Deep Q Learning for Visual Cue Game Play with Snake

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2 Abstract of the project

Q-learning is a fundamental approach when dealing with reinforcement learning problems wherein the problem has been modeled as a Markov Decision Process (MDP). Using Q-learning for models with finite decision states, we are quickly able to find the expected utility of each action at an MDP state and accordingly find the optimal course of action. A recent application of Q-learning to deep learning, by Google DeepMind, titled "deep reinforcement learning" or "deep Q-networks", has been successful at playing some Atari 2600 games at expert human levels. Preliminary results were presented in 2014, with a paper published in February 2015 in Nature[1].

Our project idea is to explore this theme of Deep Q learning in the context of the classic game Snake[2]. We will be using multiple variations of the game with varying constraints and model it as a reinforcement learning process by developing a policy to maximize a score given an alive-penalty. The model will have the game canvas grid itself as input (as an matrix encoding or pixel values) and will have no knowledge of positions. In the initial models, we will have a static length snake and try to develop a policy for its motion. This is trivially an MDP. Complexity of the model increases when we introduce obstacles and increase the grid size. The MDP model, we believe, should still be able to maximize the utility under these circumstances.

The Markov assumption breaks down[1] when we allow the snake to grow in length with time and incorporate active history of previous actions. In this exploratory phase of the project, we want to analyses the performance of deep Q learning as well as research and develop techniques of modeling this variation.

NOTE: No additional data resources are required for this project.

References

[1] V. Mnih, K. Kavukcuoglu, D. Silver, A. Graves, I. Antonoglou, D. Wierstra, and M. A. Ried-miller, "Playing atari with deep reinforcement learning," *CoRR*, vol. abs/1312.5602, 2013. [Online]. Available: http://arxiv.org/abs/1312.5602

[2] Snake (video game). (2017, January 26). In Wikipedia, The Free Encyclopedia. Retrieved 17:05, February 19, 2017, from https://en.wikipedia.org/w/index.php?title=Snake_(video_game)&oldid=762031031

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[1] In fact, it might be possible to model this variation as an MDP. We won't be exploring this idea.

SPEECH TO TEXT API

1 Group members

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2 Abstract of the project

We will make a ChatBot System where user will give input in audio form and get output in audio form,in the background text to text communication between users is done and on the frontend everything is in speech form.We will use concepts of DataMining,Machine Learning and NLP to make this project.We will use api.AI to process natural language. Chat bot will communicate to the customers and frequently give answers to their Queries We will use Node.js to upgrade the bot.So the basic knowledge of javascript and Node.js is needed for this project. With the new app our bot will be able to remember things,i.e store information into a database or connect to other API services. With this, bot will gain external knowledge and functionality. For Converting speech to text we will use Google Liv.api that will enables developers to convert audio to text by applying powerful neural network models in an easy way.The API recognizes over 80 languages and variants,to support global user base.It can transcribe the text of users dictating to an application microphone,enable command-and-control through voice,or transcribe audio files,among many other use cases. Recognize audio uploaded in the request,and integrate with audio storage on Google Cloud Storage.

2.1 Data sources

1)https://www.udemy.com/chatbots/
2)https://www.chatbots.org/country/in
3)https://github.com/chrisenytc/liv-api
4)http://www.nactem.ac.uk/resources.php
5) Paper on"LIBRISPEECH: AN ASR CORPUS BASED ON PUBLIC DOMAIN AUDIO BOOKS"
by Vassi Panayotov, Guoguo Chen , Daniel Povey , Sanjeev Khudanpur

Game Bot

1 Group members

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2 Abstract of the project

The aim of this project is to create a game bot which will learn to play a game from its own experience. We plan to use Neural Network and Genetic Algorithm. This project was inspired by MarI/O, which is a similar bot developed by Seth Bling and demonstrated in his youtube video (Link in Data Sources).

2.1 Data sources

MarI/O
Artificial Intelligence in Google's Dinosaur

AMAZON BOOK REVIEWS

1 Group members

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2 Abstract of the project:

In this project we will do Sentiment Analysis on Amazon Book Reviews. We will be using Deep Neural Network for this Sentiment Analysis. Sentiment Analysis can be of three types:

1. Positive

2. Negative

3. Neutral

This analysis can be done using any of this following methods:

1. Baseline Method.

2. Naive Bayes.

3. Maximum Entropy.

4. Support Vector Machine.

Using this method we will calculate the positive, negative and neutral sentiment. Then we will compare it with the actual result to find the accuracy.

