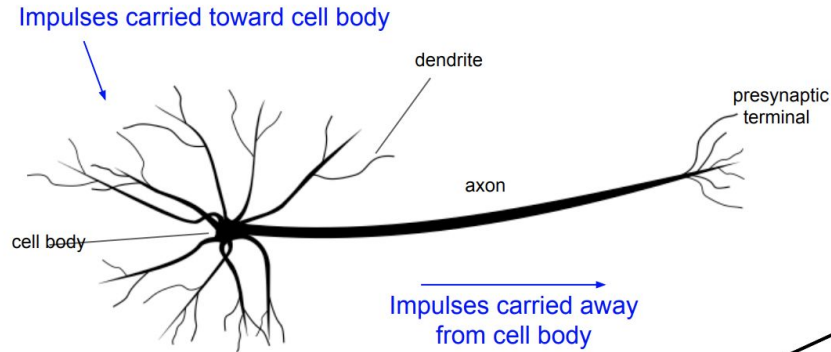


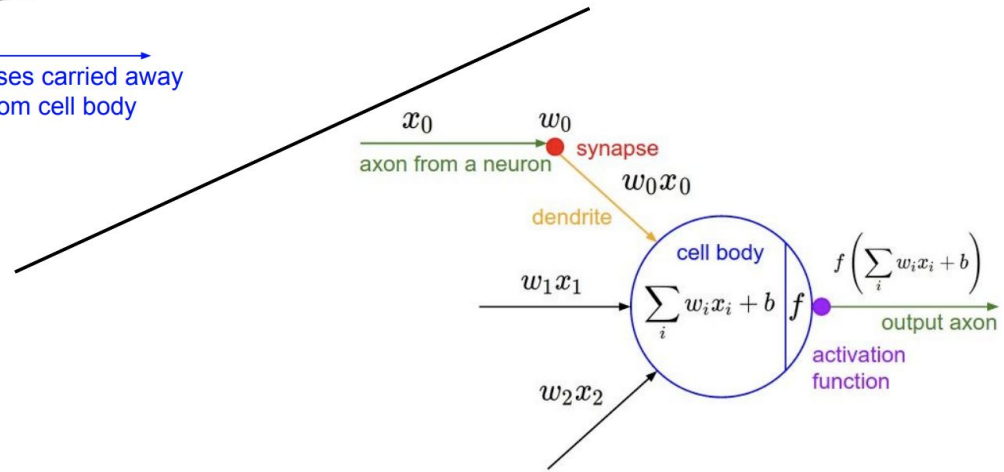
# AI Applications

Modern applications of Artificial Intelligence

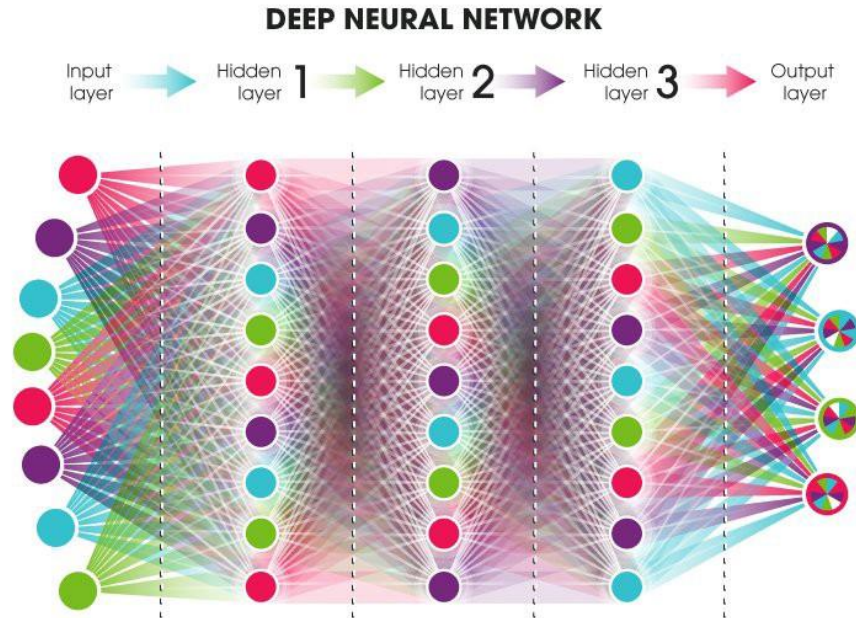
# Artificial Neuron



This image by Felipe Peruchio  
is licensed under [CC-BY 3.0](#)



