Rigved Sandeep Shirvalkar

(Undergraduate - B Tech in Electronics and Computers)

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Best time to call: before 9:00 PM and after 11:00 AM (IST)

A detail-oriented engineer with a strong passion for finding solutions with computer advancements to real world problems who could shape into a high-performance-oriented researcher in the field of Artificial Intelligence and implement learned expertise and skills to develop an impactful career with possible breakthroughs in it

COMPETENCIES

- ***Adaptability***
- ***Coding***
- ***Communication***
- ***Creativity***
- ***Networking***
- ***Problem-solving***
- ***Research***
- ***Resilience***
- ***Business acumen***
- ***Team Player***
- ***Software development***
- ***Data Analysis***
- ***Natural Language Processing***
- ***Generative AI***
- ***Ethical AI***
- ***Deep Learning***
- ***Computer Vision***
- ***Market analysis***

TECHNICAL SKILLS

- ***Deep Learning***
- ***PyTorch, PyTorch Lightning***
- ***Mathematics***
- ***Python, C++, Java***
- ***Git***
- ***Hugging Face Transformers***
- ***Langchain***
- ***Gradio***
- ***Android Development***
- ***ReactJS***
- ***Flutter***
- ***Machine Learning***
- ***TensorFlow***
- ***Probability and Statistics***
- ***NumPy,*** **Pandas**
- ***Jupyter***
- ***HPC***
- ***Retrieval Augmented Generation***
- ***Streamlit***
- ***Web Development***
- ***Django***
- ***HTML, CSS***

ACCOLADES

- Represented the school in India's largest inter-school Travel Quiz by Thomas Cook and qualified till the state level
- Was selected for the prestigious 6th Summer School of AI ’22 by IIITH
- Received the Xartup fellowship in the April ‘23 cohort after pitching my AI startup idea which was valued at 1.4 million dollars by them using the Berkus method, and passing an interview.
- Was selected for City final of Times NIE think and learn challenge
- Represented school in the city pride inter-school Web page designing competition
- Secured third position in 10th class 3rd preliminary exam
- Was awarded a gold medal for being class topper in the SOF National Cyber Olympiad (2017-18)
- Was awarded a gold medal for being class topper in the SOF International Maths Olympiad (2017-18)
- Was awarded a silver medal for achieving the second rank in the class during the National Cyber Olympiad (2016-17)

ACADEMIC CONTOUR

Academic Scores:

Semesters	1	2	3	4	5	6
Marks (CGPA)	9.09	8.64	7.45	8.84	8.55	8.65

Qualification	University/Board	Month-Year	Board/University	Percentage/CGPA
ICSE	The Bishop's Co-Ed School Kalyaninagar	2018	Indian Certificate of Secondary Education	96.4
HSC	Arham Junior College	2020	Higher Secondary Certificate	84

GRE Score:

Quantitative Reasoning	Verbal Reasoning	AWA	Total
170	154	4	324

TOEFL Score:

Listening	Speaking	Reading	Writing	Total
28	26	30	28	112

LANGUAGE SKILLS:

Fluent in English, Hindi, Marathi and Spanish (Basic)

PROJECTS:

1. **Pneumonia Detection from X Ray images –**
   - Detection of pneumonia from X Ray images using Pytorch
   - Architectures used are ResNet9, ResNet18 and other custom CNN models
   - Hyperparameters were selected using optuna and evaluated using K fold cross-validation for the final ResNet model.
   - Implemented ensembling by training 5 models with different folds of training data and using their average output as the final prediction

2. **Brain-Tumor-Segmentation**
   - Semantic Segmentation of tumor from Brain MRI images using PyTorch
   - Dataset used for training is from Kaggle LGG Segmentation Dataset which contains over 3900 samples obtained from The Cancer Imaging Archive.
   - Model converted to ONNX format for deployment using Heroku.
   - Evaluation metric used was DICE coefficient, with loss as (1-DICE) + BCELoss.

