

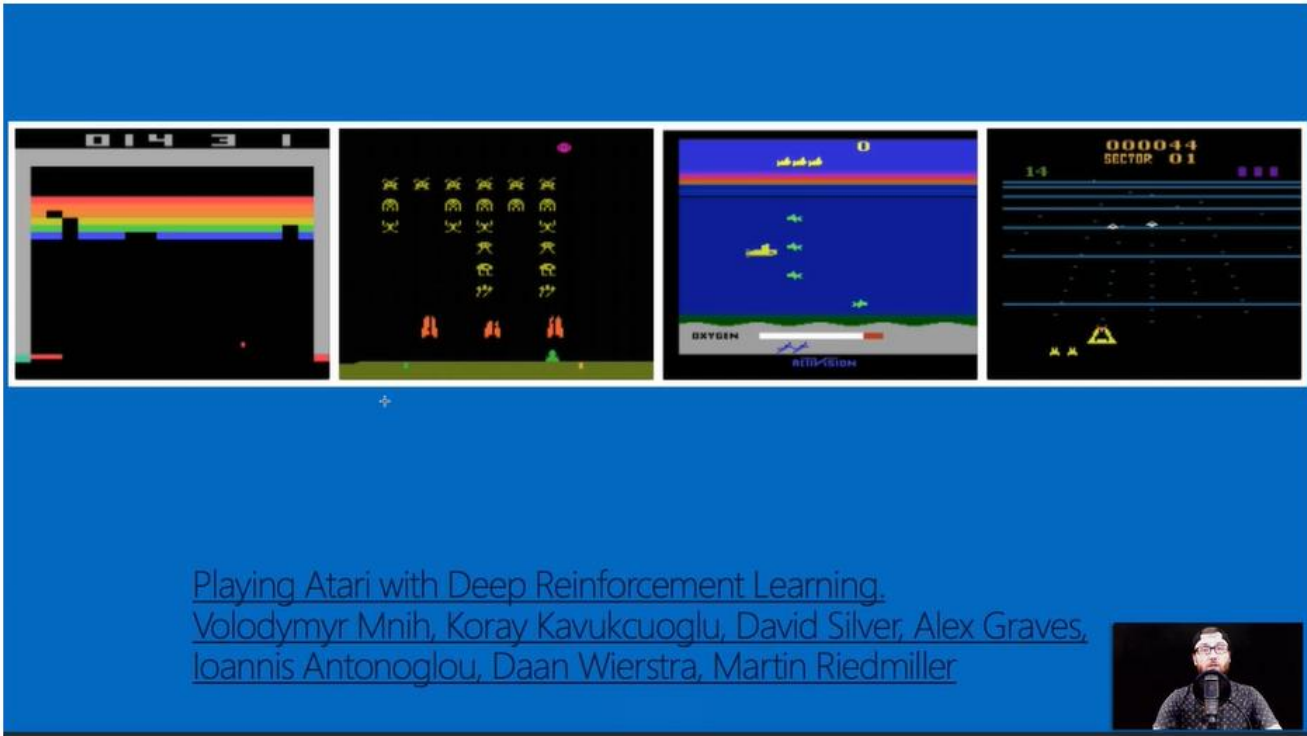
8.

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10.

