Ayush **Chakraborty**

Computer Science · Senior

(+1) 917-478-8684 | ayushc@umd.edu | ayushc.me | aiy-wish | ayush-chakraborty

Education

University of Maryland - College Park — *College Park, Maryland*

B.S. in Computer Science (Major), Statistics (Minor) — *August 2017 - May 2021*

Skills

Languages/Tools: Python, Java, C, Ruby, OCaml, Rust, R, SQL, LaTeX, SAS, Bash, Git, MATLAB, Kotlin JavaScript

Databases and Tools: Microsoft Azure, Docker,Hadoop, MySQL, MongoDB, Android Studio, Anaconda, PowerBI, Tableau, Minitab

Coursework: Object Oriented Programming I and II (Java), Introduction to Computer Systems (C, Assembly), Data Structures Discrete Structures, Organization of Programming Languages (Ruby, Rust, OCaml), Algorithms, Linear Algebra, Applied Probability and Statistics I and II, Statistical Computing with SAS, Calculus I,II,III, Java Concurrency, Applications of Linear Algebra, Sampling Theory, Introduction to Artificial Intelligence, Computer Vision.

Experience

flydubai — *Dubai, United Arab Emirates*

DevOps/Big Data Intern — *June 2019 - August 2019*

- Built a statistical model using Python to compare competitor's performance for airline market research
- Performed Data ingestion with company's data in Cloudera using Apache Kafka.
- Worked on intelligence gathering tool to analyze competitor's performance.
- Maintained Git Repositories for DevOps environment.Version Control and build automation integrating git into Jenkins.
- Developed and maintained automated CI/CD pipelines for code deployment using Microsoft Azure.

The Riva Group — *Dubai, United Arab Emirates*

Production Intern — *July 2016 - September 2016*

- Worked as a Production Intern in the Animation and VFX department at Riva Digital. I was assigned to the 3D animated content for the "Resident Evil- Dark Ride" project.
- Assisted the creative department in collating and formalizing creative feedback to the production teams.
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Ras Al Khaimah Investment Authority — *RAK, United Arab Emirates*

IT Intern — *December 2015 - January 2016*

- Worked with the IT department as IT intern. Assisted the team in designing the 'Lead Management Dashboard' mainly working on data mining for Business Development Team.

Extracurricular Activity

Marching band (MSOM)

Band Member — *January 2018 - May 2018*

- Played for the Mighty Sound of Maryland (MSOM) as part of the drumline.

University Band

Percussionist — *August 2017 - December 2017*

- Was part of the Percussionist Ensemble of the University Orchestra Band.
- Played instruments for formal ensemble events in the University.

Coursera

Mentor — *August 2018 - May 2019*

- Mentored students who enrolled for the "Introduction to C" specialization offered by Duke University.

Volunteer

BitCamp — *College Park, Maryland*

Volunteer — *March 2018*

- Have helped organize the 36 hour Major League Hackathon (MLH) with over 1000+ participants.
- Help manage around $60,000 for logistics.

CS Career Fair

College Park

Volunteer

October 2017

- Helped volunteer and organize the “once in a semester” event attended by 500+ companies and several students.
- Focused on Facebook since they were one of the biggest recruiters.
- Provided a local help by collecting and organizing the resumes.
- Provided support in the post-event cleanup part (basically clearing up tables, kiosks,etc).

Mathematics classes for students

College Park, Maryland

Teacher (Part of the TLPL Program at University of Maryland)

August 2017 - May 2018

- Taught Mathematics to elementary and middle school children at Hyattsville Elementary and Hyattsville Middle school respectively
- Created lesson plans and arranged logistics for the class activities.

Projects

Virtual Reality Locomotion

Research Project

- Constructed a Virtual Museum for the Philips Collection Museum in D.C. as part of a research project.
- A Virtual Reality implementation in Museum has the potential to reach a far broader audience.
- This project presents a test-bed and a space for experimentation for the design and evaluation of immersive experiences and architectures before they are developed at full scale.
- Implemented using Unity, Visual Studio, C# for scripting, SDK’s like GoogleVR SDK, VRTK SDK and SteamVR SDK were used.

Musico

Python,Flask, Jinja, Bootstrap,Heroku

- A user friendly, secured flask app (inspired from reddit) for music enthusiasts where one can browse through different ”musico” pages and post anything and reply to anything
- Implemented using Python,Flask, Bootstrap, and is deployed on Heroku using CircleCI

Chord Dictionary

JavaScript, Howler.js, and Tonal.js

- Built a simple Chord Dictionary which would help any music beginners or amateurs to learn about different Chord sounds.

Stock Market Analysis

Python, Pandas, NumPy, Google Finance API

- Performed an analysis on the Stock Market which basically monitors the stocks and opening prices of Google Stocks
- Did a comparison of Tesla, Ford and GM stocks, opening prices, market cap, volume trading and cummulative returns.
- Used several probability theory like Correlation and Scatter Matrix, Daily percentage change, volatility and Box Plots.