3. **Carvana Image masking**
   - Performed Image segmentation of cars using UNET
   - Implemented using Pytorch
   - Deployed using Heroku

4. **EigenCAM for YOLO V8 Interpretability**
   - A package for applying EigenCAM on the newly released YOLO V8 model.
   - It was the first such package to be created at the time of its release and has been starred on Github by many Data Scientists and Phd students as well

5. **Counsellor GPT**
   - Created an interface using streamlit and langchain, using the Chat Gpt API.
   - Takes in all the necessary information about the student to understand him better, and then suggests a way to format their SOP to create a successful application
   - Also provides a basic idea of which universities they can apply to and suggests ways they can improve their profile to increase their chances of getting admitted in the university they are applying to

6. **German to English translator**
   - Implemented and Trained a transformer model from scratch to perform English to Italian translation using the Opus_books dataset for training
   - Made this to understand more about the transformer model. My blog about it can be found at https://medium.com/@rigvedrs/a-basic-idea-of-transformers-758f0bfd43c6
   - Used bleu score as a metric for evaluation

7. **Fine-tuning neural network from scratch using LoRA:**
   - Trained a linear network on the MNIST dataset and then fine-tuned it using LoRA from scratch
   - Implemented the concept of Low Rank Adaptation to understand it better.
   - Achieved an increased accuracy for the specific digit the LoRA was trained on, with the ability to control the extent of its effects on the model's complete output using PyTorch from scratch.

8. **FaceRec - Custom Face Recognition App using Kivy**
   - Custom face recognition application that uses Siamese Neural Network for face recognition
   - Trained the neural network locally using custom face dataset for positives and LFW dataset for negatives
   - App made using Kivy for User Interface

9. **ToDo-App**
   - Developed a simple and user-friendly ToDo web application that runs on the Django backend and react in the frontend
   - Implemented a dynamic task box that adjusts its size based on the text content, preventing overflow.
   - Built a modal interface for adding and editing tasks, offering a seamless user experience.
   - Incorporated confirmation boxes for deleting tasks, ensuring user safety
   - Enhanced the application's visual appeal with beautiful CSS features, including hover effects, different fonts, and a captivating background.

10. **Scan-my-ID:**
    - Built an Android application that scans images and automatically extracts embedded email addresses and phone numbers.
    - Leveraged Flutter's cross-platform capabilities for development and deployment.
    - Utilized Firebase's OCR API to accurately scan texts from images.
    - Implemented Regex to identify and parse email and phone number patterns within the extracted text.
    - Provided a user-friendly interface for capturing or selecting images, and displaying the extracted information

RESEARCH PAPERS :

1. **Mitigating Bias in Image Classification: Pretraining on Diverse Data for Improved Generalization:**
   - Conducted Research under Dr. Geetha M, Vice Chairperson , School of Computing, Amritapuri | Assistant Professor (Sl. Gd.) , School of Computing, Amritapuri
   - Paper accepted in 7th International Conference on Electronics, Material Engineering and Nano-Technology

2. **Enhancing Pneumonia Detection Accuracy through ResNet-Based Deep Learning Models and Ensemble Techniques: A Study Using Chest X-Ray Images**
   - Conducted research under Ms. Remya, Vice Chairperson, Electronics and Communication Engineering, School of Engineering, Amritapuri | Asst. Professor, Electronics and Communication Engineering, School of Engineering, Amritapuri
   - Experimented with best ways to improve the accuracy of the model and showed a proper pipeline and approach to address it
   - Paper accepted in 8th International Conference on Smart Trends for Computing and Communications

3. **Methods for Underwater Image Enhancement : Working on Patenting the publication**
   - Conducting research under Dr. Sumi Suresh M. S, Assistant Professor, School of Computing, Amritapuri
   - Implementing works of past research papers on this topic, and performing comparative analysis to find the best image enhancement and deep learning algorithms
   - Leveraging both qualitative and quantitative analysis methods to determine the effectiveness of various enhancement approaches
   - Aiming for a patent proposal after a robust and efficient pipeline discovered

4. **Mitigating Bias in generative models:**
   - Conducting Research under Dr. Geetha M, Vice Chairperson , School of Computing, Amritapuri | Assistant Professor (Sl. Gd.) , School of Computing, Amritapuri
   - Experimenting with recent methods like adversarial training and using explainability tools for mitigating bias in generative models
   - Aiming to address selection, representation and groupthink bias using our methods

5. **Christian Iconography: The Émile Mâle pipeline :**
   - Working on a research paper that combines my work with the contributions of previous contributors at Red Hen Labs during their Google Summer of Code
   - Creating a multi modal pipeline that provides iconographical explanations which are close to the works of French historian Émile Mâle
   - Working with VQA model (BLIP), LLM model (Llama) and implementing RAG methods to obtain explanations from iconography texts.

