

# LEZIONI LINCEE DI SCIENZE INFORMATICHE

Come lavorare sui dati:

I Linguaggi per il Machine Learning

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# The Teachable Machine Experiment

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[www.sondaggio-online.com/s/30f66a4](http://www.sondaggio-online.com/s/30f66a4)

## Com'è possibile?

- Tramite una serie di istruzioni scritte in un linguaggio di programmazione
- La macchina sa come apprendere dalle immagini della telecamera
- Non ne ho alcuna idea

# The Teachable Machine Experiment

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- **Dati**
- **Hardware**
- **Machine Learning**
- **Linguaggio di Programmazione**

## Ingredienti & Attrezzi

# Machine Learning: **cos'è?**

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Metodologia (Modelli ed Algoritmi) che consente al computer di apprendere in modo automatico, sfruttando i dati disponibili.

È usualmente categorizzato in tre tipologie:

- **Apprendimento Supervisionato**
- **Apprendimento non Supervisionato**
- **Apprendimento per o con Rinforzo**

# Machine Learning: **cosa consente di fare?**

## NETFLIX ORIGINAL **HOUSE of CARDS**

★★★★★ 2015 16+ 3 Seasons 5.1

### Watch the Series

Is it true that absolute power corrupts absolutely? Congressman Frank Underwood absolutely intends to find out.

