

Apoorv Malik

(541)-250-7410 | malikap@oregonstate.edu

apoorvmalik.com | linkedin.com/in/maliap | github.com/1998apoorvmalik | leetcode.com/1998apoorvmalik

TECHNICAL SKILLS

Languages & Tools: C, C++, C#, Python, Haskell, Dart, HTML, CSS, JS, EJS, TensorFlow & Keras, PyTorch, Scikit-Learn, OpenCV, Flask, Numpy, Pandas, Node, Express, nginx, jQuery, React, Three.js, Bootstrap, MongoDB, SQL, Docker, Flutter, Firebase, AWS, Unity, OpenGL, Figma, API Development, Git/GitHub, Linux/Bash

Research & CS Interests: Computational Biology (RNA Structure Prediction), Software Development (Mobile, Desktop and Web), Machine Learning, Computer Vision, Algorithms & Theory, Computer Graphics, UI/UX

EDUCATION

Oregon State University <i>MS in Computer Science (GPA = 3.9)</i>	Corvallis, OR, USA Sept. 2022 – Present
Maharshi Dayanand University <i>Bachelor of Technology (BTech) in Computer Science & Engineering (CGPA = 9.2)</i>	Rohtak, HR, India Sept. 2016 – Sept. 2020

EXPERIENCE

Research Assistant (mentored by Prof. Liang Huang) <i>Dept. of Computer Science at Oregon State University</i>	December 2022 – Present Corvallis, OR, USA
<ul style="list-style-type: none">Developed efficient and highly accurate prediction algorithms for RNA folding and RNA design.Developed a linear time algorithm for RNA alignments, supporting calculations for partition function, base pairing probabilities, secondary structure predictions (MFE, MEA, Threshknot), and stochastic sampling of structures.Developed 7 web servers to host various RNA algorithms, enhancing the accessibility of our scientific tools.	
Teaching Assistant (Algorithms and Theory of Computation) <i>Dept. of Computer Science at Oregon State University</i>	March 2023 – Present Corvallis, OR, USA
<ul style="list-style-type: none">Taught key concepts in Algorithms and Theory of Computation, including Complexity Analysis, Divide & Conquer strategies, Greedy & Graph Algorithms, Dynamic Programming, Grammar, and Turing Machines.Graded assignments and exams, providing constructive feedback to over 300 students and collaborated closely with the course professor/instructor to design and modify course materials and assignments.Regularly held office hours to address individual student's questions and maintained effective communication.	
Software Development and Machine Learning Engineer <i>Twyn (Previously Known as Marj Technologies)</i>	January 2020 - August 2022 Noida, UP, India
<ul style="list-style-type: none">Developed 3 IoT-based Industrial Automation and Quality Control applications for Non-Contact Dimensional & Quality Inspection, OCR, Parameter-based PA check, Object Classification, and Bar & QR code scanning.Contributed to the startup's seed funding of \$328K and helped achieve a valuation of \$3.7M by completing 4 projects for multiple clients of Marj (Ask Frase le Friction, Minda Group, Samsung India, and JBM).Interviewed 30+ job applicants for AI & Software Development positions and further built & managed the core team of 8 developers for product development. Implemented agile development methodologies, such as Scrum, to improve team efficiency.Led cross-functional teams of developers to deliver software projects on time and within budget, provided mentorship to 3 junior developers to improve their skills.	

PUBLICATIONS/PREPRINTS

- Apoorv Malik**, Liang Zhang, Ning Dai, Sizhen Li, He Zhang, David Mathews, and Liang Huang (2024). [LinearAlifold: Linear-Time Consensus Structure Prediction for RNA Alignments](#). Journal of Molecular Biology (JMB) Special Issue on Computation Resources for Molecular Biology. ([Publication Link](#))
- Tianshuo Zhou, **Apoorv Malik**, Wei Yu Tang, Liang Huang. Scalable and Interpretable Identification of Minimal Undesignable RNA Structure Motifs with Rotational Invariance. To appear in RECOMB 2025. ([arXiv Link](#))
- Sizhen Li, **Apoorv Malik**, Ning Dai, He Zhang, David H. Mathews, and Liang Huang. [LinearSankoff: Linear-time Simultaneous Folding and Alignment of RNA Homologs](#). In submission to NAR Journal. ([arXiv Link](#))
- Liang Huang, Otso Barron, **Apoorv Malik**, Sizhen Li, David H. Mathews. [Lazy Outside and Lazy Backward Algorithms](#). ISMB 2024 (International Society for Computational Biology).

