KUNJAL PANCHAL

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SKILLS

Programming Languages – Python, Java, C/C++, Matlab, R
Web Development – HTML5, JavaScript, CSS3, SQL, Ruby on Rails, Django, Flask, React, RESTful APIs, NodeJS
Tools – PyTorch, Tensorflow, spaCy, OpenCV, NumPy stack, SciPy stack, Google Colab, Github

EDUCATION

University of Massachusetts – Amherst, Massachusetts — Sep 2019 – Expected May 2021
- Master of Science in Computer Science – Research Track – 3.2/4.0
- Relevant Coursework – Computer Vision, Natural Language Processing, Machine Learning, Robotics, Modern Computer Architecture, Advanced Cryptography, Advanced Algorithms, Master's Independent Research

The Maharaja Sayajirao University of Baroda, Gujarat, India — Aug 2015 – May 2019
- Bachelor of Engineering in Computer Science – 4.0/4.0
- Relevant Coursework – Artificial Intelligence, Data Structures, Advanced Technologies in Database, Client and Server Architecture, Computer Networks, Network Security, Microcontrollers, Advanced Microprocessors, Object Oriented Programming, Software Engineering, Engineering Economics, Parallel Processing, Design and Analysis of Algorithms, Operating Systems, Theory of Computation, Relational Database Management Systems, .NET Framework, Translator Design, Computer Graphics

RESEARCH EXPERIENCE

https://github.com/Astuary/ResearchPapers

- Hierarchical Transformers with Delta-Attention for Multimodal Emotion Recognition — Sep 2020
- Aspect-based Sentiment Analysis with Intermediate Task Fine-Tuning andCross-Domain Adaptation — Sep 2020
- Relaxed Authentication in Performance Constrained Networking — Jun 2020
- Differential Privacy and Natural Language Processing to Generate Contextually Similar Decoy Messages in Honey Encryption Scheme — May 2020
- Improved Algorithm for Seamlessly Creating Infinite Loops from a Video Clip — Dec 2019
- Skin Cancer Detection with Deep Learning — Jan 2019

WORK EXPERIENCE

Teaching Assistant and Grader — Sep 2020 – Current
College of Information and Computer Sciences, University of Massachusetts – Amherst
- Held office and discussion hours, resolved student queries, walked through homework problems for the graduate class CS 690C Foundations of Applied Cryptography
- Graded homeworks, quizzes, assignments, exams for the graduate class CS 690C

Graduate Student Researcher — Apr 2020 – Current
College of Information and Computer Sciences, University of Massachusetts – Amherst
Areas – Machine Learning, Computer Vision, Cryptography, Natural Language Processing
- Built a deep residual network for steganalysis of digital images for ALASKA2 challenge with accuracy of 91.78%, which focused on noise residues and DCT of the JPEG images with secret data hidden them
- Developed an efficient algorithm to produce decoy messages for a cryptographic scheme called Honey Encryption to fool an attacker into believing that their brute force attack was successful
- Employed GPT-2 transformers for natural language decoy message generation with success rate of 89.40%

Emotion AI Program Intern — Jul 2020 – Aug 2020
Affectiva, Boston, MA
- Developed a prototype for an "Emotion-enabled" smart fridge, detecting the available food inside a refrigerator, and the mood of the user with Affectiva facial expression recognition SDK to suggest the food intake accordingly
- Trained the VGG-16 food classifier on Freiburg Grocery dataset with the accuracy of 76.16%

- Implemented a multiclass incremental learner classifier decision tree which correlates the mood of the user and what food they are picking up from the fridge
- Became familiar with the market analysis, pitching the project idea, patent creation and honed the technical aspects of data acquisition, data synthesis, affect analysis, and personalization from facial analysis

Software Developer Intern Jun 2018 – Jun 2019

The Maharaja Sayajirao University of Baroda, India

- Created the simulations and visualizations of inner workings of operating systems and processors in Java
- Utilized JNLP [Java Network Launch Protocol] to make the Java apps render on client-side while using server resources with ~1000 simultaneous connections capacity
- Refactored the database of the learning platform site on which these simulations were embedded, with 60% increase in speed-up efficiency
- Provided a mobile interface for the site which had inherently no support for mobile version of servlet render

PROJECTS

SoundCluch – *https://github.com/Astuary/BoseSoundTouchAPI* Feb 2020

- Winner of "Best use of Bose SoundTouch API" and "Best Hack for Home Accessibility sponsored by Wayfair"
- Enhanced the SoundTouch API in Python, to get the motion sensor inputs within 150 cm with a Raspberry Pi, to sound off a custom audio notification through the Bose speakers with latency as low as 200 ms

LSTM Variants for Time-Series Data Prediction Dec 2019

- Used the human activity recognition data set - ExtraSensory dataset, containing data from 60 individuals, for the task of probabilistic activity forecasting.
- Built LSTM variants to predict the probability that each of the five labels (LYING_DOWN, SITTING, FIX_walking, TALKING, OR_standing) at the future specified time, t.
- Experimented with GRU baseline model, LSTM baseline, CNN LSTM, Separable CNN LSTM

Optimization-based supervised and unsupervised learning models Sep 2019 – Sep 2020

- Developed from scratch, the augmented versions of outlier minimizing linear regression with Huber and Approximate Absolute losses, logistic regression with Z-score transform, heteroscedastic regression, geometric regression, support vector classifiers with regularization, a custom neural network with regression and multi-class classification, laplacian mixture models with missing data imputations

Roger the Robot - *https://github.com/Astuary/Robotics* Jan 2020 – Apr 2020

- Built a 9 Degree of Freedom robot in a 2D simulator environment with arm kinematics, vision and search tracking, and path planning where all the mathematics and physics were implemented with C/C++ libraries.
- Learned nonlinear systems of algebraic equations and Newton's Laws on dynamics to solve motion, kinematics and movements related problems for the robot.

Deep Image Prior - *https://github.com/Astuary/DeepImagePrior* Sep 2019 – Dec 2020

- Denoising images with an auto-encoder with batch normalization and bilinear upsampling and also with deeper architectures, those with skip connections, averaging the results across iterations to scale up the resolution

LEADERSHIP

Campus Leader – Google Developer Students Club India Dec 2018 – Dec 2019

ACHIEVEMENTS

Gold Medalist – The Maharaja Sayajirao University of Baroda, B.Engg. in Computer Science

Student of the Year – The Maharaja Sayajirao University of Baroda

High Ranker with Distinction – The Maharaja Sayajirao University of Baroda

National Talent Search Examination [High-school] – Top 100 in Science and Mathematics

All India Essay Writing Event – Honorable Mention

Community Science Center – Winner of Conmat Cosmopolitan Tree Garden Award