

EMS702P Statistical Thinking and Applied Machine Learning

Week 10.3 – Deep Learning: Engineering applications

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Deep learning

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Edition:

v1.1

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Deep Learning:

Neural networks with multiple hidden layers

Some engineering applications using Deep Learning:

- Classification
- Prediction (Regression)
- Clustering (Segmentation)

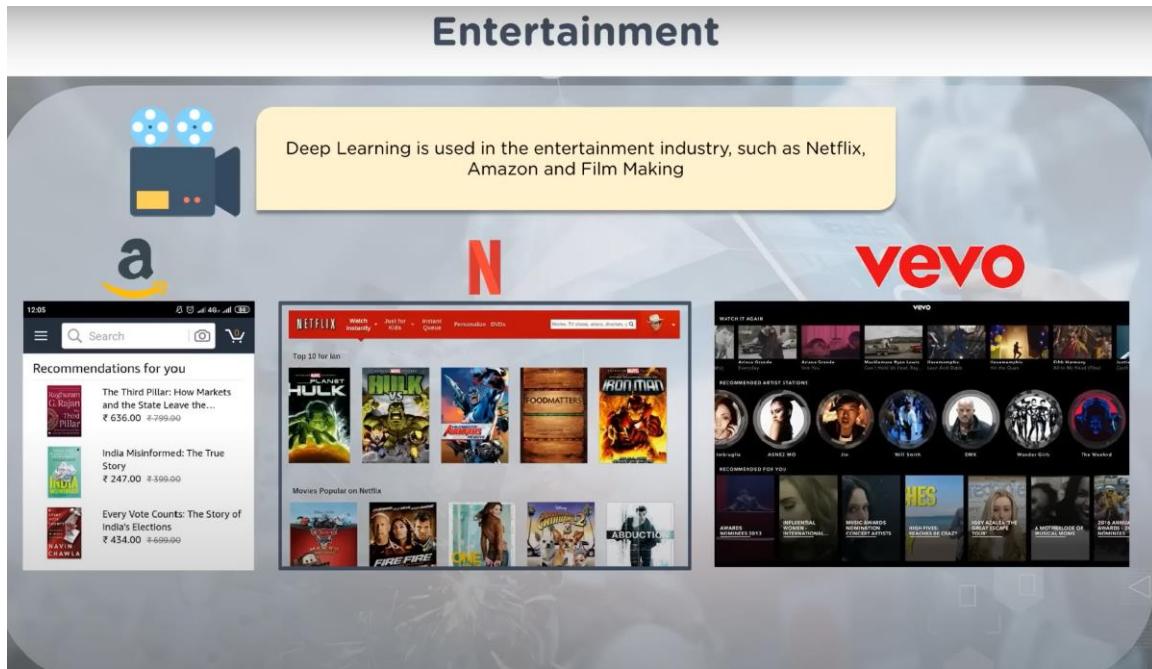
What's in it for you?