2.1 Data sources:

We are taking data from amazon book reviews for the list of books:
Gone Girl, The Girl on the Train, The Fault in our Stars, Fifty Shades of Grey, Unbroken, The hunger games, The Goldfinch, The Martian.
Link for data: http://archive.ics.uci.edu/ml/datasets/Amazon+book+reviews

2.2 Reference:

1. Sentiment Analysis and Opinion Mining by Bing Liu.

2. Opinion mining and sentiment analysis by Bo Pang and Lillian Lee.

3. Transfer Learning for Cross-Lingual Sentiment Classification with Weakly Shared Deep Neural Networks by Guangyou Zhou, Zhao Zeng, Jimmy Xiangji Huang, and Tingting He.

On KDD cup Dataset (Intrusion Detector Learning)

1   Group members

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2   Abstract of the project

I am going to do my project on KDD cup data set. This data is based in intrusion detection types. Data is given separately for training and testing. For the given training dataset, I have to build the model using the method(Neural network, Support vector machine, Regression Technique) , not clear this time. After building the model, we are going to test the accuracy of our model on the testing dataset or it can also be possible for the given training data set(70 percent for the training the model and 30 percent for the testing). In the KDD cup data set forty one features are given and there are basically four types of attacks are given. For building the model I have to used these given features.

2.1   Data sources

http://archive.ics.uci.edu/ml/datasets/KDD+Cup+1998+Data

Handwritten Digit Recognition

18/february/2017

1   Group members

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2   Abstract of the project

Handwritten Digit Recognition System involves reception and interpretation of handwritten digits by a machine. Due to variation in shape and orientation of handwritten digits, it is difficult for a machine to interpret handwritten digits. Handwritten digit Recognition has a wide area of research due to its vast applications like automatic bank cheques processing, billing and automatic postal service. In this thesis, an Offline Handwritten Digit Recognition System is presented. The recognition system is broadly divided into 2 parts, first part is feature extraction from handwritten images and the second one is classification of feature vector into digits. We propose descriptors for handwritten digit recognition based on Histogram of Oriented Gradient (HOG) feature .It is one of the widely used feature vector for object detection in computer vision. For classification of features, linear Support Vector Machine Classifier is proposed.

We will use MNIST dataset for implementing the Digit Recognition. Which consist of 70000 samples for all digits each digit may have more than 7000 samples.

The Language we can use for implementing the system is either java or python.

2.1   Data sources

List of data sources.

MNIST Dataset http://yann.lecun.com/exdb/mnist/

Lung Cancer Detection

18 February 2017

1 Group members

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2 Abstract of the project

The count of lung cancer patient is increasing day by day. It would be a boon if cancer can be detected earlier. Researchers are looking forward to use CT images for detecting lung cancer. Some areas of lung become abnormal for a cancerous patient. Abnormal areas can be both cancerous or non-cancerous. We are planning to design a deep learning network that can detect whether abnormal areas are cancerous or not. The data set consists of several CT scan images. The basic aim is to analyze the pattern of abnormal cancerous area in lung so that given any CT image, it can be accurately detected whether the patient is cancerous or not.

2.1 Data sources

The data sources are available at: *https://www.kaggle.com/c/data-science-bowl-2017*. The data contains many CT images in 'DICOM' format.

Image Classification : Face Detection and Recognition

February 19, 2017

1 Group members

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2 Abstract of the project

Detection and recognition of human faces is a very important problem for surveillance application. By, detection persons across frames of a video we can identify persons of interest and track their movement across the location where the surveillance is active. In this project we will start firstly with the CIFAR dataset [1], train a convnet over it, to enhance our implementation skills for the network. Then we will proceed towards face detection. We will develop methods which can recognize faces similar to HAAR Cascades, an OpenCV technique for face detection. We will try to generate dataset by extracting faces of persons from multiple videos. Train our network over it and try to test images to detect faces. Later on we will try to extend this over detecting person in frames of video by detecting their faces with the help of our convnet.

2.1 Data sources

1. The CIFAR-10 dataset [http://www.cs.toronto.edu/ kriz/cifar.html]

2. Building powerful image classification models using very little data [https://blog.keras.io/building-powerful-image-classification-models-using-very-little-data.html]

Chat Bot

1 Group members

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2 Abstract of the project

Chat Bot which is also named as Conversational Agent or Dialogue System is a computer program which communicates with human or machine via text or auditory methods. Chat bots are used now a days for various practical purposes including customer service or information acquisition. In this project we are going to solve the problem of message classification using natural language processing and deep learning techniques. The Chat Bot will read the message and classify the message into different categories named as General, Location, Schedule and Urgent. Here, each categories can have various sub-categories like Call, Meeting, Query.