# Artificial Neural Network - Deep Learning

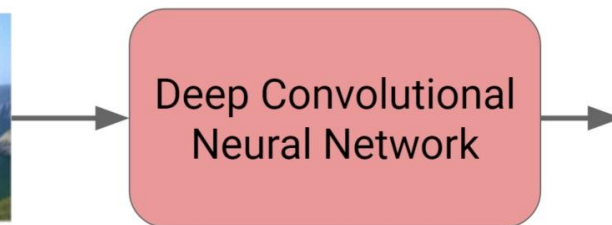


# Automatic Image Tagging

## Google Photos Search



Your Photo



**"ocean"**

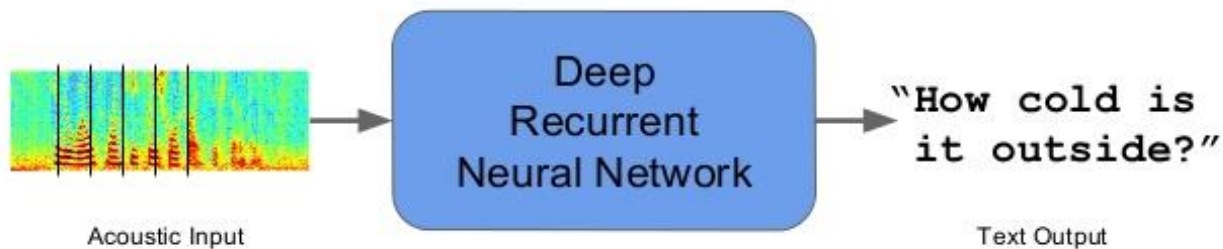
Automatic Tag

Search personal photos without tags.