WORK EXPERIENCE AND INTERNSHIPS:

1. **Open Source contributor for Red Hen Lab** (05/2023 – present)
   - Created a multimodal Deep Learning Pipeline that detects speech gestures in Christian Art Images using pose detection transformer, YOLO V8 classifier, Neural network for pose classification, and YOLO V8 object detection model.
   - Applied Style transfer using AdaIn to generate data similar to art images for fine-tuning the YOLO V8 pose detection model
   - Used a pre-trained pose detection transformer from a research paper that specifically trained it on art images
   - Created and annotated over 2000 images for training the palm gesture detection model using YOLO
   - Created another dataset of 1000 images for classifying and detecting the person in the images and further improving the caption generated by the pipeline. Trained YOLO V8 classification and object detection models on these datasets
   - Currently working on creating a multi-modal pipeline that uses an image captioning model (BLIP) to describe the art and passing the caption to an LLM using RAG (Retrieval-Augmented Generation) to explain meaning and symbolism of the gestures used in the image.

2. **Internship program in Machine Learning** (01/2021 – 03/2021)
   FoxTradingSolutions
   - Trained models to fit datasets with the highest accuracy possible
   - Solved some case studies on machine learning problems

3. **Full Stack Web Developer Intern**(03/2021 – 06/2021)
   Traboda CyberLabs
   - Added features and solved issues in both backend and frontend to simplify UI and UX
   - Used CSS, ReactJS and Django in my work there

CO-CURRICULAR ACTIVITIES

- Completed CS50's Introduction to Artificial Intelligence with Python offered on EdX
- Completed HarvardX PH125.8x Data Science: Machine Learning offered on EdX
- Completed IBM Deep Learning with Python and PyTorch offered on EdX
- Completed Neural Networks and Deep Learning Course on Coursera offered by DeepLearning.AI
- Completed Structuring Machine Learning Projects course on Coursera offered by DeepLearning.AI
- Completed Improving Deep Neural Networks: Hyperparameter Tuning, Regularization and Optimization course on Coursera offered by DeepLearning.AI
- Completed course on How Diffusion Models Work offered by DeepLearning.AI
- Completed course on Building Generative AI Applications with Gradio offered by DeepLearning.AI
- Completed course on Evaluating and Debugging Generative AI offered by DeepLearning.AI
- Completed Introduction to Deep Learning Using PyTorch offered by Udacity
- Completed course on Reinforcement Learning from Human Feedback offered by DeepLearning.AI
- Completed course on LangChain for LLM Application Development offered by DeepLearning.AI
- Completed course on Building and Evaluating Advanced RAG offered by DeepLearning.AI
- Completed course on Functions, Tools and Agents with LangChain offered by DeepLearning.AI
- Completed course on Quality and Safety for LLM Applications offered by DeepLearning.AI
- Completed course on Large Language Models with Semantic Search offered by DeepLearning.AI
- Completed course on Understanding and Applying Text Embeddings offered by DeepLearning.AI
- Completed course on Vector Databases: from Embeddings to Applications offered by DeepLearning.AI
- Completed a 6 days foundational module in Robotics by Lydnow where I learned basic soldering skills and how certain electronic components work. I also got to make my own remote-controlled vehicle using the skills I learned from the course
- Conducted a workshop for freshmen engineering students of Dhole Patil University on ‘All about Open Source and GSOC (Google Summer of Code)’, where I guided and taught the juniors how to get started with contributing in Open Source communities and participate in the programs and opportunities that are available. Also received a Letter of Recommendation from the principal of the University for the same.
- Participated in the GE Healthcare Hackathon ‘23

- Participated in the Flipkart GRID Hackathon ‘23
- Participated in the Prelims of Technothlon ‘17, an event of Techniche 2017, IIT Guwahati, which was conducted nationwide