2.1 Data sources

List of data sources.

Title of the project

1 Group members

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2 Abstract of the project

Multilingual Question Answering

Hindi is not so fortunate language with respect to English in terms of the number of tools available and quality of these tools. So we can use Cross Language Learning which can use annotated resources available in some resource fortunate language to bring NLP capability to a less fortunate language. Aim is to learn a common representation from two language of the same data such that: (i) any single language can be reconstructed from the common representation, (ii) a single language can be predicted from the representation of another language and (iii) the representations learned for the two language are correlated. Now a days other languages like Hindi etc. are getting importance like English language in digital contents. So many researches are going on to make other language NLP tools and there quality equivalent to English. An obvious solution to this problem is to improve the annotated inventory of these languages but the involved cost, time, and effort act as a natural deterrent to this. Better way of achieving this is to project parameters learned from the annotated data of one language to another language. These projections are enabled by a bilingual resource such as a Machine Translation tool, a parallel corpus or a bilingual dictionary. Alternatively, one can exploit such bilingual resources to learn a shared representation for two languages.

This project is basically Multilingual Question Answering. In which source data is in English and user can ask question in Hindi and the answer will be in Hindi only.

2.1 Data sources

1. English annotated corpus.
2. Hindi annotated corpus.
3. Hindi English Parallel corpus.

Fish Species Likelihood Prediction

February 15, 2017

1 Group members

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2 Abstract of the project

Kaggle - The Nature Conservancy Fisheries Monitoring

In this project we intend to detect and classify different species of fish which appears on a fishing boat, based on images captured from boat cameras of various angles.

Our goal is to predict the likelihood of fish species in each picture. Eight target categories are available in this dataset: Albacore tuna, Bigeye tuna, Yellowfin tuna, Mahi Mahi, Opah, Sharks, Other (meaning that there are fish present but not in the above categories), and No Fish (meaning that no fish is in the picture). Each image has only one fish category, except that there are sometimes very small fish in the pictures that are used as bait.

2.1 Data sources

The data consists of images of the fishing vessel, containing one fish category. The dataset was compiled by The Nature Conservancy in partnership with Satlink, Archipelago Marine Research, the Pacific Community, the Solomon Islands Ministry of Fisheries and Marine Resources, the Australia Fisheries Management Authority, and the governments of New Caledonia and Palau.

List of data sources:

- **train.zip** - zipped folder of all train images. The train folders are organized by fish species labels.

- **test_stg1.zip** - zipped folder of all test images in stage 1

- **test_stg2.zip** - zipped folder of all test images in stage 2 (not available until the second stage of the competition)

- **sample_submission_stg1.csv** - a sample submission file in the correct format

- **sample_submission_stg2.csv** - a sample submission file in the correct format (not available until the second stage of the competition)

  link: The Nature Conservancy Fisheries Monitoring dataset

Neural Machine Translation

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2 Abstract of the project

Deep Learning is an interesting new branch of machine learning where neural networks consisting of multiple layers have shown new generalization capabilities.

Neural Machine Translation (NMT) is a new paradigm in data-driven machine translation. Previous generation Statistical Machine Translation (SMT) systems are built using a collection of heuristic models, typically combined in a log-linear model with a small number of parameters. In Neural Machine Translation, the entire translation process is posed as an end-to-end supervised classification problem, where the training data is pairs of sentences. While in SMT systems, word-alignment is carried out, and then fixed, and then various sub-models are estimated from the word-aligned data, this is not the case in NMT. In NMT, fixed word-alignments are not used, and instead the full sequence to sequence task is handled in one mode.

2.1 Data sources

We will take the help of Stanford WMT'14 English-German dataset. http://nlp.stanford.edu/projects/nmt/

Sentiment Analysis of Book Reviews

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2 Abstract of the project

Our project topic is Sentiment Analysis of Book reviews. In this project we will do automatic classification of subjectivity of Amazon.com book reviews. For data collection we will collect data(book reviews) from amazon.com. The corpus will be divided into training set and testing set.

Input will be in the form of review statements and output will be in the form of sentiment (positive, negative or neutral).

2.1 Data sources

1. http://archive.ics.uci.edu/ml/datasets/Amazon+book+reviews