SEARCH & MENU

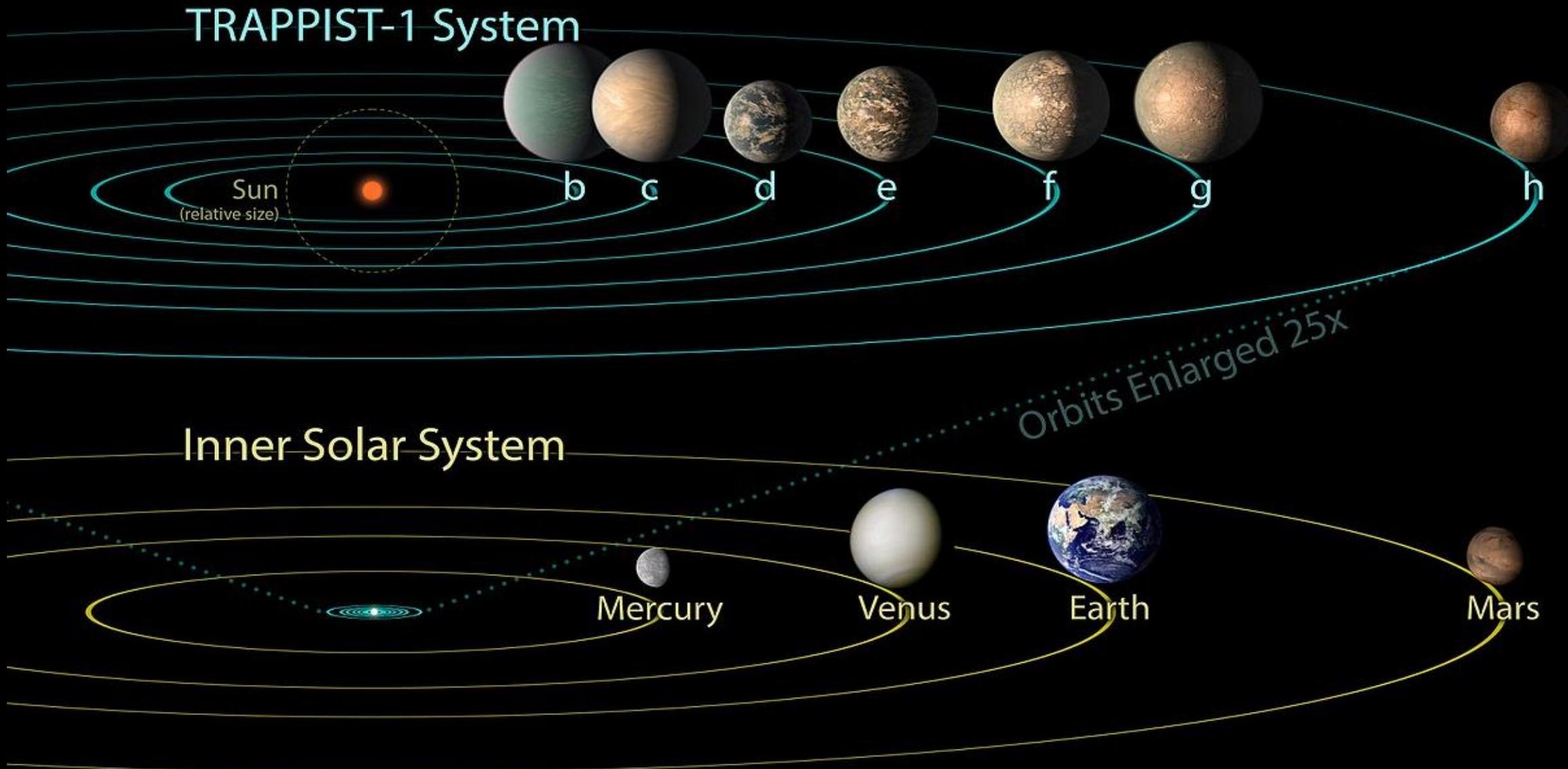
### Popular on Netflix



### Top Picks for Takafumi



# Machine Learning: Kepler-90 e il sistema solare Trappist

