



Computer Vision

Autumn 2024

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Instructor

Lectures and practices :

- **Yuriy P. Kochura**
 - Department of Computer Engineering, FICS



Course Description

This course will introduce you to deep learning approaches that are used in cutting-edge research in computer vision and provide practical experience:

- Using of neural networks (fully connected and convolutional layers, forward and backward propagation, activation functions, ...)
- Training of neural networks (initialization, optimization, regularization, model choice, ...)

Course Learning Outcomes

1. Identify problems where computer vision techniques are applicable.
2. Apply CV techniques for some classical problems.

Prerequisites

1. **Mathematics:** Knowledge of and ability to use calculus, analytical geometry, linear algebra and probability theory.
2. **Programming:** Ability to program in Python.

Classroom

This semester the course takes place online (virtual in-class lectures) on **BigBlueButton** at <https://bbb.ugrid.org/b/yur-spb-qnl-jqk>

The screenshot displays the BigBlueButton interface. On the left, a sidebar contains sections for MESSAGES (Public Chat), NOTES (Shared Notes), USER MANAGEMENT (Waiting Users), and USERS (1) (Yury Kochura (You)). The main area shows a 'Public Chat' window with a welcome message: 'Welcome to Computer Vision'. Below this, it states: 'For help on using BigBlueButton see these (short) tutorial videos.' and 'To join the audio bridge click the speaker button. Use a headset to avoid causing background noise for others.' It also provides a link to invite someone to the meeting: 'https://bbb.comsys.kpi.ua/b/yur-spb-qnl-jqk'. The main content area features a 'Welcome To BigBlueButton' message and a grid of interactive tools: CHAT (Send public and private messages), WEBCAMS (Hold visual meetings), AUDIO (Communicate using high quality audio), BREAKOUT ROOMS (Form teams of users for group work), POLLING (Poll your users anytime), EMOJIS (Express yourself), SCREEN SHARING (Share your screen), and MULTI-USER WHITEBOARD (Draw together). At the bottom, there is a 'Message Public Chat' input field and a toolbar with icons for chat, audio, video, and screen sharing.

Course hub

All important information about the course will be available on the course web page
<https://courses-cs-kpi.github.io/cv-24fall/>

- Slides and materials
- Homeworks

The screenshot shows a web page for a 'Computer Vision' course. On the left is a dark sidebar with 'Home' and 'About' links. The main content area has a search bar at the top. Below it, the course title 'Computer Vision' is displayed, followed by the institution 'Igor Sikorsky Kyiv Polytechnic Institute, Autumn'. A circular profile picture of Yuriy P. Kochura is shown next to his name and email 'iuriy.kochura@gmail.com'. Below this, it says 'Department of Computer Engineering, FICS' and 'When: every Tue at 12:20 PM by Kyiv time', with a 'BBB Link' button. A paragraph describes the course as introducing deep learning for computer vision. A numbered list of two topics follows: 'Using of neural networks' and 'Training of neural networks'. 'Course Learning Outcomes' are listed as identifying applicable problems and applying CV techniques. A 'More...' link is present. At the bottom, an 'Intro' section shows a date '19 Sep:' followed by 'OVERVIEW' and 'Details' buttons, and '[HML][PDF]' links. The footer contains site attribution and copyright information.


Home

About

Search Home

Computer Vision

Igor Sikorsky Kyiv Polytechnic Institute, Autumn

 **Yuriy P. Kochura** LECTURES/PRACTICES
iuriy.kochura@gmail.com
Department of Computer Engineering, FICS
When: every Tue at 12:20 PM by Kyiv time
[BBB Link](#)

This course will introduce you to deep learning approaches that are used in cutting-edge research in computer vision (CV) and provide practical experience:

- 1 Using of neural networks (fully connected and convolutional layers, forward and backward propagation, activation functions, ...)
- 2 Training of neural networks (initialization, optimization, regularization, model choice, ...)

Course Learning Outcomes

- Identify problems where computer vision techniques are applicable.
- Apply CV techniques for some classical problems.

[More...](#)

Intro

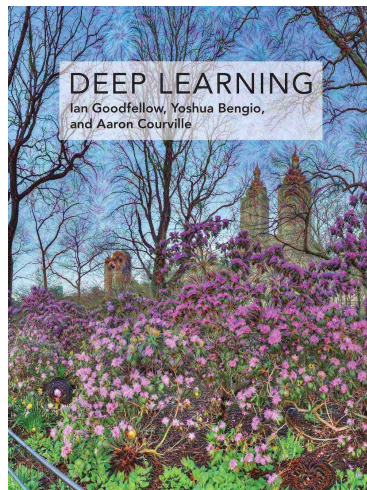
19 Sep: [OVERVIEW](#) [Details](#) 🍌 [\[HML\]](#)[\[PDF\]](#)

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Textbooks

There is no required textbook for this class, but I would like to recommend some books for a more comprehensive introduction with advanced topics in deep learning and computer vision or get another perspective on the lecture material:



Free

Neural Networks and Deep Learning

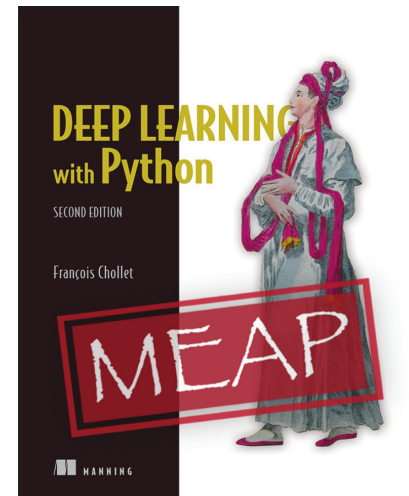
Neural Networks and Deep Learning is a free online book. The book will teach you about:

- Neural networks, a beautiful biologically-inspired programming paradigm which enables a computer to learn from observational data
- Deep learning, a powerful set of techniques for learning in neural networks

Neural networks and deep learning currently provide the best solutions to many problems in image recognition, speech recognition, and natural language processing. This book will teach you many of the core concepts behind neural networks and deep learning.

For more details about the approach taken in the book, [see here](#). Or you can jump directly to [Chapter 1](#) and get started.

Free



Freely previewing

Announcements & Discussions

All [announcements](#) and [discussions](#) will take place in Telegram (let me know if you need to be added)

- Discuss materials and ask your questions offline in the group.
- Don't be shy!



Discussions&Announcements

Assignments

Exercises to get you started with deep learning techniques for computer vision tasks.

Grading

- 60% Programming assignments (15% each)
- 40% Graded test

Note! The requisition of admission to semester control (Graded test) is

Programming assignments $\geq 36\%$

Let's start!