Healthcare

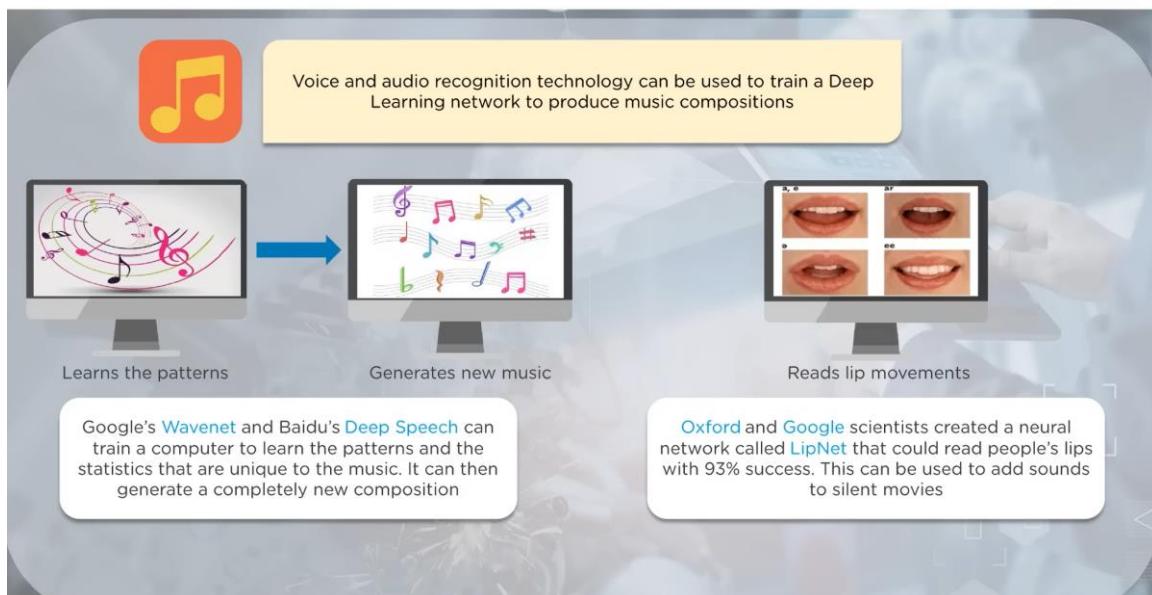


Deep Learning helps in early detection of [cancer cells](#) and [tumors](#), improves the time-consuming process of [synthesizing new drugs](#), and invents sophisticated [medical instruments](#).

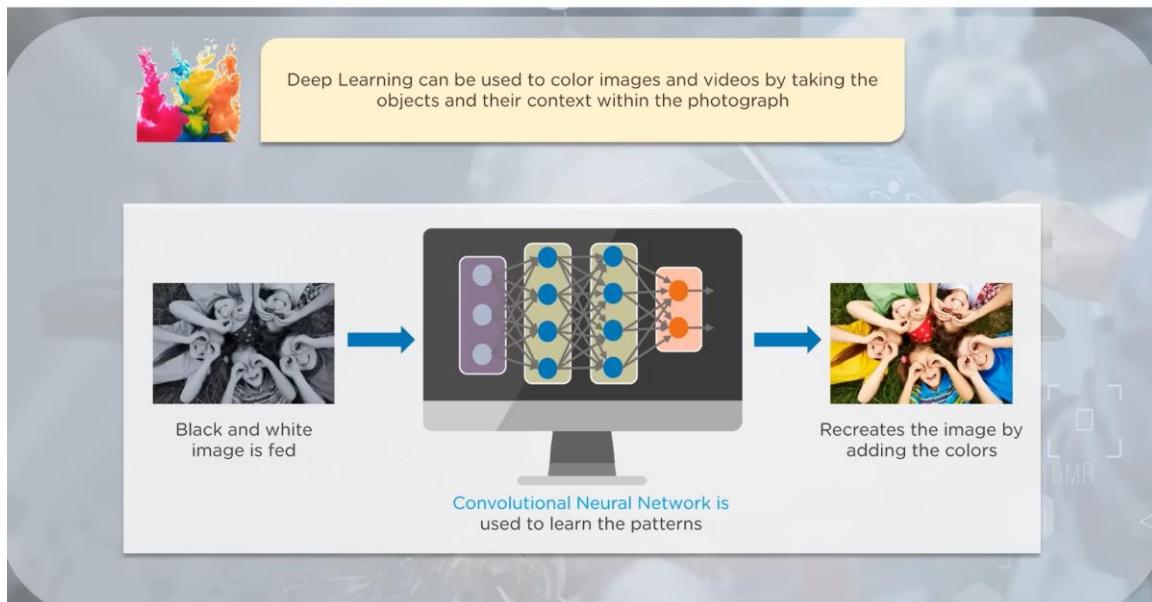


[Amazon](#), [Netflix](#) and [Vevo](#) use [recommender systems](#) to provide a personalized experience to its viewers using their show preferences, time of access, history, etc.

