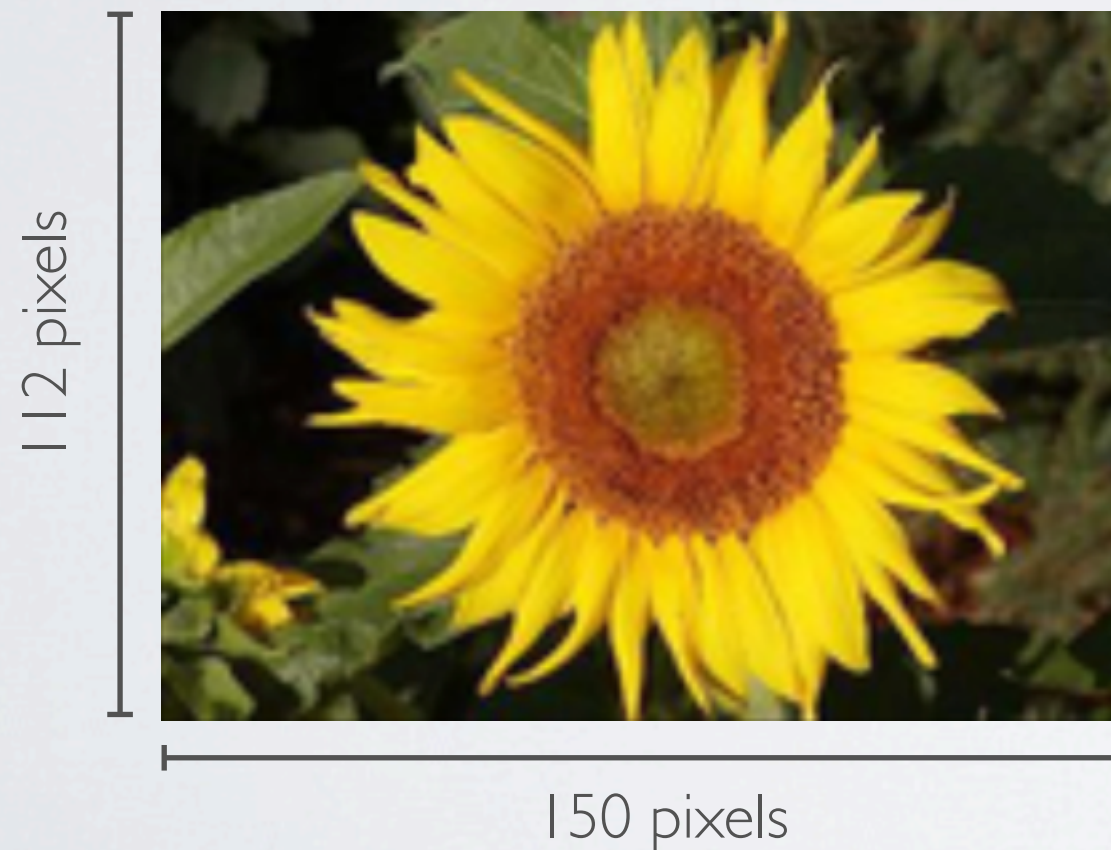# Neural networks

Computer vision - motivation
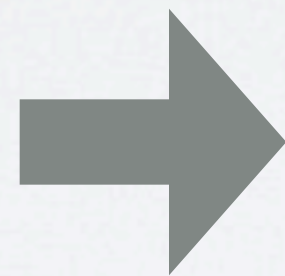
COMPUTER VISION

Topics: computer vision, object recognition

• Computer vision is the design of computers that can process visual data and accomplish some given task

▸ we will focus on object recognition: given some input image, identify which object it contains

Caltech 101 dataset

112 pixels

150 pixels

➡ "sun flower"

COMPUTER VISION

Topics: computer vision

• We can design neural networks that are specifically adapted for such problems

‣ must deal with very high-dimensional inputs

- 150 x 150 pixels = 22500 inputs, or 3 x 22500 if RGB pixels

‣ can exploit the 2D topology of pixels (or 3D for video data)

‣ can build in invariance to certain variations we can expect

- translations, illumination, etc.

• Convolutional networks leverage these ideas

‣ local connectivity

‣ parameter sharing

‣ pooling / subsampling hidden units