Google Research Blog - June 2013

# Speech to Text

## Speech Recognition

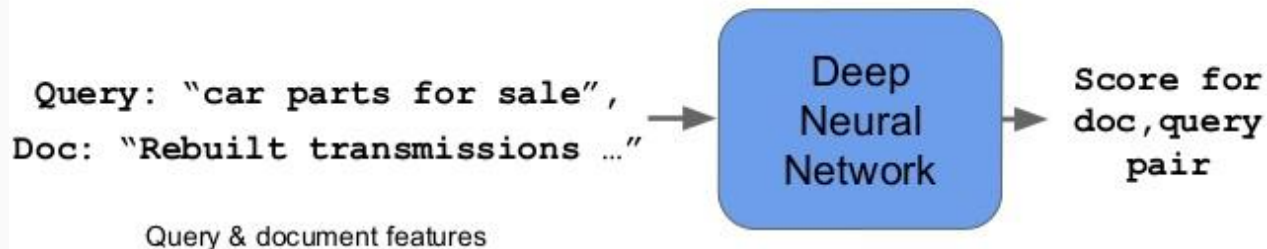


Reduced word errors by more than 30%

Google Research Blog - August 2012, August 2015

# Page Ranking

## RankBrain in Google Search Ranking

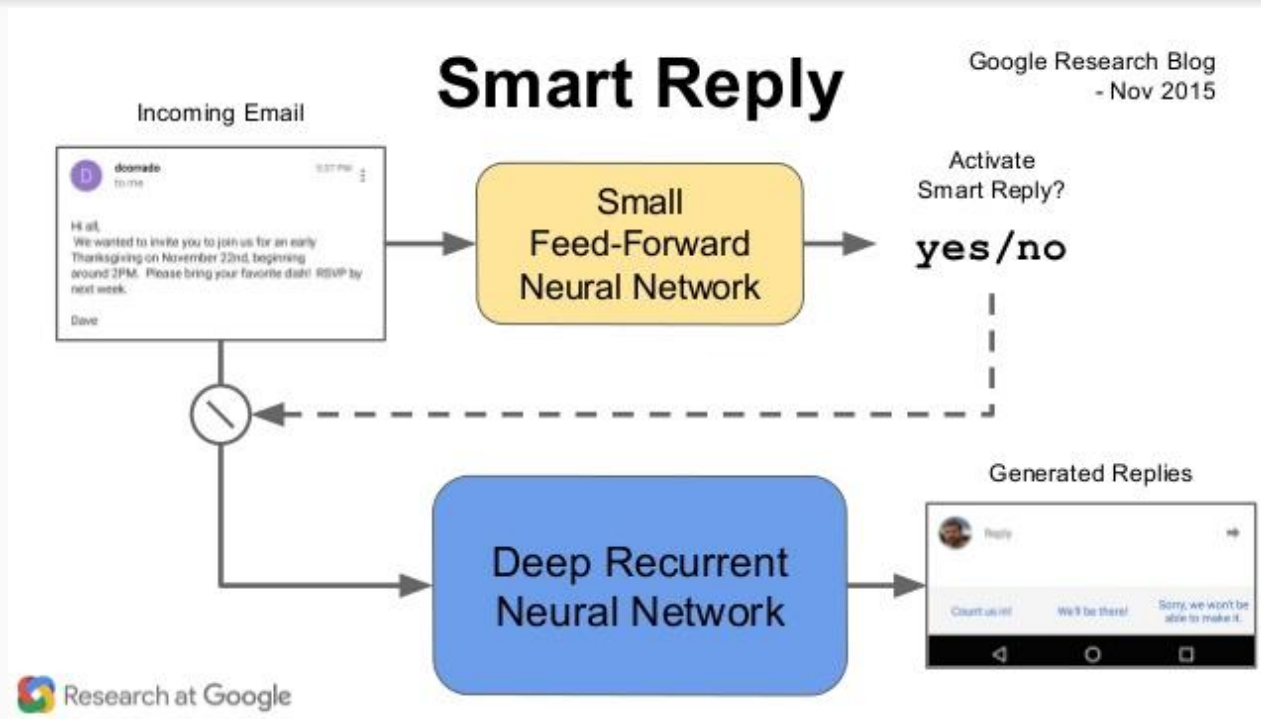


Launched in 2015

Third most important search ranking signal (of 100s)

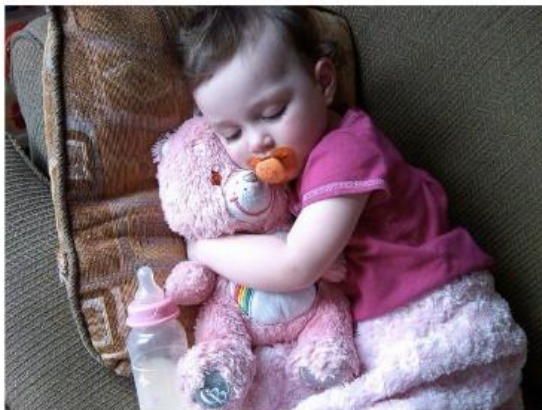
Bloomberg, Oct 2015: "Google Turning Its Lucrative Web Search Over to AI Machines"

# Auto Reply



# Image Captioning

## Generating Image Captions from Pixels



*Human:* A young girl asleep on the sofa cuddling a stuffed bear.

*Model sample 1:* A close up of a child holding a stuffed animal.

*Model sample 2:* A baby is asleep next to a teddy bear.



# Estimate solar savings potential



Analysis complete. Your roof has:



**1,531 hours of usable sunlight per year**

Based on day-to-day analysis of weather patterns



**758 sq feet available for solar panels**

Based on 3D modeling of your roof and nearby trees

## \$5,000 savings

Estimated net savings for your roof with a 20-year lease

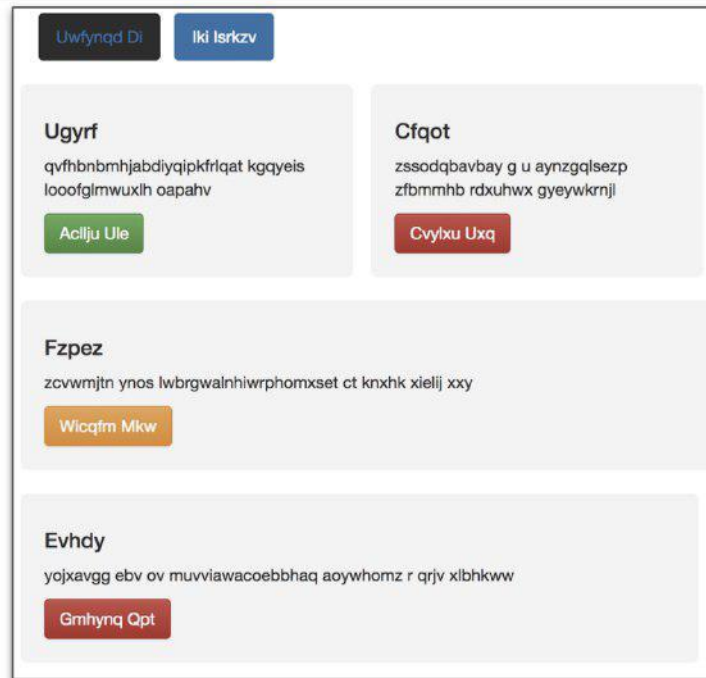
[FINE-TUNE ESTIMATE](#)

[SEE SOLAR PROVIDERS](#)

Wrong roof? Drag the marker to the right one.