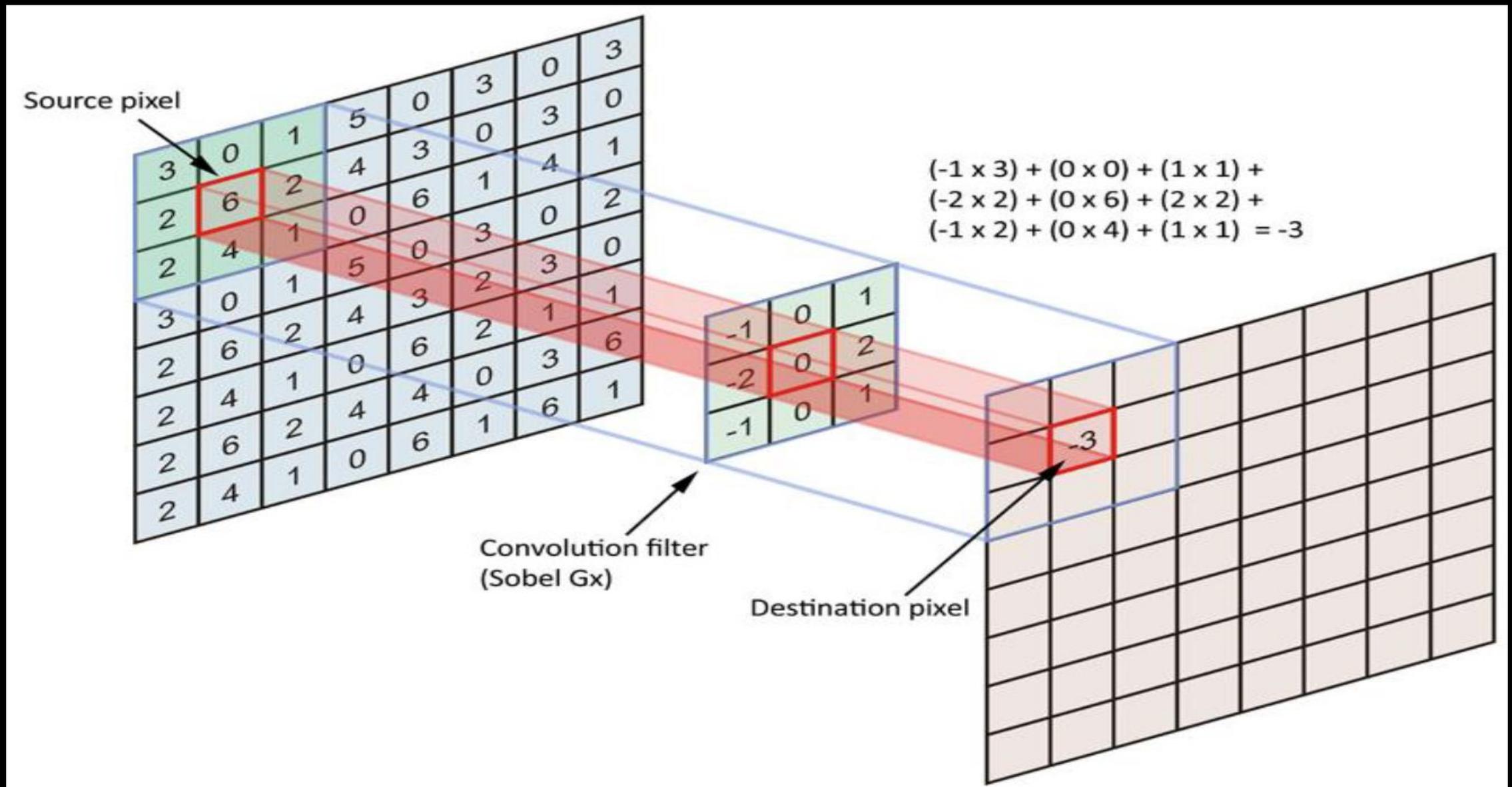


# Machine Learning: diagnosticare malattie

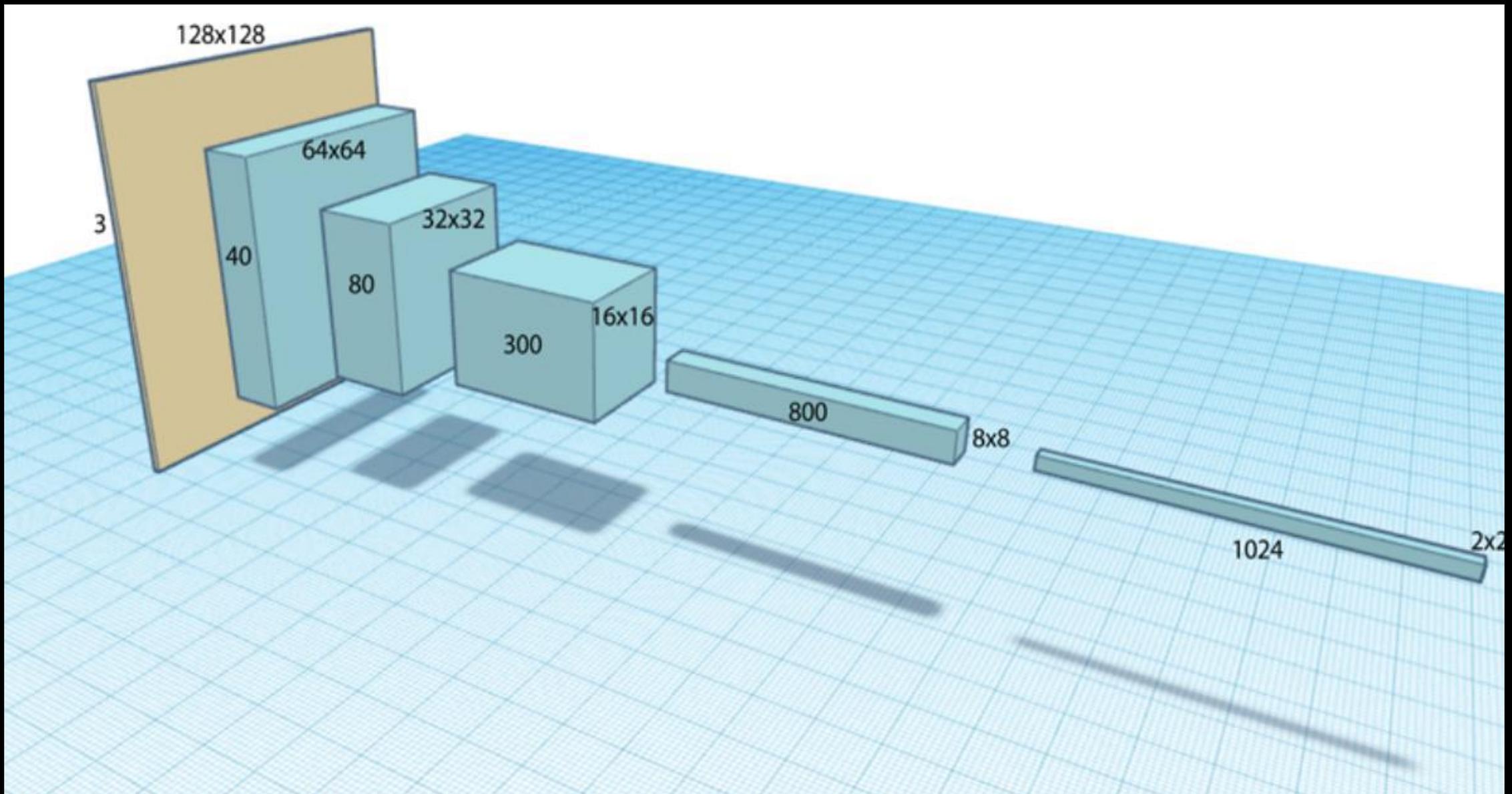
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