Convolutional Neural Networks

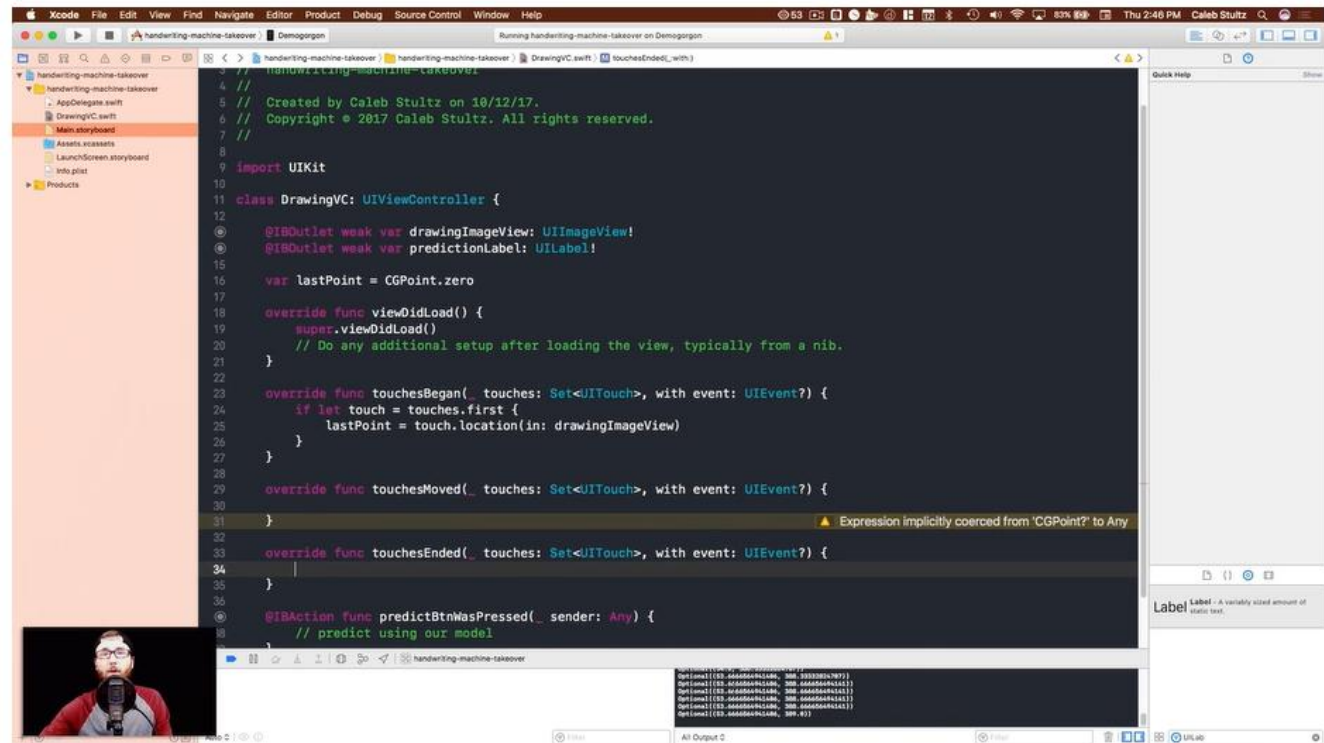
In this lesson, you will learn how convolutional neural networks function and how they are used to classify images.



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moved and ended functions are added to the VC file.



```
1 //
2 //
3 // Created by Caleb Stultz on 10/12/17.
4 // Copyright © 2017 Caleb Stultz. All rights reserved.
5 //
6
7 import UIKit
8
9 class DrawingVC: UIViewController {
10
11     @IBOutlet weak var drawingImageView: UIImageView!
12     @IBOutlet weak var predictionLabel: UILabel!
13
14     var lastPoint = CGPoint.zero
15
16     override func viewDidLoad() {
17         super.viewDidLoad()
18         // Do any additional setup after loading the view, typically from a nib.
19     }
20
21     override func touchesBegan(_ touches: Set<UITouch>, with event: UIEvent?) {
22         if let touch = touches.first {
23             lastPoint = touch.location(in: drawingImageView)
24         }
25     }
26
27     override func touchesMoved(_ touches: Set<UITouch>, with event: UIEvent?) {
28
29     }
30
31     override func touchesEnded(_ touches: Set<UITouch>, with event: UIEvent?) {
32
33     }
34
35     @IBAction func predictBtnWasPressed(_ sender: Any) {
36         // predict using our model
37     }
38 }
```

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Lesson Summary

- In this module you were shown how to build an app that can recognise handwriting, using the core ML model.
- A new Xcode project was set up; a black box, label and button were added to the view controller (VC) and configured.
- Instructional text was added to the label, to direct users to tap the Predict button.
- When a number is hand written in the app and the Predict button is tapped, this converts the handwritten image into a 28 x 28 pixel image which is matched against a repository of data.
- The user interface (UI) was set up to recognise handwriting input.
- The 'touch' began, moved and ended functions were added to the VC file.
- A 'draw line' function was added, to convert moving touch into a line or image.
- Values were entered to specify how the line or drawing appears, in terms of size, shape and colour.
- A function was entered to recognise when touch or drawing stops.
- Drawing was tested in the simulator and the result was successful.
- A function was added to remove the most recent drawing from the screen, when a new touch is started.
- Core ML and the Vision framework was used to implement the prediction function.

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