Kishan Ved
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Discipline of Computer Science and Engineering
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ACADEMIC DETAILS

Degree	Specialization	Institute	Year	CPI/%
B.Tech.	*Computer Science and Engineering*	IIT Gandhinagar	2022-Present	9.71(/10)
Class XII	*Physics, Chemistry, Maths*	Prakash College, Mumbai	2020-2022	85
Class X		Thakur International School, Mumbai	2014-2020	97.8

INTERNSHIPS

- **Google Summer of Code 2024, NumFOCUS** [May '24 - Present]
  (Mentor - Gagandeep Singh) | *Project Link* | *Blog Link*
  - Developed the C++ backend for a Python package: PyDataStructs. Added support for tree data structures like Binary Search Trees, Self Balancing Binary Trees, Red Black Trees, AVL Trees etc. and their algorithms available in PyDataStructs.
  - Achieved a 5-8 times increase in speed by redirecting code execution to the C++ backend. This is extremely valuable for scientific computing and high-performance applications.
  - Submitted a proposal for a talk at PyCon India 2024, based on my project: Link to proposal
  - Used C++, Python and Python-C API. Learned to incorporate OOPS principles to write effective and reusable code and useful tools like Git and GitHub.

OPEN SOURCE CONTRIBUTIONS (ON GITHUB)

- **LFortran (A Fortran Compiler)**: **10 merged PRs**
  Implemented Fortran intrinsic functions in the C++ backend with comprehensive compile time and runtime integration tests. Addressed bugs related to string slicing and warnings emitted. Fixed handling of datatypes and conversion from complex to other datatypes.
- **LPython (An ahead-of-time Python Compiler)**: **5 merged PRs**
  Implemented hypot() in the NumPy module. Developed string APIs like replace(), isnumeric() and isalnum() with all parameters supported. Modified the version control to ensure correctness of the CI checks on GitHub.
- **PyDataStructs**:
  Implemented introsort function in the Python backend. Added exhaustive tests to ensure correctness. Selected for Google Summer of Code 2024 based on this PR.
- **scikit-learn**:
  Made required changes to the documentation and closed an issue with a merged PR.

PROJECTS

- **Text Generator based on next character prediction (Machine Learning Project)** [Mar '24]
  (Advisor - Professor Nipun Batra, IIT Gandhinagar) | *Project Link* | *Application link*
  - Developed a pipeline model for next character prediction based on the context of previous 'k' characters. The model used is a neural network with an embedding layer followed by 2 hidden layers. The model is able to capture the semantics of English language and generate meaningful words and phrases.
  - Deployed a Streamlit application which showcases the difference in results based on the choice of embedding and architecture of the neural network. Performed hyperparameter tuning to get the best results.
  - Used Python and its libraries: PyTorch, sklearn, t-SNE and Matplotlib.
- **Human Activity Recognizer (Machine Learning Project)** [Jan '24]
  (Advisor - Professor Nipun Batra, IIT Gandhinagar) | *Project Link*
  - Made a machine learning model that uses only decision trees to recognise 6 different human activities by utilizing time series data of acceleration available in the UCI-HAR dataset.
  - Learned to handle time series data by employing featurization and dimension reduction. Performed hyperparameter to tuning select the best model based on bias-variance trade-off. Deployed the model and tested the predictions on real acceleration data collected from a smartphone.
  - Used Python and its libraries: sklearn, tsfel and Matplotlib.
- **Facebook graph clustering based on density (Data Science Project)** [Jan '24]
  (Advisor - Professor Anirban Dasgupta, IIT Gandhinagar) | *Project Link*
  - Implemented a greedy algorithm to extract the densest subgraph from Facebook's graph (with pages being nodes and mutual links being edges). Peeled the 5 densest subgraphs (and hence, detected 5 closely knit communities in the graph) and analyzed their entropy.
  - Learned to employ data clustering techniques on large real-world datasets, involving logic and algorithmic optimization in terms of both space and time complexity.
  - Done using Python and its relavant libraries like NumPy and Pandas.

