Ashish Gupta

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EXPERIENCE

Junior ML Engineer at Omdena
Oct 2019–Present

A team of 40 people from 23 countries are working to find the solution of forest fire using AI. And we will spend the **8 weeks(2 months) from now** working on the challenge.

Research Intern under Arun k. Pujari Vice Chancellor,Central University of Ajmer,Rajasthan
Jan 2019-Sept2019

- I worked on 3D reconstruction problem using deep learning.
- Different works are Visual Hulls(3D reconstruction algorithms),3D representations like voxels,octrees,Object Pose estimation(6 DOF),Semantic Segmentation.
- Constructed the pipeline of complex networks that includes the combination of different CNN's,Visual Hull construction algorithms.Different Networks are tested and modified.
- Trained the CNN's model in a GPU with environment.
- Used Py-Torch framework for implementing the model.Other libraries were numpy,matplotlib,PIL,OpenCV,Matlab.
- Different pooling sizes are tested as 7*7,3*3, 1*1 with skip connections and batch normalisation to different units.Finally a basic understanding is drawn to put the different techniques like batch norm,skips to the CNN units.
- Pinhole camera model is used. The 3D object is reconstructed in unit-length cube.

Intern Orbnet Softech Solution Pvt. Ltd
May 2017-March 2018

I worked on developing Student Online Test System with Marks Evaluation Using Fuzzy Logic(Online Portal) with JSP,MySQL,HTML,CSS and develop various small Desktop Applications in Java.

EDUCATION

Courses

- Deep Learning Specialization
- Intro to Deep Learning, Pytorch Udacity
- Machine Learning Coursera by Andrew Nag
- Fuzzy Logic,Nptel(Prof. Debasis Semanta)
- Linear Algebra(18.06) by Gilbert Strang MIT OCW
- ScienceOf Uncertainty,edx
- NLP Analyzing Text with the Natural Language Toolkit by Steven Bird, Ewan Klein, and Edward Loper

- Java SE,Java EE

Achievements

- Convernor at Computer Society of India, BIT Since 2017(3rd Sem), MESRA Campus.
- Winner at SUR SANGAM at Vibrations,Cultural Fest BIT Mesra.
- Operations Coordinator at Quizophilic India.
- Winner at Singing Competition at Surbhi Music Sanstha.

2016-Saint George Academy, Jaipur -12th RBSE Board

2020-Pursuing BE(7th Sem) in **Computer Science Engineering from Birla Institute Of Technology, Mesra, Ranchi**

PROJECTS

1. Extracting Silhouette By Semantic Segmentation
March 2019-April 2019

- I extract silhouette from the images using deep Residual network(encoder-decoder).
- Various architectures are tested like FCN-VGG,FCN-AlexNet,etc.
- The output voxel probability is binarise with 0.4 threshold.
- Mean IOU on Synthetic Data(ShapNet) is **0.897** and on Pascal Voc 2012 is **0.731**.
- Pytorch is used with Pillow. Dataset used was PascalVoc 2012.
- Various data Augmentation techniques are used with mask images have to be prepared manually for silhouette.
- The learning rate is set to 1e-4 with around 7000 images with batch size of 16. Google Colab GPU is used for training.
- Adam Optimizer with Cross Entropy loss is used. Different Learning rate schedule like cosineAnnealing(used),step,etc are tested.

2. Single View 3D Object Reconstruction Using Deep ResNets.
Jan 2019-present

- Using deep Residual Nets(CNN) and Shape Net(Synthetic Images) dataset, I construct a network which takes a single input image and gives output as the corresponding 3D object of the object present in the image.
- Encoder-Decoder deep Resnet architecture is used as a model.
- Mean IOU are as follows-
    1. airplane : 0.053
    2. chair: 0.071
    3. Car:0.127
    4. couch:0.235
- I have taken 4 different objects i.e.couch, chair, car, airplane with 100 classes each.
- Its observed that the model performed better when the object have more solid shape like in couch.
- The 3D objects/models are handled with Binvox lib and voxels are used as representation.
- All the implementation is done in Pytorch Framework,Pillow and GPU used is Google colab. Batch size is 24 and learning rate is 1e-4 with xavier initialisation and binary cross entropy loss is used.
- ShapeNet Dataset is used.Data Augmentation with different learning rates are tested and used(1e-4,-5,etc).
- The problem of Saddle point is observed.