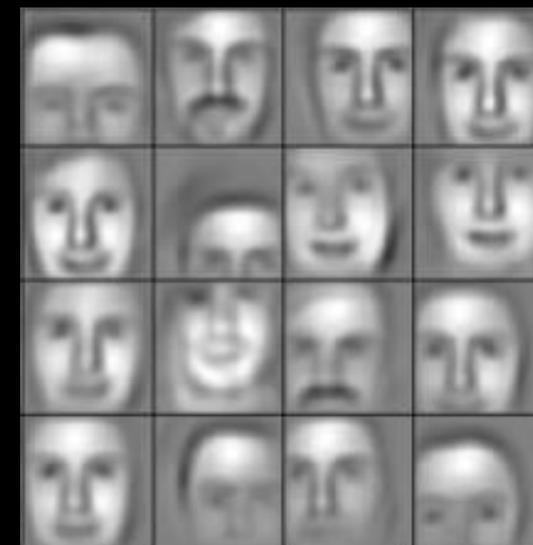
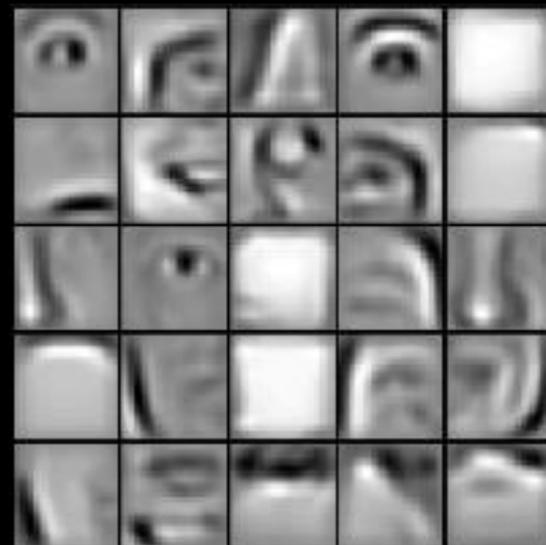
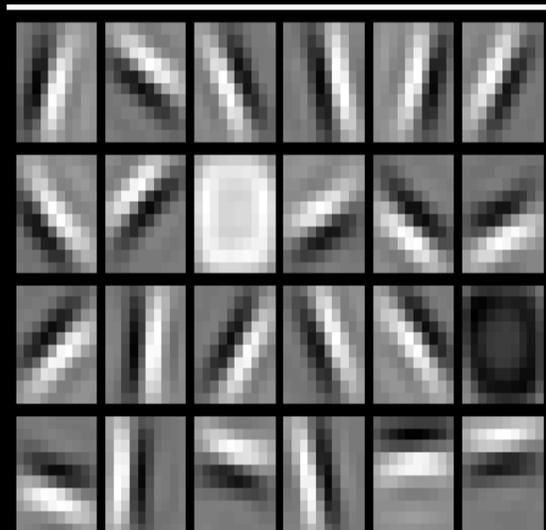
# Machine Learning: **la convoluzione**