Music generation and adding sounds to silent movies



Coloring images and videos



Robotics

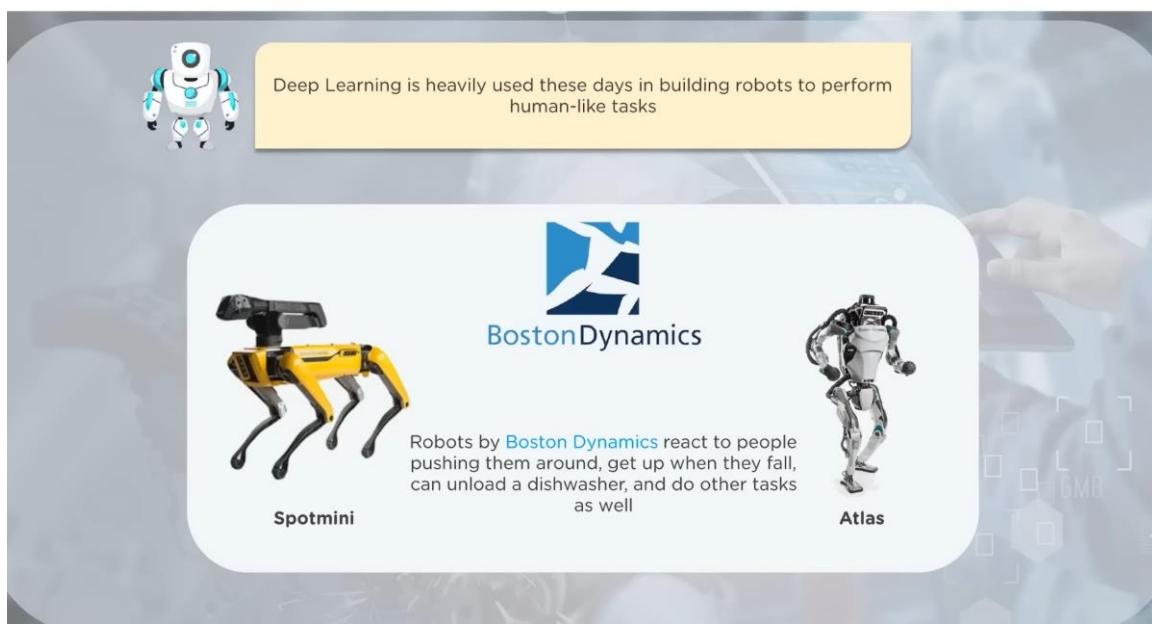
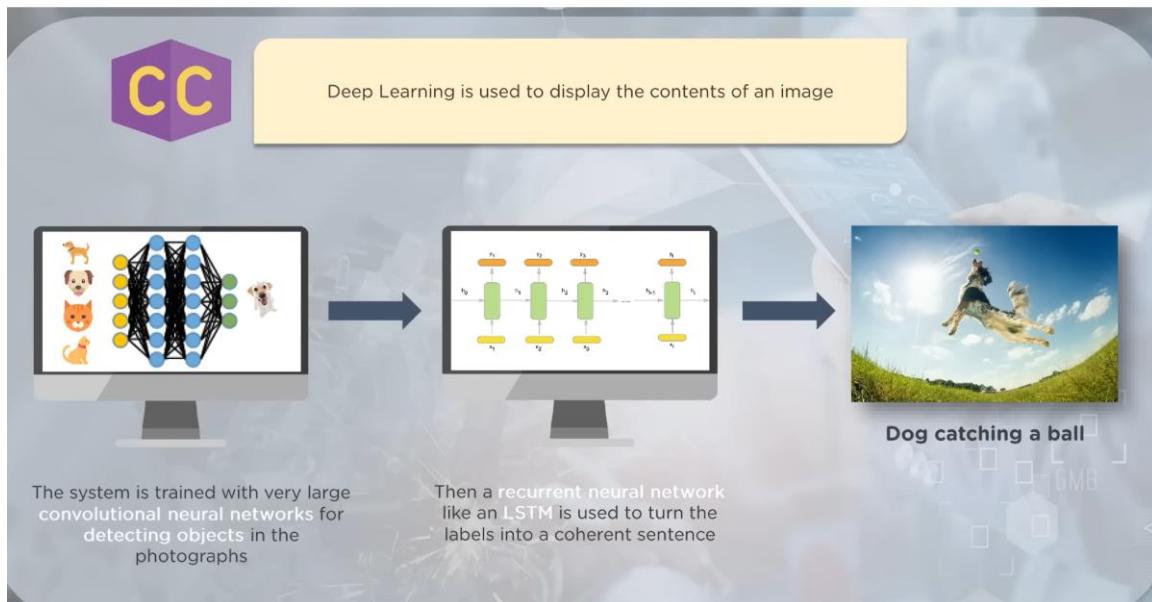
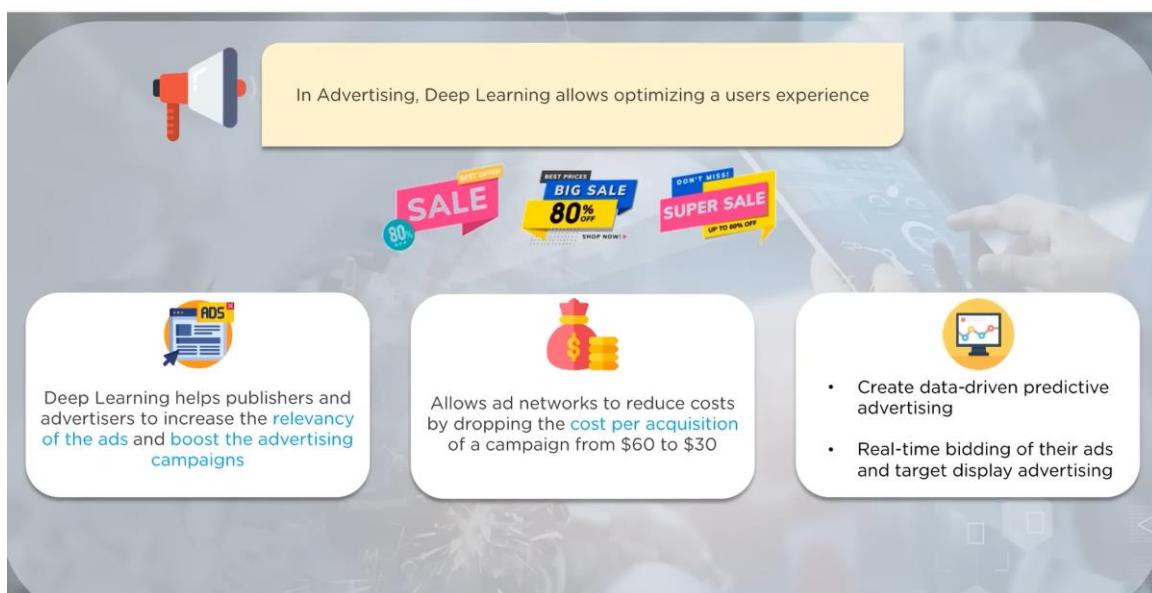


Image caption generation



Advertising



Earthquake prediction

The infographic is set against a background of a hand holding a smartphone displaying a map, with a blurred Harvard University crest watermark. It features several text boxes and icons.

- Top Left:** An icon of a house with a crack in the ground and a small tree next to it.
- Top Right:** A yellow callout box containing the text: "Deep Learning model can be used to predict earthquakes by considering a factor called [von Mises yield criterion](#)".
- Middle Left:** A cartoon illustration of a woman with brown hair, wearing a black blazer over a green top and black pants, pointing towards the center.
- Middle Center:** The Harvard University crest logo.
- Middle Right:** A blue arrow pointing right, followed by the text: "This application helped to improve the earthquake calculation time by **50,000%**".
- Bottom Left:** A white text box containing the text: "Scientists at Harvard used Deep Learning to teach a computer to perform [viscoelastic computations](#), which are used in the prediction of earthquakes".