# Front-end Development



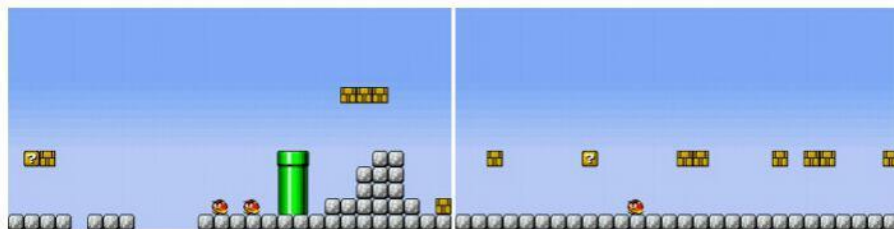
# Self-driving Cars



# Generate New Game Levels



**Figure 6: Level with increasing difficulty.** Our LVE approach can create levels composed of multiple parts that gradually increase in difficulty (less ground tiles, more enemies). In the future this approach could be used to create a level in real-time that is tailored to the particular skill of the player (dynamic difficulty adaptation).



(a) Playable level maximizing jumps

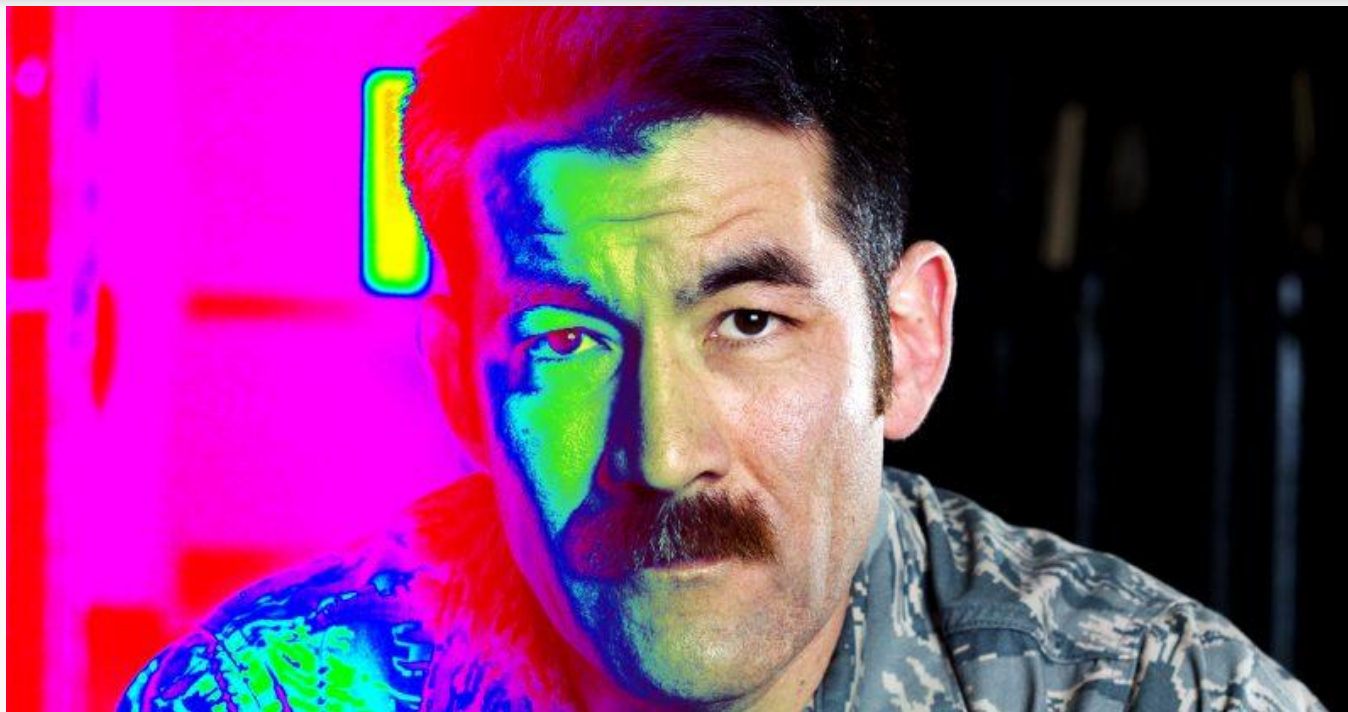
(b) Playable level minimizing jumps



(c) Unplayable level

(d) Broken tiles

Recognize faces in the dark and through walls





# Deep Painterly Harmonization



# Style Transfer

## 1 Upload photo

The first picture defines the scene you would like to have painted.