- **Spacecraft Charge Distribution Modelling** [Sept '23 - Nov '23]
  (Advisor - Professor Soumyabrata Chakrabarty, Scientist- ISRO (SAC), Professor- IIT Gandhinagar) | *Project Link* | *Poster* | *Report*
  - Employed numerical methods such as Gaussian elimination, Gauss-Jordan algorithm, and TDMA to solve the system of equations for a detailed and accurate charge distribution profile.
  - Programming of all mathematical equations and visualizations are done (from scratch) using Python and it's libraries.
  - Received the highest marks (25/25) among a total of 50 projects presented at the end of the Numerical Methods course.
- **Child Safety Monitoring Application, IoT Powered bicycle safety system** [Sept '23 - Nov '23]
  (Advisor - Professor Nithin V. George, IIT Gandhinagar) | *Project Link*
  - Developed a comprehensive Android/iOS mobile application, transforming the phone into a smart IoT embedded system for monitoring child safety during cycling. Implemented advanced features, including real-time GPS, accelerometer, and gyroscope data monitoring, alongside boundary detection, fall detection, and over-speed alerts.
  - Integrated a custom-built mini Google Maps for the IITGN campus, allowing seamless real-time location sharing and communication between the parent and child devices.
  - Utilized MATLAB for backend processing, Simulink for UI design, and TCP/IP protocols for efficient real-time data transfer and voice communication.
- **Intelligent Game Engine (DSA Project in C and C++)** [Sept '23 - Nov '23]
  (Advisor - Professor Balagopal Komarath, IIT Gandhinagar) | *Project Link*
  - Developed a repository featuring intelligent game implementations, where the computer employs optimal strategies to make informed moves, showcasing proficiency in algorithmic decision-making, especially graphs and path finding algorithms.
  - Represented games in the form of graphs and employed graph traversals and game specific optimal greedy algorithms to make the computer play the best possible move.
  - Engineered a cube-solver capable of generating the most efficient solutions for any 2x2x2 Rubik's Cube, highlighting algorithmic optimization.
- **Open Source Project: Student Resume Generator Website** [Dec '23 - Ongoing]
  (Used by Professional Development Council, IIT Gandhinagar) | *Project Link*
  - Deployed an innovative website enabling students to input their details and generate professional resumes in LaTeX, within seconds. Used by the entire student community at IITGN and also featured on the website of the Professional Development Council, IITGN.
  - Made using HTML, CSS, JavaScript, Git and GitHub. Hosted by GitHub-Pages.
- **IITGN Technical Summit's Official Website** [Sept '23 - Nov '23]
  (Technical Team, Amalthea, IITGN Technical Summit) | *Project Link*
  - Played a pivotal role as a key contributor in the development team for the official website of Amalthea '23, the annual technical summit at IIT Gandhinagar.
  - Made significant contributions to the website's design, functionality, and overall development, ensuring a polished and user-friendly online platform for the summit. Worked collaboratively to implement innovative features and enhance the digital experience for participants and attendees.
- **Machine Learning Blogs Website** [Aug '23 - Ongoing]
  (Advisor - Professor Nipun Batra, IIT Gandhinagar) | *Project Link*
  - Crafting technically in-depth blogs understand machine learning concepts from scratch and visualize the mathematics behind machine learning algorithms and explain their working.
- **Data Narratives** [Jan '23 - Apr '23]
  (Advisor - Professor Shanmughanathan Raman, IIT Gandhinagar) | *Project Link*
  - Analysed and organized the data of highly complex datasets using Numpy, Pandas, Matplotlib and Python.
  - Extracted quality information from the dataset and used it to predict trends by using machine learning techniques.

TECHNICAL SKILLS

- **Programming Languages:** C++, C, Python, Java, HTML, CSS, JavaScript(basic).
- **Tools:** Git, GitHub, PyTorch, Tensorflow, Numpy, Pandas, Linux (Ubuntu), MATLAB, Simulink, Autodesk Inventor, Latex, Verilog.

RELEVANT COURSES

- Machine Learning **(A+ or 11/10)**, Signals, Systems and Random Processes **(A+ or 11/10)**, Numerical Methods **(A+ or 11/10)**, Data Structures and Algorithms 2 **(A or 10/10)**, Data Science **(A or 10/10)**, Data Centric Computing **(A or 10/10)**, Data Structures and Algorithms 1 **(90.75/100, A- or 9/10)**, Probability, Statistics and Data Visualization **(A or 10/10)**, Discrete Mathematics **(A- or 9/10)**, Digital Systems **(A or 10/10)**, Linear Algebra and Single Variable Calculus **(A or 10/10)**, Ordinary Differential Equations **(A or 10/10)**, Partial Differential Equations **(A or 10/10)**.