# Rete Neurale Convoluzionale: **tensori, tensori, ...**

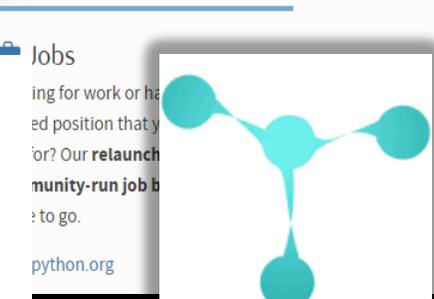
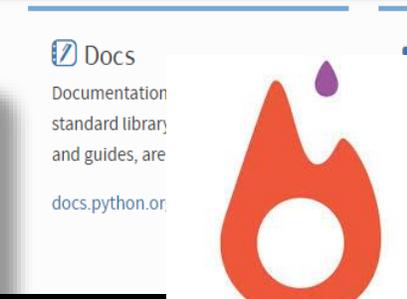
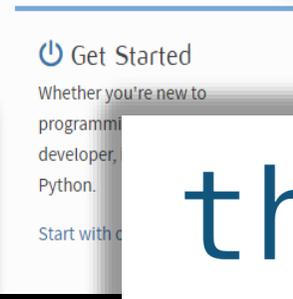
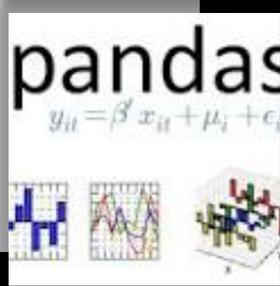
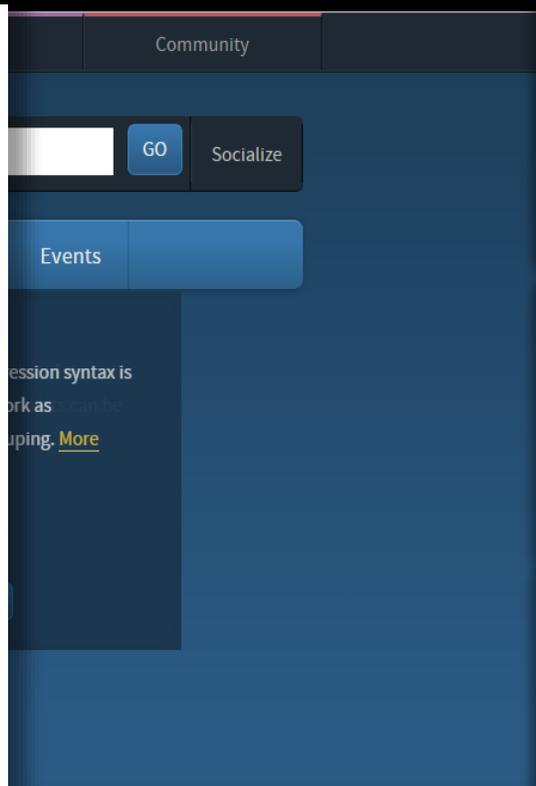
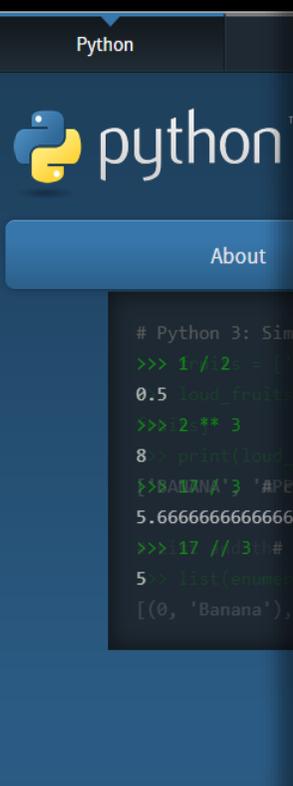


