Murali Manohar | CV

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Computer Science Undergraduate student. I am an ML&DL developer and App developer in web, mobile and desktop domains. Interested in modeling Deep learning techniques for NLP, CV with relatively lesser data and unsupervised approaches with emphasis on Generative modelling.

Previous Employment

International Institute of Information Technology (IIIT-H)   **Hyderabad**
Research Intern   *Dec 2019– Ongoing*

Working on unsupervised tasks in NLP. Can't disclose much at this point

International Institute of Information Technology (IIIT-H)   **Hyderabad**
Research Intern   *May 2018–July 2018*

Done my internship under **Prof. Dipti Misra Sharma**. We have tried the feasibility of Transfer learning, Multi Task learning using Pre-Trained Neural(LSTM Networks) Language Model in NLP and worked on various approaches for improving sequence labeling task using Deep Learning Techniques and achieved encouraging accuracies. **Accepted** in *20th International Conference on Intelligent Text Processing and Computational Linguistics,* **CICLing 2019**.

Geek Online Ventures Pvt Ltd   **Bangalore**
Developer Intern   *June 2017–July 2017*

Built a Desktop Application using Python ,which extracts every detail of the employee such as Screenshots of the Desktop at random intervals,actual working hours and files uploaded. Built a web application for the Project Manager(Or equivalent) to view the data. My co-interns and I, contributed to the foundations of Chatbot Development Team by creating a prototype without any GUI.

Research

o **Determining Question Relevance in the context of Visual QA**

We have developed a model, which deals with determining how relevant a question asked is, with respect to an image since Visual QA encounters open-ended questions. Specifically, we have experimented with the inclusion of Visual Concepts extracted, Natural Questions extracted from the image and premises from text.

o **Supervised Learning Approaches to Hindi WSD**

WSD deals with finding the problem of finding appropriate sense of a word given its context. Implemented using SVM and KNN.Result extraction and analysis are done.Started writing the paper. Apart from varying the context window size, we have considered features like morphological variants, POS Tags , stemming ,stop word filtering and (syntactico-semantic relations) defined by the *karaka* relations. The evaluation has been done on 50 polysemous nouns taken from a Sense Annotated Hindi Corpus. Our experiments show that stop word removal and stemming consistently yield superior results.

- ○ **Deep learning Techniques on WSD**

  Implemented using RNN with LSTM,CNN and ensemble of the two.Word Embeddings have been used.Result extraction is done and analysis has been started under the guidance of **Dr.Ratna Sanyal** Ma'am, formerly IIIT Allahabad.

- ○ **Data Engineering for Indian Languages**

  Worked as Research Assistant under **Dr.Satyendr Singh** for creating Sense Annotated Corpus for Telugu, Nepali, Gujarati, Punjabi. This involved cleaning, parsing raw corpuses to build datasets for the native language speakers to annotate. *Work on Nepali WSD had been **accepted** to **MIND 2019***.

Achievements

- ○ **2nd Runner Up at Alibaba Hackathon, India**

  Made an ensemble of different classifiers like CNN, SVM etc for dealing with the situation of lesser training data than the testing dataset.

Projects

Notable Projects

- ○ **Core Project:** *Determining Question Relevance in the context of Visual QA*

  I am part of a team developing a model, which deals with determining how relevant a question asked is, with respect to an image since Visual QA encounters open-ended questions. Specifically, we have experimented with the inclusion of Visual Concepts extracted, Natural Questions extracted from the image and premises from text.

- ○ **Visual Question Generation :** *Generates Natural Questions About an Image*

  After going through Nasrin Mostafazadeh et.al 's paper on Generating Natural Questions About an Image, I've decided to implement it on my own. I started with VQG dataset from here and an architecture of Inception V3 (CNN) for convolving the image and LSTM trained for generating the questions with Teacher Forcing methodology. Final predictions are made using Beam search.

- ○ **Number to Handwritten image:** *Generates Handwritten images given a number using DCGAN and Deconvolutional Neural Network*

  It is a variation of Conditional GANs. Main difference is the Discriminator part, i.e instead of classifying the image as real/fake, it classifies the image into real (10 classes)/ fake. Instead of feeding a random noise(A vector of size 100 or so) to the Generator, one-hot vector(size=10) of a number is given to the generator to generate images. GAN model is trained over these images. We pickup Generator from GAN to produce images. Also, tried a simple Deconvolutional network which inputs a number and produces the image. Deconvolutional approach outperforms GANs.