Analysis and Clustering of restaurants in Dubai

Python, Pandas, NumPy, FoursquareAPI, Zomato API

- A data analysis on restaurants of Dubai during the pandemic based on the data by several APIs for restaurant and location.
- Performed a study on what cuisines and restaurants are popular. Furthermore this could help food businesses to understand their market and make decisions based on the conclusions.
- Clustered restaurants and did a map visualization based on prices, ratings, online delivery services.

MoneyBall

Python, Pandas, NumPy

- Inspired by the movie MoneyBall starring Brad Pitt.
- Performed data wrangling and exploratory data analysis from existing MLB Teams database.
- Performed this study to see how efficient teams have been historically at spending money and getting wins in return.

Classification of Mortgage Affordability

Python, Pandas, NumPy

- Performed an experiment to analyze and predict whether affordability can be standardized depending on regions using the Mortgage Affordability data from Zillow
- Finding out which algorithm was suitable: decision tree vs logistic regression,random forest vs decision tree,K-nearest neighbours vs random forest

WordNet

Ruby

- Created a semantic lexicon, grouping words into synsets that describe semantic relationships between each other.
- Exercised knowledge of the “is-a” relationship with hypernyms, which connects synsets.

Small C

OCaml

- Implemented a lexer, parser and interpreter for a smaller version of the C language using OCaml and exercised the knowledge of lazy evaluation and thunks for function calls.
- The lexer converts an input string into a token list, the parse consume this token list and produces a statement/expression corresponding to the input and the interpreter consumes the statement/expression will compute the results and give the desired output. Performed error handling for invalid inputs.

Twitter Search Client

React, JavaScript, CSS, HTML, Twitter API

- Built a full stack application for finding any tweet, twitter user, posts which can be sorted in different ways based on the user's choice.
- The application interacts with the Twitter API and manages state across components in React.

Auction Server

Java

- Created a simulation of an auction service where both the bidders and sellers interact simultaneously using Java Multithreading concepts.
- Bidders get to request the list of items from the seller, check the price of the item, place a bid on the item, check the outcome of a bid and pay for the items they won after placing the highest bids.
- Sellers get to submit new Items to the server mentioning the price, the minimum bids and outcomes.
- It also keeps track of the transactions and bids made by several bidders and this was solely possible by Synchronization and Multithreading.

Ratsie's Simulation

Java

- Create a highly simplified simulation of the Ratsie's restaurant (which was a College Park institution that nurtured generations of Maryland students through the rigors of college life).
- This simulation depended on parameters like number of customers,tables,cooks in kitchen,count of machines and a flag for a customer receiving their orders.
- The simulation kept track of the customers leaving, ordering food, receiving their orders, cooking time and other activities simultaneously and this was solely possible by Synchronization and Multithreading.

Maze Runner

Java

- Created an efficient solver for a two dimensional maze which consists of a grid of positions and one can move through the maze in north, south, east, west directions.
- The only constraints here are the walls. The program is provided with a starting position and has to determine the most efficient, shortest exit route or determine no exit routes exists.
- The maximum size the maze can extend to is 20,000 x 20,000 cells and is possibly only by multithreading since we randomly generate the maze and the paths are determined synchronously and then we get the best results quicker than using a single thread.

Resource Manager

Java, Akka

- Created a distributed resource-management scheme using akka actors where a resource can be anything that a system may use to fulfill the tasks that its users ask of it.
- Each such actor will contain a list of local resources that it manages, and a list of other resource managers in the system, and will communicate with other resources - manager actors, and users, solely via message - passing.

Twitter Analyzer

Java, Hadoop

- Created a tool using Hadoop for processing sets of Tweets and determining which people, tweets, hashtags, and pairs of hashtags are popular.
- Divided the processing of data into two parts: one for counting the number of times a user, tweet or hashtag is mentioned across all tweets and second sorting the results from most to least popular.

Color Segmentation

MATLAB, Computer Vision ToolKit

- Performed Color Segmentation of the ball for Nao robots, who are the star players in RoboCup (an annual autonomous robot soccer competitions).
- Used the Single Gausian and the Gaussian Mixture Model (GMM) to mask the ball in the image captured, which will help the robot to locate and trace the ball in order to play.
- Estimated the distance to the ball which will help the robot to play with the ball.

Panorama Stitching

MATLAB, Computer Vision ToolKit

- Implemented a similar end to end pipeline of a smartphone camera for stitching a collection of images into a panorama.
- Detected potential corners of an image and used the ANMS algorithm to find stronger corner points which is then used for feature descriptors and feature matching of two images. We then used RANSAC and then blended and stitched the images

RotoBrush

MATLAB, Computer Vision ToolKit

- Implemented a program to segment deformable object from any video source.
- The segmentation was done using Localized Classifiers, Color Models and Shape Models and finally extracting the final foreground mask in order to capture the part of the moving object of a video.

SfM/ SLAM

MATLAB, Computer Vision ToolKit

- Implemented a Bayesian Network-based solution to Simultaneous Localization and Mapping (SLAM)/ Structure from Motion (SfM).
- Built a map based on the observation measurements the drone makes and localize the robot on the map (SLAM) using the GTSAM package.
- The data was collected with a hand-held SLAMDunk sensor module (manufactured by Parrot R), simulating flight patterns over a floor mat of AprilTags each of which has a unique ID.