ADITYA DUTT

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EDUCATION

PhD, **Machine Learning**, University of Florida, Gainesville, Florida, USA *(Aug 2019 – Present)*   ***3.66/ 4.0***
M.S., **Computer Science,** University of Florida, Gainesville, Florida, USA *(Jan 2018 – May 2019)*   ***3.70/ 4.0***
B.Tech., **Computer Science,** Jaypee Institute of Information Technology, Noida, India *(Aug 2013 – May 2017)*   ***6.9/ 10.0***

PUBLICATIONS

- Aditya Dutt, Richa Dutt, Hema N. (*2017*). *Development of Cost-Effective Substitute of Braille Tactile Display Operated by Linear Actuators:* **IEEE Xplore.**
- Kumar Sushil, Pant Millie, Kumar Manoj and Dutt Aditya (*2015*). *Color image segmentation with histogram and homogeneity histogram difference using evolutionary algorithms:* Int. J. Mach. Learn. & Cyber (**Springer**)

WORK EXPERIENCE

Graduate Research Assistant for **Dr. Aditya Singh**   *Jan 2020 – Present*

NASA LC/LCLUC Project, Institute of Food and Agricultural Science, University of Florida, Gainesville, FL
- Implementing machine learning methods to estimate indicators of poverty and food security across economically depressed regions of India by analyzing regional patterns of land cover change.
- Leading the construction of a custom SQL database to gather and analyze data from India's National Sample Survey Office. Data is comprised of housing conditions, employment and agricultural assessment surveys of India.
- Use U-Nets to identify land cover change in features such as water, urban area, forest, grassland, shrub, and agriculture, which strongly correlate to food security.

Graduate Teaching Assistant for Course **"**Distributed Operated Systems"   *Aug 2019 – Dec 2019*

Computer Science Department, University of Florida, Gainesville, FL
- Created course assignments that were approved by the supervising professor. Managed one Teaching Assistant and one Course Grader. Held weekly office hours, graded coursework, and championed student development.
- Collaborated in creating projects (and grading system) based on Twitter implementation and gossip algorithms in Elixir using the actor model to simulate the dissemination of information across a network using Honeycomb and 3D Torus.
- Received an end-of-semester evaluation score of "Outstanding" based on student feedback.

Internet of Things (IOT) Intern   *Jun 2016 – Jul 2016*

Indian Institute of Technology, Delhi, India
- Tasked with the challenge of controlling the rpm of a DC motor clock so that it synchronized with data from a GPS using Beagle Bone.
- Created a webpage using HTML, CSS, and JavaScript to monitor live data from microcontroller to detect and resolve time and clock errors.
- Gathered data from Arduino and Wi-Fi module (ESP8266) and stored it in the SQL database. Next, pushed data from database on the webpage allowing microcontroller hardware to be controlled remotely.

RESEARCH EXPERIENCE

Emotion Detection Based on Text and Speech, Advisor: Dr. Paul Gader   *Jan 2020 – Present*
University of Florida, USA

- Researching on detecting different emotions from speech by analyzing spectrograms as a visual representation speech features such as the pause between each word, pitch, loudness, and more.
- Testing an analytical blend of words with aggregate factors (pauses, pitch, etc.) to more accurately do sentiment analysis including which may alert to security breaches or health issues.

Lexicon-Based Segmentation of Offline Cursive Handwriting, Advisor: Dr. Paul Gader   *Jan 2019 – Dec 2019*
University of Florida, USA

Worked on a project to build a machine learning model that can recognize cursive handwriting, which is a more difficult task than recognizing printed characters. The objective was to develop algorithm that can understand handwriting and accurately convert handwritten text to printed documents. The application is useful for reading postal addresses, bank check amounts, and forms.

- Implemented a combination of connected component analysis and distance transform to segment (or oversegment) word into possible characters. The small segments which are not characters can be used as a good dataset to test outlier detection algorithms.
- Developed a robust peak detection algorithm to detect peaks pointed in all directions in binary images which correctly splits a word into possible characters. Used a dynamic programming algorithm and **CNN** to find a match score between each string in the lexicon (dictionary) and the segmented parts of word image.

ACADEMIC PROJECTS

COVID-10 Speech Tracker *[Python, Google Dialogflow]*   *2020*
Created a speech-based tracker to answer the questions related to covid-19 heath information, deaths and confirmed cases in any county, state or country between any time period. Extracted covid data from '*csbs*' and '*jhu*' databases using a python package. Used **Dialogflow** to detect and extract intent and time period from speech and respond with appropriate answer.

Voice controlled Web Browser *[Python, Wit.ai, Selenium]*   *2020*
Created a voice-controlled web browser using **wit.ai** to train the model and extract intent from voice command. Used **selenium** to access the web page and control it as per user's command. Used **Beautiful Soup** to scrape weather information and news from New York times. The various commands supported were- switching tabs/ windows, scrolling, controlling scroll speed, play video on YouTube, mute, play/pause. Used **gTTs** library to convert output to speech.

Mussel Mounds Detection with Aerial Imagery *[Python, Scikit, NumPy]*   *2019*
Worked on a project to identify settlements of mussels. Filtered water and green region near coastal areas by converting image from RGB to HSV format and applying several color masks using **Scikit** and **OpenCV** libraries. Successfully detected greenish gray mounds through grayscale thresholding and circular blob detection. Filtered blobs within threshold size. Matched results with LIDAR ground truth data.

Music Genre Classification *[Python, Librosa, CNN, LSTM]*   *2019*
Collaborated on project to accurately segment music based on different genres. Extracted multiple 30-second parts of song to compute MFCC features of each chunk using a **librosa** library and **Keras**. Applied **PCA** on features and a combination of **CNN** and **LSTM** to achieve an 85% classification accuracy. Also used CNN directly on **spectrograms** and compared the output performance with earlier model.

Implementation of Information Propagation Protocols *[Elixir/OTP, Phoenix]*   *2018*
Implemented information propagation protocols [Elixir/OTP, Phoenix], Gossip and Push Sum algorithm to simulate information dissemination in a network, network topologies such as 2D, Random 2D, 3D, Sphere to compare dissemination speeds, and chord algorithm for 10,000 nodes using GenServer with fault tolerance.

Bitcoin Simulator *[Elixir, Phoenix, JavaScript]*   *2018*
Created a simulator using actor model in the elixir to make a distributed system to simulate bitcoin mining and observe its behavior. Implemented bitcoin wallet and target difficulty with maximum 8 zeros. Simulated 400 bitcoin transactions for 100 nodes using GenServer and implemented pool mining.

SKILLS
Tools: Keras, TensorFlow, Tensor Board, Pandas, Geopandas, NumPy, Scikit-Learn, OpenCV, Matplotlib, Plotly, PyQt, Seaborn, Spacy, NLTK, Beautiful Soup, Jupyter Notebook, QGIS
Languages: Python, SQL, MATLAB, Elixir, C/ C++, HTML, CSS, Linux