Some project ideas appear below; but you can use any dataset you wish instead.

Additional data-sets can be found at the KAGGLE website: <https://www.kaggle.com/datasets>

1. Speaker / Singer identification (recognition):

In this project you will build a speaker recognizer using deep learning.

A dataset can be found here: <http://www.speech.cs.cmu.edu/databases/an4/> (additional audio data could be downloaded from lectures and talks with no crowd, e.g. Coursera). You may want to record yourself as well, and show how a dummy agent can reply "good morning X" according to the speaker (ignoring what the speaker actually said).

A baseline may use a shallow neural-network, which may be extended to a more sophisticated NN (e.g. RNN LSTM).

It would be interesting to extend this work to identify singers (automatically identify who the singer or band of a song is). This project may later be extended to a full automatic speech recognition system (but this is out of the scope for the class project).

You can use MFCC features, you can use: <https://github.com/jameslyons/python_speech_features> on the signal to obtain them.

You can start with only a single male voice and a single female voice.

Other options include the detection of gender / language (see VoxForge for dataset, you may need to use wget to download)

You could create an app for detecting user's accent. You can find data at: <http://accent.gmu.edu/browse_language.php?function=detail&speakerid=61>

2. Fill holes in images.

Create an app which will allow a user to mark an area in the picture which should be completed automatically. Can be useful for removing unwanted items which appear in an image, a camera with a black/blind/covered-spot, removing glare from glasses etc. In case of a mal-functioning camera, that same camera can be used to take a picture of a white wall or paper to identify where it's black-spots are.

You can get images from ImageNet (<http://image-net.org/download-images>). For training your model, simply remove some areas of your image, and use the original image as the label (the loss should be some distance between your prediction and the original image).

3. Predict election results in Israel, based upon polls. (I will provide data from last 4 Israeli elections). In the first stage use should use all polls to predict final results (using leave-one-out cross validation), but in second stage you should use only partial results (i.e. predict based upon all polls up-to a specific date which may be way ahead of the elections themselves). It is possible (but not required) to make use of the Israeli Knesset seat allocation method: <https://www.knesset.gov.il/elections18/heb/about/MandatesSystem.aspx>.

A baseline method could include an average over the last X polls. (This baseline method must, obviously, be outperformed by your machine learning based method.)

4. Use ImageNet (<http://image-net.org/download-images>) data to create a classifier, and then visualize the weights learned by the hidden layers by activation maximization.

5. Build an agent that can play a game using deep reinforcement learning. Note that we will be learning it only towards the end of the semester, so you will need to learn it in advance.

6. Given some flight information, predict when it will actually arrive at the destination (or something more interesting), obtain the dataset from: <https://www.transtats.bts.gov/DL_SelectFields.asp?Table_ID=236&DB_Short_Name=On-Time>

8. Take a few books from the bible (in English of course), and try classifying each verse to the book it was taken from.

9. Try predicting a value related to the number 3x+1 problem (e.g., the highest value each number approaches, or the total numbers in the sequence of numbers until ending-up in 1).

Additional interesting datasets:

A dataset for images and relations between them: <http://visualgenome.org/api/v0/api_home.html>

data-set: <https://aws.amazon.com/public-data-sets/multimedia-commons/> (<http://www.multimediacommons.org/>, <http://multimedia-commons.s3-website-us-west-2.amazonaws.com/>)

<https://www.cs.cornell.edu/%7Ecristian/Cornell_Movie-Dialogs_Corpus.html>

We will be learning MNIST at class, so please don’t use MNIST as your project.