## 2 Choose style

Choose among predefined styles or upload your own style image.



## 3 Submit

Our servers paint the image for you. You get an email when it's done.



# Style Transfer

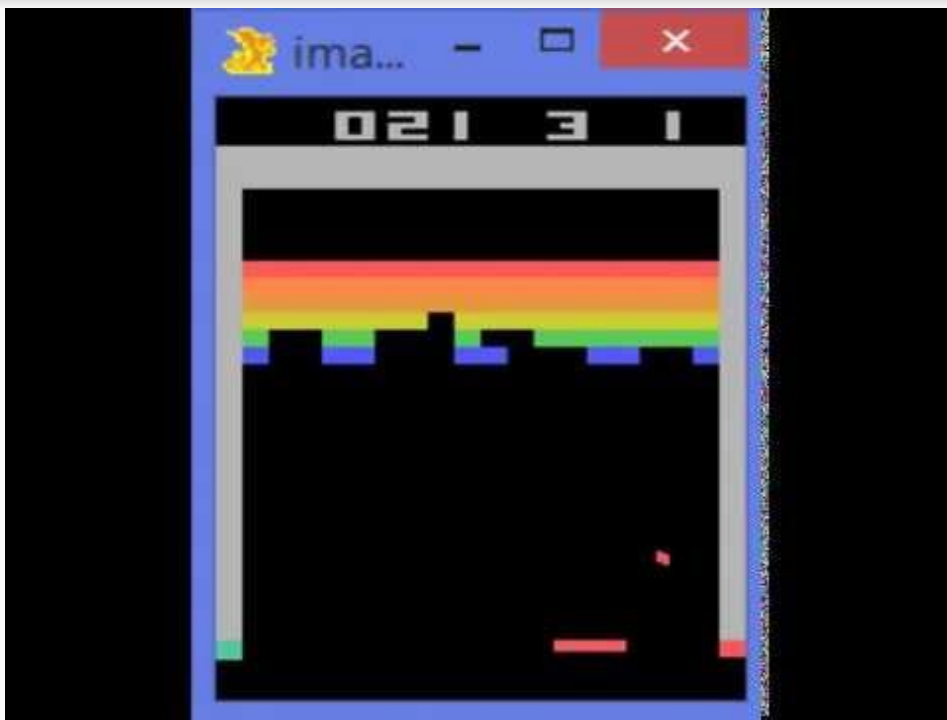




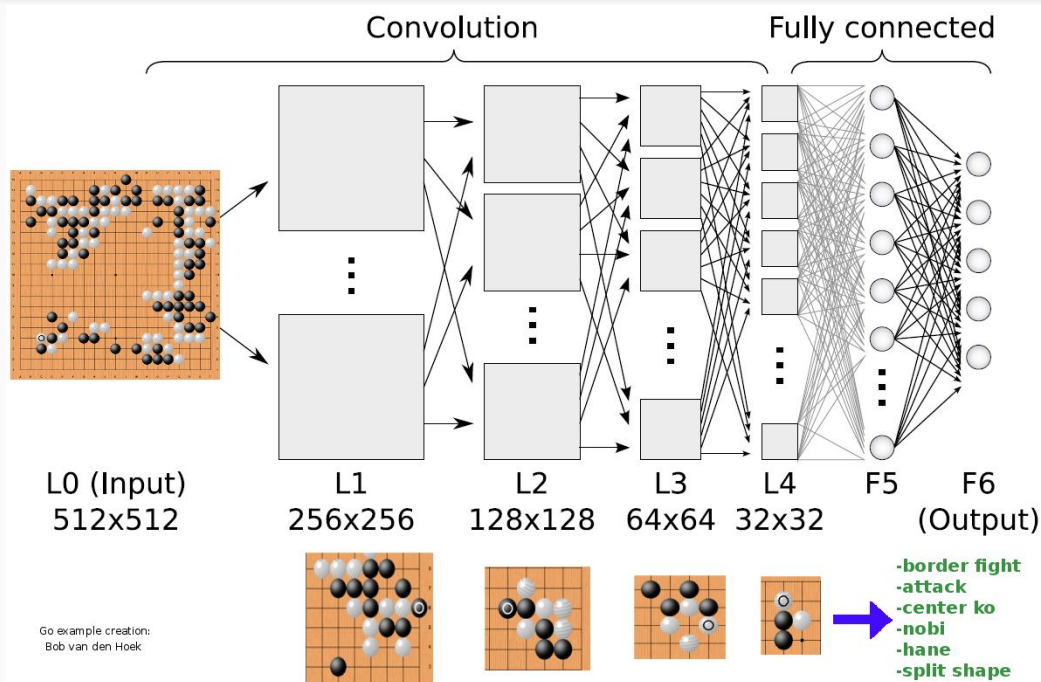