EXTRA CURRICULAR ACTIVITIES

- Completed the Flight training for P1 paragliding pilot’s course from Temple Pilots, and with knowledge and basic skills, I fly and practice under direct instructor supervision within operating limitations (https://www.youtube.com/watch?v=HHKsVqhW1GQ&pp=ygUSUmlndmVkIFBhcmFnbGlkaW5n)
- Participated in the 2023 Trekking Panda Kundalika River Rafting White water 12 kms racing thrills with Grade 2 and 3 challenging Rapids that tames the turbulence and gradient of the Kundalika and tested Adrenaline and Excitement, along with physical and stress endurance
- WaterFall Trek - Kolad Water Sports Adventure Camp 2023 with adventure and exploration that tested endurance, strength, and cardiovascular fitness and Stress relief management
- Participated in the 2023 Trekking Panda Quiz Competition where mental stimulation, social Interaction, teamwork and collaboration was tested
- Participated in the 2023 Trekking Panda Treasure Hunt that challenged the participants’ Problem-Solving Skills and Resilience and Perseverance
- Participated in the 2023 Trekking Panda Kundalika River Solo - Kayaking to test Mental and Emotional Endurance
- Participated in the 2023 Trekking Panda Zipline to develop Increased Confidence and Resilience, with Fear management
- Participated in the 2023 Trekking Panda River Crossing to experience a sense of Achievement and learn to access new areas
- Participated in the 2023 Trekking Panda Jet ski where developing specific skills such as throttle control, steering, and maneuvering techniques to test the mind body coordination
- Participated in the 2023 Trekking Panda Endurathon an endurance-based events and races that can challenge athletes mentally and physically
- Completed basic training of scuba diving where I was trained by professionals about its basics in a 50 m deep pool with all the necessary scuba diving equipment
- Attended the ‘Space tech - Innovation and Entrepreneurship’ workshop, where the first session was by the Chairman of ISRO, second one by the DGM of Canara Bank, and the third one by the general manager of DIC Kollam.
- Created and managed a software development-focused YouTube channel, producing 2 educational videos and demonstrating skills in content creation, communication, and video editing (https://youtube.com/@rigveds5191?si=3SpbKWGEWMzhQFAt)
- Represented School in the Annual Inter School Computer Competition for Web Page Designing, conducted by the City Pride School in January 2016
- Event Coordinator and Security Volunteer for University's annual Holi and Ugadi celebrations
- Was a part of the sponsorship team for the Vidyut Fest conducted by our University, where our work was to find potential sponsors for the events to be conducted during the fest.
- Took tennis classes when the lockdown was partially opened for 3 months during the first year of my college

- Participated in the SOF National Science Olympiad in class 7, 9 and 10
- Participated in the SOF National Cyber Olympiad in class 4, 8, 9 and 10
- Participated in the SOF International Maths Olympiad in class 4, 5, 6, 7, 8 and 10
- Participated in National Level Science Talent Search Examination in class 3 and 8
- Presented the working of hydraulic machine by creating a working model using syringes in the school science exhibition
- Presented a project on Automatic Street Lighting System, that automatically lighted up the street lamps using sensors, in the school Science exhibition
- Was part of the Pune United Football Academy from grade 7 to 9
- Received a certificate for participating and credibly performing in the International Hindi Olympiad conducted by the Hummingbird Foundation
- Completed workshop on Permaculture at Tokoro farms where we planted trees using the permaculture methods that we learned during the workshop
- Successfully completed 12 module Energy Literacy course covering energy generation, consumption, and alternative solutions
- Completed second level abacus training of GKidz playKAT in 2009
- Achieved Yellow and Green Belts at Brandon's Taekwondo Academy (2008 and 2009)
- Participated in the Junior Drawing Contest Conducted by Schoolsindia (class 2-4) and National Drawing Competition 2009 by Kalabharati Child Art Institute

COMMUNITY SERVICES AND SOCIAL WORK

- Led a Road Safety Awareness Drive that involved three impactful activities to promote road safety. Firstly, delivered a compelling presentation to over 100 attendees on the significance and protocols of road safety. Secondly, we took to the roads to distribute toffees and emphasize the importance of wearing helmets to individuals who were not wearing them. Lastly, organized an interactive session with the Motor Vehicle Inspector from RTO enforcement of our city, who enlightened our college students on the crucial aspects of road safety
- Contributed to a local street animal service NGO during the lockdown by designing posters to promote pet adoption and actively sharing information about their adoption programs. Additionally, fostered a stray kitten for them and streamlined their adoption process by transitioning their text-based forms to user-friendly Google forms. We also adopted a cat from the same service during this period
- Volunteered at Read A Story NGO, dedicatedly teaching English language skills to a 10-year-old child over a period of 4 weeks. The NGO's commendable mission targets children residing in remote and inaccessible areas of Maharashtra, where education is imparted in the local vernacular. The sessions are generally conducted every weekday for an hour through regular phone and video calls
- Participated in invitational Pentagon Cricket Tournament which was held to generate funds for old age homes in 2022
- Successfully completed a millet awareness campaign in Pune, where the citizens were connected to farmers and were educated about the millet diet and its benefits
- Organized a workshop on Cancer Awareness for women and soldiers from QMTI Camp at QMTI, Pune in 2023