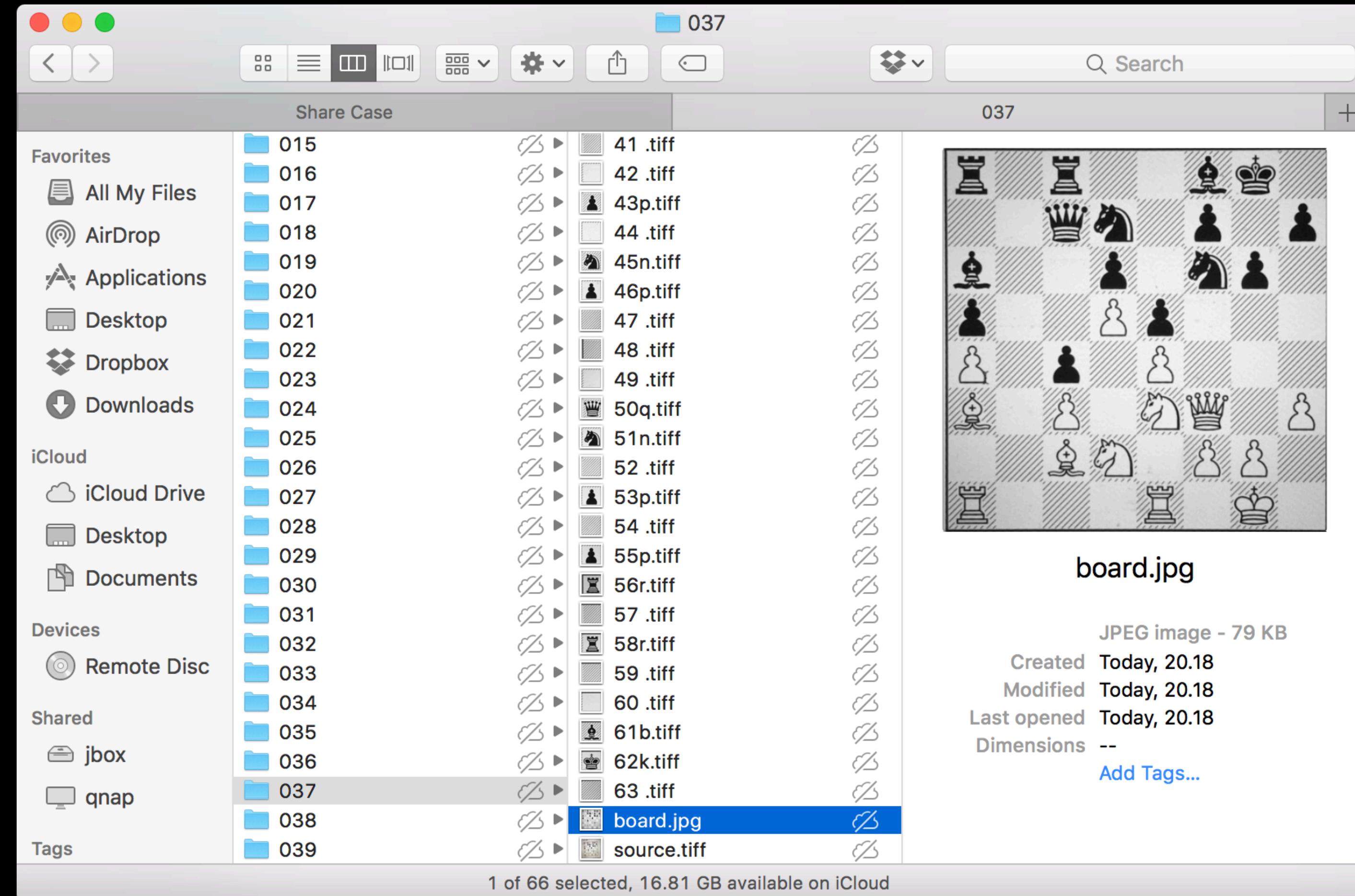
THE FILE BUNDLE

.CPR



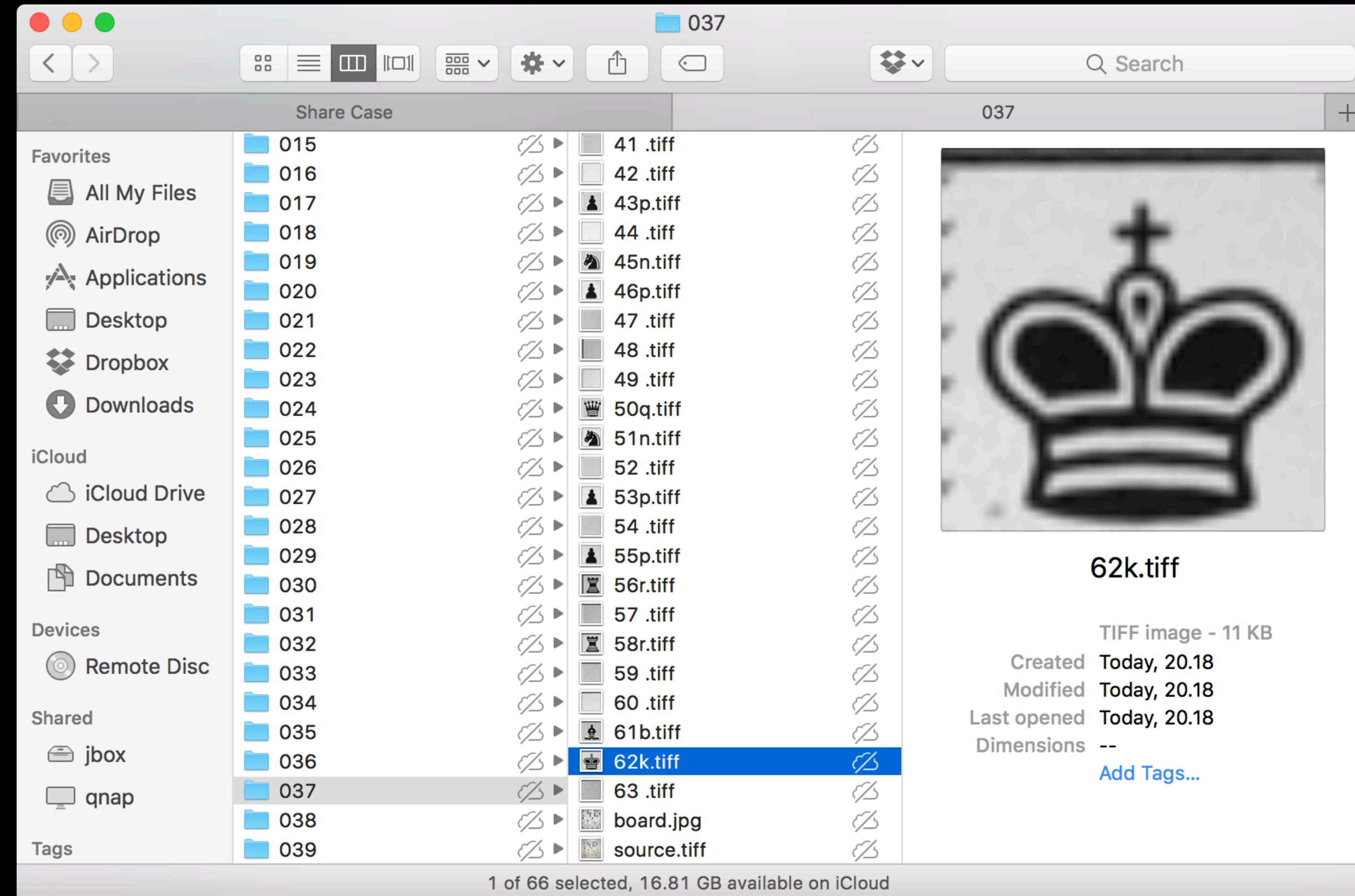
THE FILE BUNDLE

.CPR



THE FILE BUNDLE

.CPR



APP ARCHITECTURE

Capture (UIKit)

- `ChessPositionImageView : CoreImageView : GLKView`
- `CaptureBufferSource`

Pipeline

- `Pipeline`, with configured:
 - `ChessBoardDetector?`
 - `ChessBoardProcessor?`
 - `ChessBoardSnapshotter?`
 - `ChessPositionRecognizer?`
- `PipelineOperation`
- `PipelineQueue`

Processing

- `ChessBoardProcessor`
- `ChessBoardPreprocessFilter : CIFilter`
- `ChessBoardSnapshotter`

Detection

- `ChessBoardDetector` [uses a `CIDetector`]
- `RandomPositionRecognizer : ChessPositionRecognizer`
- `BigNerdRanchPositionRecognizer : ChessPositionRecognizer`

```
protocol ChessPositionRecognizer {  
    func position(from: Array<CGImage>) -> ChessPosition  
}
```

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NEXT STEPS



macOS CLI tweaked pipelines



Training 1,000,000+ images

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THANK YOU

Joachim Bondo
@osteslag