- ○ **Video Classification :** *Video Classification to detect if there's any danger involved in the video.*

  Video is broken down into frames using jump cut detection. Frames are convolved with VGG16 and these frames are processed sequentially using an LSTM to make a prediction on danger detection. In order to increase the efficacy of the model, additional information is concatenated to each frame in the form of YOLO's object detection.

- **Advanced Algorithms course project:** *Animation of Knapsack Algorithm (Dynamic with input data)*

  Done as a part of "Advanced Analysis and Design of Algorithms" course, 6th semester . Main objective is to make our junior batches understand algorithms by leveraging animations, which are dynamic to the input. It involved HTML,CSS,JavaScript and jQuery. Project is evaluated according to the understandability rather than the coding/animation complexity

- **Industrial Project with Geek Online Ventures Pvt Ltd:** *Development of PySnap(Employee Tracker) to ensure the efficiency of employees*

  In the 2nd year of my course, I spent 2 months completing an industrial project for Geek Online Ventures. I worked with a team operating as developers for a particular problem the company's HR department was having. There was problem in figuring out troublesome interns & employees for performance issues and wasting working hours. After co-operating with various managers and engineers to create a design that met the requirements of the problem, we came up with a desktop application that could potentially track an employee's activities by taking screen shots of the desktop at regular intervals, file logs & timers everyday. Built a web app for the Project Manager(or equivalent) to view the data. Implemented using Python, Tkinter GUI, HTML, CSS, jQuery, PHP and JavaScript.

- **Website for BMU ATV Vehicle:** *Website showcasing the ATV vehicle for sponsors*

  In my 2nd year, I spent a week on making a website for the ATV vehicle made by Mechanical Engineering students for attracting sponsors. Implemented using HTML, CSS and JavaScript.

- **Joy of Engineering course project:** *Virtual Hand Bot using Arduino*

  A bot that replicates human writing. For the prototype, we restricted its capacity to plotting time *i.e* only numbers. This would help people who are unable to write. We 3d printed the parts and used an Arduino to control 3 servos and an Real Time Clock chip.

Other Projects

- **Youtube Comments Spam Classifier**

  Classifier using an ensemble method of SVM,KNN,Decision Trees,NaiveBayes classifier. Implemented while learning the machine learning concepts.

- **Neural MT Chatbot**

  55GB reddit data is downloaded and parsed for creating a chatbot, which is sarcastic and informative. Implemented while learning Neural Machine Translation,

- **Economical Color Based Product Sorter**

  Done as a part of **Internet of Things** course. With this project, we've successfully a built a system which detects the color of a product's tag and sorts it to the destined slot. Built using Raspberry Pi,Python,ThingSpeak,Servos.

- **Web Scraper using Python**

  Done as a part of **Information Retrieval** course. Crawls the web , picks up required content and dynamically updates the network graph and information table.

- **StatusP - CPU Scheduling Predictor**

  Done as a part of **Operating Systems** course. Provides optimal gantt charts for a given input according to FCFS, SJF, Round Robin & Priority scheduling algorithms.

- **Foodie - Online Food Order Android Application**

  Done as a part of **Operating Systems** course. Provides optimal gantt charts for a given input according to FCFS, SJF, Round Robin & Priority scheduling algorithms.

Academic Qualifications

BML Munjal University   **Gurgaon**
B.Tech, Computer Science and Engineering , 9.21 CGPA   *2015–2019*

Sri Chaitanya Jr.Kalasala   **Hyderabad**
MPC, 96.9 %   *2013–2015*

Technical and Personal skills

- **Skills:** C, Java, C++, Python, Machine Learning, Information Retrieval, NLP, Deep Learning, Computer Vision, HTML, CSS, JavaScript, PHP, SQL, Arduino & TeX. Also basic ability with: Verilog, VHDL.

- **Platforms:** PyTorch, Keras, Tensorflow, Jupyter Notebook, Spyder, AWS, Android Studio, Java Swing, Arduino, Adobe After Effects, SONY Vegas Pro.

- **Other:** Cinematography, Photography and Editing.

CERTIFICATIONS

- Coursera certification on Using Databases with Python

- Coursera certification on Using Python to Access Web data

- Coursera certification on Python Data Structures and Getting Started with Python

- Coursera certification on Machine Learning By Stanford University

References

- Prof. Dipti Misra Sharma
- Prof. Sudip Sanyal
- Prof. Ratna Sanyal
- Dr. Satyendr Singh