

# EN. 601.647/667

# INTRODUCTION TO HLT

# DEEP LEARNING

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# AGENDA

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- PyTorch
- Backprop/Gradient Descent
- Build an actual HLT Deep Network

# RECAP

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- Supervised Learning
- Logistic Regression
- Neural Networks

# PYTORCH

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- Yes, I verified ... it will most likely be needed for an assignment

# PYTORCH

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- Yes, I verified ... it will most likely be needed for an assignment
- But it is also one of the most important tools you will need for HLT

# CONDA

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- “Conda is an open source package management system and environment management system that runs on Windows, macOS and Linux.”

<https://docs.conda.io/en/latest/>

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# CONDA

USE IT!!!

- 
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# Data science technology for a better world.

A movement that brings together millions of data science practitioners,  
data-driven enterprises, and the open source community.

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<https://www.anaconda.com/>

# CREATE A NEW ENVIRONMENT

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- Always do this for a new project ... prevents conflicts

```
(base) C:\Users\Kenton Murray>conda create --name introHLT python=3.7
Collecting package metadata (current_repodata.json): done
Solving environment: done
```

# ACTIVATE ENVIRONMENT

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- Actually use it 😊

```
(base) C:\Users\Kenton Murray>conda activate introHLT  
  
(introHLT) C:\Users\Kenton Murray>python  
Python 3.7.11 (default, Jul 27 2021, 09:42:29) [MSC v.1916 64 bit (AMD64)] :: Anaconda, Inc. on win32  
Type "help", "copyright", "credits" or "license" for more information.  
>>> exit()  
  
(introHLT) C:\Users\Kenton Murray>python --version  
Python 3.7.11
```

# PYTORCH

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## FROM RESEARCH TO PRODUCTION

An open source machine learning framework that accelerates the path from research prototyping to production deployment.

[Install](#) >

# PYTORCH

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```
(introHLT) C:\Users\Kenton Murray>conda install pytorch torchvision torchaudio cudatoolkit=10.2 -c pytorch
```

# JUPYTER NOTEBOOK <https://jupyter.org/>



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Project Jupyter exists to develop open-source software, open-standards, and services for interactive computing across dozens of programming languages.

# JUPYTER NOTEBOOK

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```
(introHLT) C:\Users\Kenton Murray>conda install -c conda-forge notebook  
Collecting package metadata (current_repodata.json): done  
Solving environment: done
```



# SWITCH TO NOTEBOOK

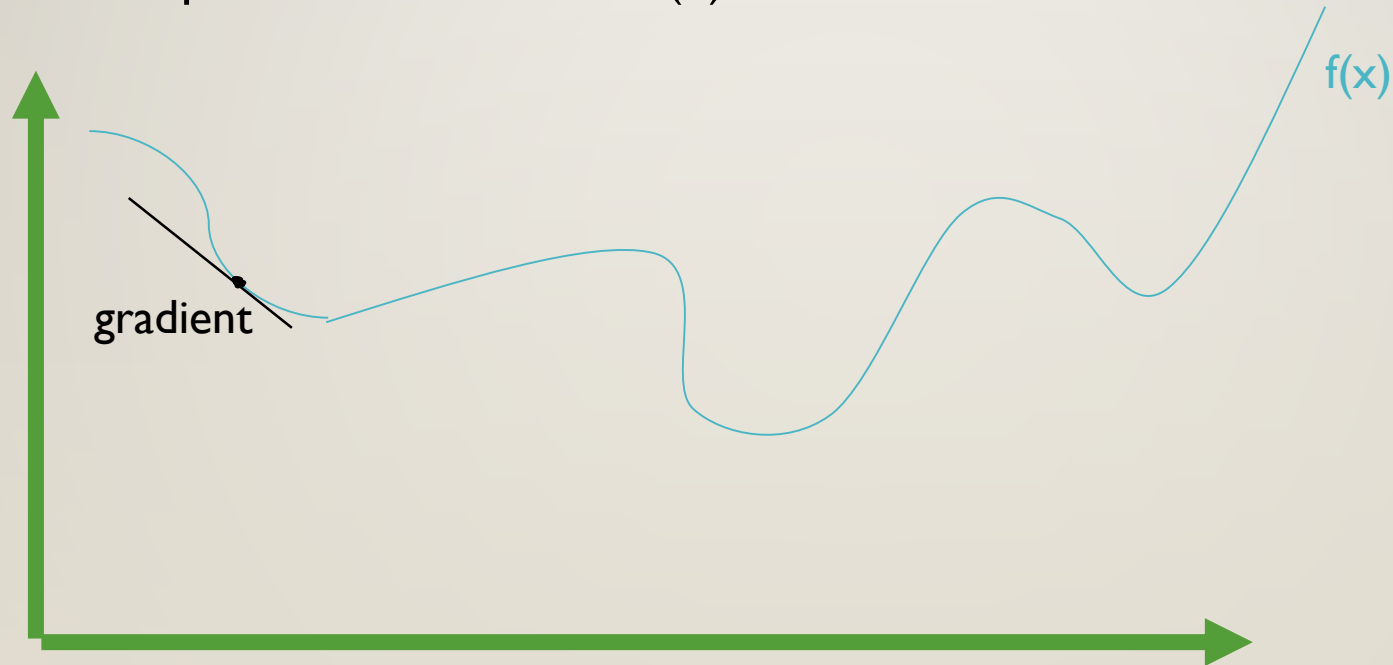
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```
(introHLT) C:\Users\Kenton Murray>jupyter notebook
```

# GRADIENT DESCENT

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- Find *local* optimum of a function,  $f(x)$



# ONE-HOT VECTOR

## Dictionary

The And I Dog Johns ..... Me Cat

Johns Hopkins was founded in .....

0 0 0 0 1 ..... 0 0