  (A+ or 11/10 grade is awarded for outstanding performance and ranking #1 in the batch.)

ACADEMIC ACHIEVEMENTS AND AWARDS

- Selected as a contributor for **Google Summer of Code 2024**. I am among the 1,220 accepted contributors out of 43,984 applicants.
- Recognized as a **Reliance Foundation Undergraduate Scholar** and recipient of the Reliance Foundation Undergraduate Scholarship, which is received by the top 2000 nationwide applicants, for showcasing academic excellence and exemplary potential.
- Received grade **A+ or 11/10** in **Machine Learning, Signals, Systems and Random processes (SSRP)** and **Numerical Methods** for exhibiting outstanding performance and ranking **#1 in the batch**.
- Recognised as a **KVPY (Kishore Vaigyanik Protsahan Yojana) Scholar** with All India Rank **639**.
- Secured an All India Rank of **1348** in JEE (Advanced) and **2538** in JEE (Main).
- Secured the **third place in the Forecasting Stock Prices using Machine Learning** in Hackrush, IIT Gandhinagar's annual hackathon, in my first year itself.
- Selected in the **Dean's List of Semester-1, Semester-2, Semester-3 and Semester-4** for exhibiting excellent academic performance.
- Secured **A grade** in both Elementary and Intermediate drawing examinations.

POSITIONS OF RESPONSIBILITY

- **Member, Technical Team, Amalthea** (Annual Technical Summit, IIT Gandhinagar) [Aug '23 - Nov '23]
  - Designed and developed a user-centric and interactive UI for the official website of Amalthea, the prestigious annual technical summit of IITGN, enhancing user engagement and ensuring a seamless browsing experience. *Website Link*
  - Collaborated in a team to manage a substantial codebase and played a pivotal role in crafting the website for Amalthea, contributing to its overall success.
- **Class Representative, Computer Science Engineering** [Nov '23 - Ongoing]
  - Elected as the representative for the Computer Science Engineering department at IIT Gandhinagar, demonstrating leadership qualities and effective communication skills in representing the interests of a diverse batch of 70 students.
- **Member, Technical Council IITGN** [Jun '23 - Ongoing]
  - Contributed expertise and strategic guidance as a valued member of the Technical Council at IITGN, driving innovation and shaping technological advancements to meet organizational objectives.
  - Collaborating with the community to devise and implement cutting-edge initiatives that fostered technical excellence and facilitated interdisciplinary collaboration within the IITGN community.
- **Sponsorship Executive, Amalthea** (Annual Technical Summit - IITGN) [Nov '22 - Jan '23]
  - Contacted and maintained relations with numerous companies for sponsorship.
  - Raised sponsorship opportunities with industries and contributed to the success of Amalthea '22.
- **Head Boy, Thakur International School** [Sep '18 - Sep '19]
  - Elected as Head Boy in a school of 1500+ students, demonstrated strong leadership, organizational skills, and a commitment to fostering a positive academic environment.
  - Effectively represented the student body as the Head Boy, implemented initiatives that promoted student welfare, encouraged student engagement and enhanced the overall educational experience for all students.

EXTRA-CURRICULAR ACTIVITIES

- **Open Source Contributor** and enthusiastic about helping build software and solutions for the benefit of the society. I have contributed to: **NumFOCUS, LPython, LFortran and scikit-learn**.
- Competitive Programming (CP) enthusiast. Regular Codeforces contest participator. **Codeforces rating 1454 (Specialist)**, as on June 8, 2024. *Profile Link*
- **175+ problems** solved on **LeetCode** with **120+ solutions** posted that received **1600+ views** combined. *Profile Link*
- Member of GRASP, Group for Algorithms and Sport Programming, the CP club of IIT Gandhinagar.
- Member of the Machine Learning Scoiety, IIT Gandhinagar.
- Member of Metis Club: Web and Application Development Club of IIT Gandhinagar, in AY 2022-23. Successfully completed a project- Text Chat Web Application. *Project Link*
- Passionate about reading and painting, finding joy and inspiration in the realms of literature and art. Cricket, tennis and basketball enthusiast.