# Deep Style



# Play ATARI Games



# Play Board Games



# Image Generation

Labels to Street Scene

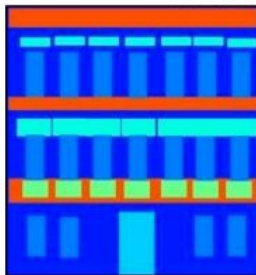


input



output

Labels to Facade



input



output

BW to Color



input



output

Aerial to Map



input



output

Day to Night



input



output

Edges to Photo

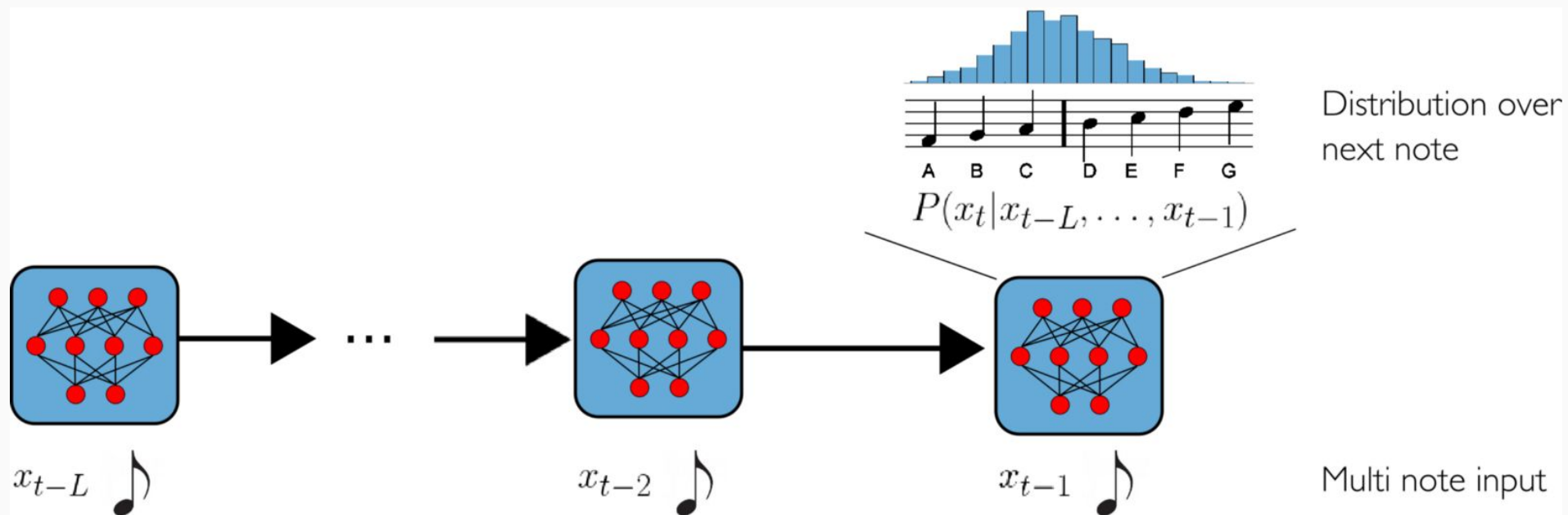


input

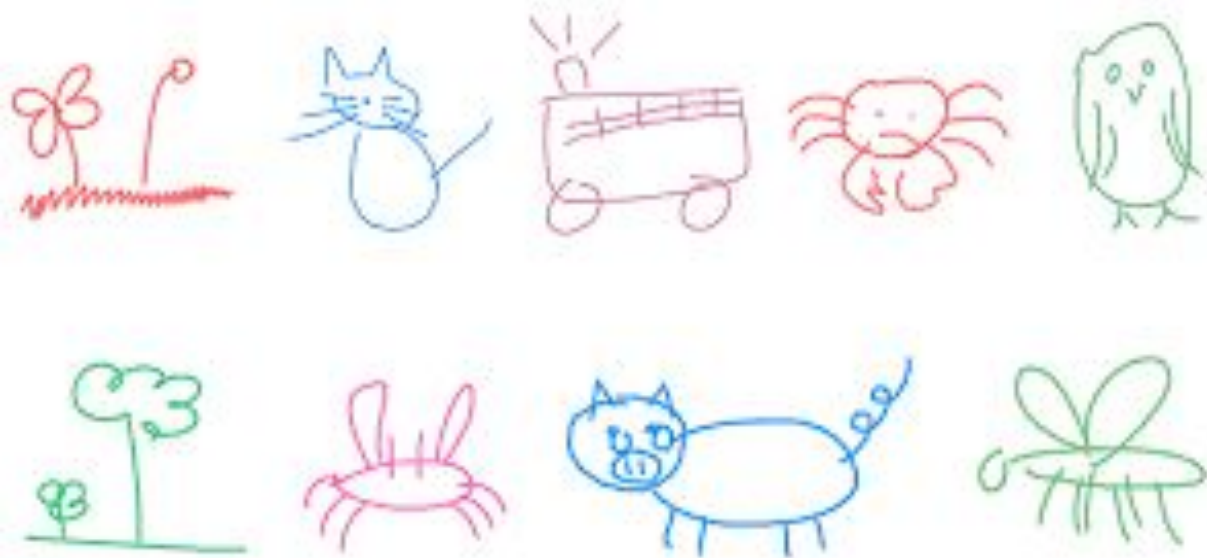


output

# Music Generation



# Drawing





# Finding Tiny Faces

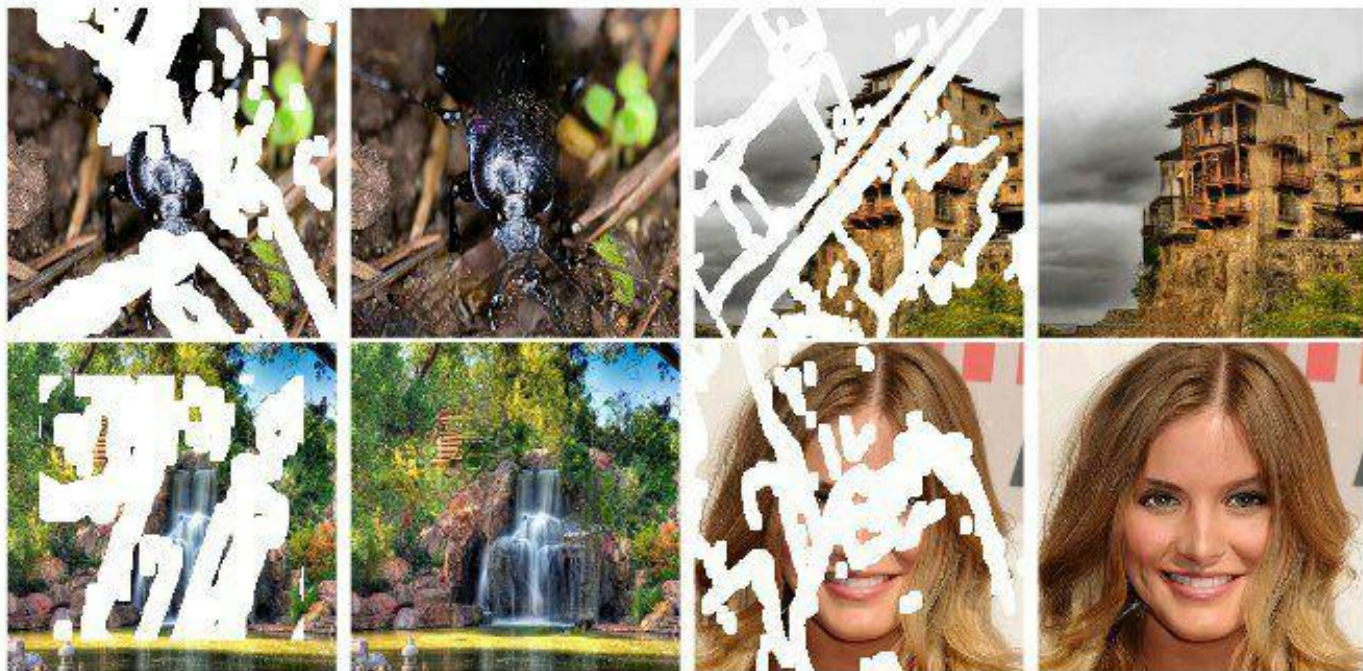


# Google Duplex





# Image Inpainting



# Image Outpainting

INPUT



OUTPUT



