SREEKAR GARLAPATI

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EDUCATION

Masters in Computer Science, University of Massachusetts, Amherst 2019 - 2021
Key Coursework: Computer Vision, Advanced Natural Language Processing, Reinforcement Learning, Probabilistic Graphical Models, Secure Distributed Systems, Neural Networks and Neurodynamics, Algorithms for Data Science
Current GPA : 3.967/4.0

B.Tech. (Honors) in Computer Science, I.I.T. Bombay 2015 - 2019
Key Coursework: Advanced Machine Learning, Artificial Intelligence, Design and Analysis of Algorithms
GPA : 8.74/10.0

SKILLS

C++/C, Python, Java, PyTorch, TensorFlow 2, NumPy, scikit-learn, Pandas, SQL, Shell Script, Spark, Scala

RESEARCH EXPERIENCE

Deep Learning based pixel prediction methods for improving lossless compression Feb 2021 - Ongoing
UMass Amherst & Adobe Research

- The aim of the project is to improve lossless image compression performance by using better pixel prediction algorithms in the Free Lossless Image Format (FLIF) method.
- FLIF uses heuristic prediction methods and MANIAC compression to encode the prediction errors. By using the state-of-the-art super resolution model, a 15% improvement in compression size was achieved.

Improving Novelty Detection and Response in Deep Reinforcement Learning June - September 2020
SRI International

- Benchmarked Episodic Curiosity based **Deep Reinforcement Learning** agent written in **TensorFlow 2.0** in a Minecraft environment.
- Developed a new simulated environment analogous to Minecraft in the 3D game world of **DeepMind Lab** for a comparative study.

Accelerating SQL query processing using Generative Programming May - July 2018
Purdue University

- Implemented and optimized operators for **Flare**, a back-end system for **Spark** which uses generative programming with **Lightweight Modular Staging** for performing relational queries.
- Extended Flare to support the TPC-DS benchmark in addition to the existing TPC-H benchmark. The implemented operators achieve speedups over Spark ranging from 4x to 63x.

PAC Arm Selection in Infinite-Armed Bandits July - December 2018
IIT Bombay

- Experimented and developed novel sampling techniques for **infinite-armed Bandits** in a reward-rich domain in a **PAC setting** and on extending techniques for finite Multi-armed Bandits to the infinite-armed setting.
- The algorithm outperformed previous works by a margin proportional to the fraction of arms which satisfy the reward threshold.

Verification of Security Properties of Cryptographic Protocols May - July 2017
INRIA

- The aim of the project was to develop a library for first-order terms in **F*** which allows for verification of security properties of **cryptographic protocols**. Contributed to it by developing functions for manipulating terms, substitution and unification and proved fundamental lemmas using them.
- This effort is part of a larger project to certify the correctness of proofs output by the **DeepSec prover** for cryptographic protocols.

PROJECTS

Gaussian Bounding Box modeling in CenterNet for improved object detection

- Used the idea to introduce Gaussian Modeling for the bounding box parameters presented in Gaussian YOLOv3 to the CenterNet model for Object Detection.

Discriminative Adversarial Search for Abstractive Summarization

- Implemented the idea of using a discriminator to re-rank the beam search outputs in the decoder of the UniLM model to improve summarization performance.
- This was a reproduction of the paper of the same name presented at ICML 2020.

Gesture Control for Android

- Designed a glove which uses flex-sensors and an accelerometer connected to a 8-bit microcontroller to capture the state of the hand, and transmits the data via a Bluetooth module to the android application at regular intervals
- The data is processed using the Dynamic Time Warping algorithm by an android application to classify it as a gesture and execute a corresponding action. Each gesture is mapped to one of various actions such as taking a photograph, increasing volume/brightness

Multi-user Chat Application

- Developed a chat application which uses Socket Programming, Android services in the background to implement real-time functionalities
- Developed on a python server and supports both android and terminal based clients
- Also supports group messaging, file transfer, sending and accepting friend requests etc.

Academic Event Management System

- Developed an Android application which students can use to get their personal timetables and are served real-time reminders for assignment deadlines
- The app maintains synchronous databases and notifies the user about updates, if any. It has a platform for professors to obtain feedback from students as well
- Backend of the companion website employs the Django framework and is deployed on a remote server

Compiler for a C-Like Language

- Wrote a compiler for A Pointer Language(APL), a variant of C, in Python using Python Lex and Yacc
- Support for features such as loops, if-else conditions,recursive function calls was implemented using Control Flow Graphs and Abstract Syntax Trees

SCHOLASTIC ACHIEVEMENTS

- All India Rank **14** in the IIT-Joint Entrance Exam (JEE) Advanced 2015
- Awarded a **Bronze Medal** at the **Asian Physics Olympiad** held at Singapore 2014