3. Botanical Flowers Identifier with Web Search Facility
October2018

- Sponsorship coordinator at Cavorts.

Skills and Handles

Deep Learning and ML
Pytorch,Tensorflow,keras Sklearn,numpy,pandas and openCV,matlotlib,NLTK

Web and Desktop Development
Java SE and Java EE

Database
Mysql,Oracle

Cloud
Google Colab

Programming Languages
Python,Java ,C,C++

Operating Systems
Linux,Microsoft Windows

GitHub
https://github.com/ashishgupta2598

Medium Blogs
https://medium.com/@ashishgupta_65016

LinkedIn ID
https://www.linkedin.com/in/ashish-gupta-36934874/

- Various architectures with transfer learning and from scratch are tested like VGG's,Inception,resnets.
- Web Browser,Google Search API is used. Training is done in Google Colab GPU.Pytorch with pillow and OpenCV are used.
- Validation accuracy was improved from 71.45% to 89.77%.
- Data Augmentation techniques like flipping,center-crop etc used.
- Begin the project with 5 flower classes(accuracy-89.77 at resnet50) then 10 classes and finally reached 102 classes(accuracy-around 71%)

4. Object Pose(6 DOF) Estimation Using Deep ResNet.
Feb 2019

- Using ShapeNet and Pascal Voc dataset we estimate rotation and translation (camera extrinsic parameters).
- Mean Rotation Error comes out to be **10.76 degrees**.
- Preparation of dataset is crucial part as data in Pascal Voc comes in different format. Different implementation is tested and finally ShapeNet dataset is used for training the CNN model.
- Using CNN as pose regressor and the project is implemented in pytorch. I used L1 loss and Adam optimizer with a learning rate of 1e-4 and decreased to 1e-6 after 20 iterations.
- Tested on both L1 and L2 loss and its observed that L1 loss produces better results.
- Construction of Visual Hull from 6 Dof and mask images requires different testing on problems like scaling, consideration of different parts.

5.**Sentiment analysis using RNN(GRU's) (NLP)**

- Here in this, I used the Recurrent Neural Network with 3 recurrent units. Different layers of LSTM,GRU are tested.
- Finally used GRU's and used a data-set consisting of 50000 reviews of movies from IMDB.
- All the implementations are done in Tensorflow with Keras.
- accuracy training: 0.8765 validation accuracy: 0.8752
- The model is trained under GPU.

6. **Rule based NIM Game JAVA**
August 2017

- It's a GUI Java-based game which uses various Heuristic(Rules) for designing the brain of the game.
- GUI is designed in Swings Java and Action Listener is used. The game can be played both multiplayer and single.

The set of rules are designed on two bases:

i. Winning Condition-The winning goes in the hand of the computer player, ie. now whatever move human will take, there is no chance of winning the human player.

ii. Not in winning condition-The computer player is not in the winning condition, so it will try to take all those moves to let the computer player be in winning strategy.

7. Online Test System with Marks Evaluation Using Fuzzy Logic(Online Portal) December 2017-Feb 2018

- Here in this, an online portal is created using Java Server Pages (JSP) with HTML and CSS. Database-MySql

- **Features:**
  - ✔ Login/ accounts for students and Faculty.
  - ✔ Faculty can conduct various examinations (MCQ's) for particular batches.
  - ✔ Students marks are evaluated and updated in the Data Base.
  - ✔ At the end of the semester, student marks are evaluated using Fuzzy Logic and mark sheet is generated.