# Eye-opener

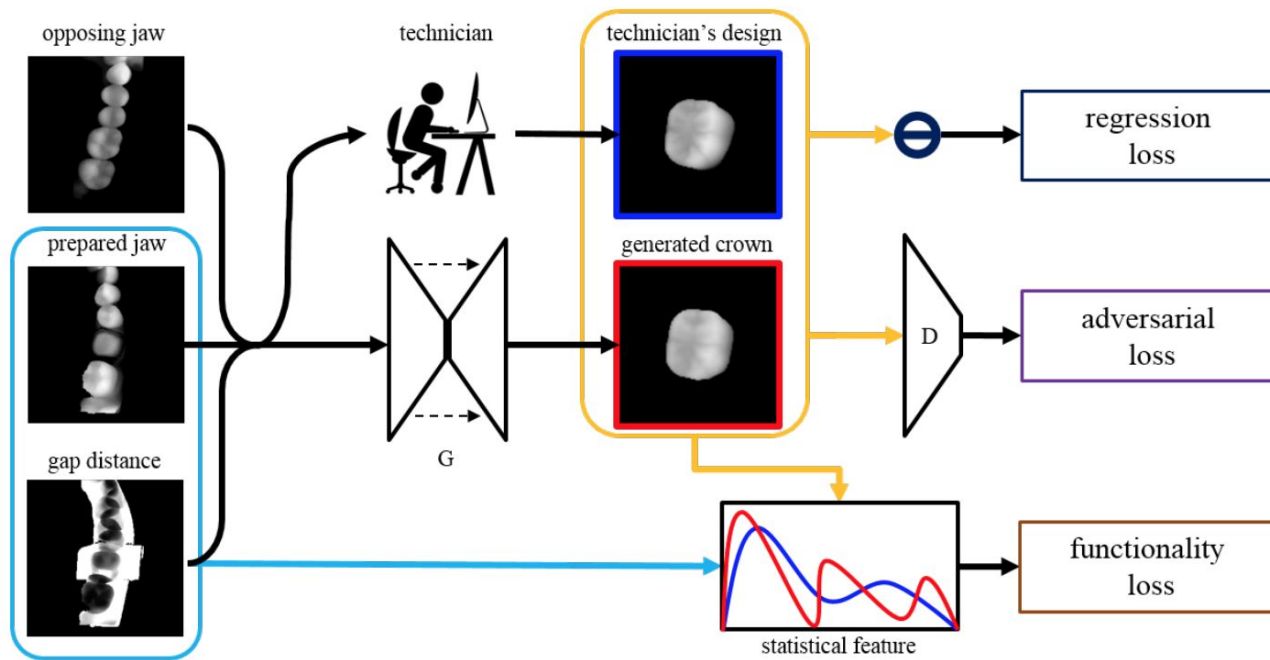


# Raindrop Removal from a Single Image





# Design Dental Crowns



# Learning Lip Sync from Audio

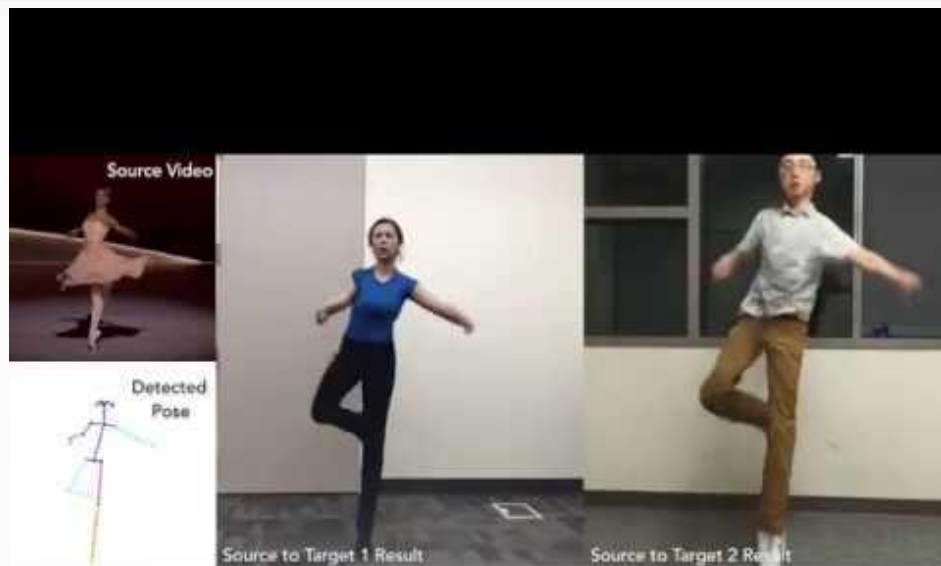


# Move Mirror



MOVE  
MIRROR

# Everybody dance now!





# Play Dota 2



Thank You!