# Rete Neurale Convoluzionale: **il razionale**



**Come posso far imparare il mio computer?**

# Linguaggi/Ambienti per Machine Learning: Python



# Linguaggi/Ambienti per Machine Learning: cane e gatto



# Reinforcement Learning

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```
(tensorflow) C:\Users\fra_v>
```

# Reinforcement Learning: **AlphaGoZero**

Mosse Go  $10^{1761}$

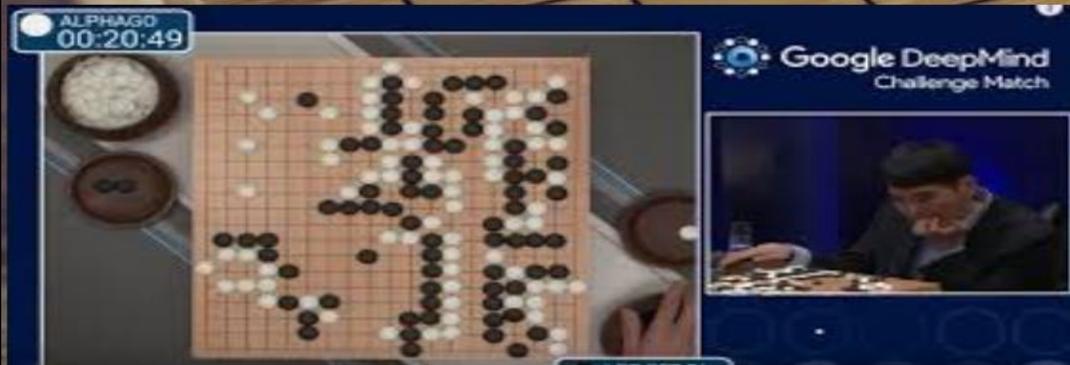
Mosse scacchi  $10^{123}$

Atomi universo  $10^{81}$



# Reinforcement Learning: AlphaGo & AlphaGoZero

2016: World Go Champion  
Beaten by Deep Learning



# Ringraziamenti

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**Daniele Bellani**

Convolutional Neural Networks - Python

[https://github.com/danibe248/kaggle\\_cats\\_and\\_dogs](https://github.com/danibe248/kaggle_cats_and_dogs)

**Francesco Stranieri**

Reinforcement Learning – Atari Games

[https://frenkowski.github.io/Atari\\_RL/](https://frenkowski.github.io/Atari_RL/)



# La Ri(E)voluzione non è ancora avvenuta

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Twitter: [@FabioAStella](https://twitter.com/FabioAStella)

# Machine Learning: Kepler-90 e il sistema solare Trappist



The image displays a row of eight planets, labeled b through h, against a black background. To the left of the planets is a large, bright orange celestial body. Below the planets is a NASA logo. Below the logo is a screenshot of a Twitter post from NASA (@NASA) with the following text:

**NASA** @NASA  
Explore the universe and discover our home planet with @NASA. We usually post in EDT (UTC-4).  
nasa.gov  
Iscritto a dicembre 2007

**Tweet** Tweet e risposte Contenuti

**NASA** @NASA · 2 h  
Roman gods & their mythological underworld: @IAU\_org & @NASANewHorizons agree on themes for naming Pluto's features: [go.nasa.gov/2IA3FFi](https://go.nasa.gov/2IA3FFi)  
Traduci dalla lingua originale: inglese

Chi seguire · Aggiorna · Visualizza tutto

- RecSysChallenge @recsy... Segui
- Karen Bellin @airviewing Segui
- TechCrunch @TechCrun... Segui

Trova amici

Tendenze · Modifica

#FordSocialHome  
1.067 Tweet