PROJECTS

- Motifs** | [Web Server Link](#) | [arXiv Link](#) December 2024
- Developed a full-stack web app to maintain database of unique minimal undesignable RNA structures and motifs.
 - Users can explore, visualize, analyze, and identify undesignable motifs in existing and new RNA structures.
 - Frontend built with React, backend powered by Flask and Express, with MongoDB for data storage.
 - Deployed using Docker and Nginx for scalability and performance.
- LinearAlifold** | [Web Server Link](#) | [GitHub Link](#) | [Publication Link](#) November 2023
- Developed a dynamic programming algorithm for RNA alignments' linear-time consensus structure prediction. It incorporates beam pruning (for enhanced computational efficiency), multiple energy parameters, and various computational modes.
 - Enabled computation of the partition function and base pairing probabilities, with added support for predicting Maximum Expected Accuracy (MEA), Minimum Free Energy (MFE), and Threshknot structures. Additionally, implemented a mode for the Stochastic Sampling of Secondary Structures.
 - Developed a web server for providing users the ability to input their own sequences and perform various functions, thereby enhancing practical applications of the tool.
- Google Explore ML DSC Facilitator** | [Certificate Link](#) April 2020
- Conducted five workshops on machine learning, introducing core concepts and practical applications.
 - Facilitated as part of the Google-sponsored Explore ML program, enhancing machine learning awareness among university students.
- Computer Vision Project for Ask Fras-Le Friction Pvt. Ltd.** May 2022
- Automated part of the quality control and inspection process by developing a vision-based application for dimensional analysis and classification of brake liners in an industrial setting.
 - Utilized multiple vision cameras for real-time measurement and quality assessment.
- Machine Learning Engineer Capstone Project** | [GitHub Link](#) July 2019
- Developed a Deep Q-Learning (Reinforcement Learning) algorithm enabling an AI agent to master and significantly beat human players in the game of Atari Breakout.
 - The AI agent discovered innovative strategies for high scoring, demonstrating the effectiveness of the implemented learning techniques and algorithmic intelligence.
- Chess Game Development** | [Demo Link](#) | [GitHub Link](#) March 2022
- Programmed a chess game from scratch in Flutter & C++, focusing on efficient move generation using bitboards.
 - Implemented advanced game features, including an AI opponent using the NegaMax algorithm and online multiplayer capabilities.
- Teachable Image Classifier** | [GitHub Link](#) January 2022
- Created a app for non-experts to train deep learning models, enabling class creation and image sample addition.
 - Designed with adjustable training parameters, making deep learning accessible and customizable for various needs.
- Vedic Life Foundation App Development** September 2021
- Developed a comprehensive mobile application for meditation teaching, member enrollment, and session tracking, compatible with both iOS and Android platforms.
 - Included social media features for community engagement, allowing users to share thoughts, ask questions, and track meditation progress.

CERTIFICATIONS

- 2021 Flutter Development Bootcamp** | [Certificate Link](#) January 2022
- Mastered Flutter and Dart for cross-platform app development, UI design, and state management techniques.
 - Developed skills in API integration, Firebase services, animations, and deploying production-ready mobile apps.
- Udacity - Artificial Intelligence Nanodegree** | [Certificate Link](#) | [GitHub Link](#) June 2020
- Learned AI techniques including classical search, constraint satisfaction problems, and local search optimization.
 - Gained experience in adversarial search (Minimax, Monte Carlo Tree Search) and probabilistic reasoning with Hidden Markov Models.
- Udacity - Machine Learning Engineer Nanodegree** | [Certificate Link](#) | [GitHub Link](#) August 2019
- Mastered supervised (Regression, KNN, Random Forest, SVM) and unsupervised learning (Clustering, GMM)
 - Gained proficiency in data preprocessing, including data cleaning, normalization, feature engineering, and applied PCA for high-dimensional datasets.
 - Developed expertise in Deep Learning (CNNs) for image classification and Reinforcement Learning (Q-Learning, DQN, Actor-Critic, DDPG) for autonomous decision-making in complex environments.