

# CURRICULUM VITAE/RESUME

## GYANIG KUMAR

MS in Computer Science for Fall'2024

+91-81-178-82184    [gyanig.kumar@gmail.com](mailto:gyanig.kumar@gmail.com)    [Gyanig Kumar](https://www.linkedin.com/in/GyanigKumar)    <https://gyanigk.github.io>

### Education

Kalinga Institute of Industrial Technology, Bhubaneswar, India

July'19 – July'23

Bachelor of Technology, Computer Science and Systems Engineering

CGPA: 9.05/10 or 3.878/4.0

### Research Interests

Multi-modal learning, gaze estimation, Object Detection and Tracking, 3D deep learning problems

### Experience

I3D Lab, Indian Institute of Science, Bangalore, India

April'22 – Present

ML Intern, Research Assistant under Prof. Pradipta Biswas(Phd. Cambridge)

- Worked on an optimized version of **I2D-Net Person-Specific Gaze Estimation model**, achieving a **0.5x** Model Parameters and **2x** Inference speed and comparable SOTA Accuracy of **4.33°**.
- Worked in collaboration with **Faurecia** on extending **Interactive Automotive Heads-Up Display** features with *Gaze-based On-Road Distraction Detection* system.
- Contributed to dataset collection & training for a newly developed **Indigenous Wearable IR-Based Eye-tracker** for 3D Gaze Estimation.
- Worked in collaboration with **Collins Aerospace** on a *Mixed Reality-based Assembly Instruction with Real-Time Continuous Object Detection* research on varied and complex classes of components.
- Trained and evaluated SOTA Object Detection Models like **YOLOv5—v8, DETR, etc**, with added **various augmentations evaluation on our Dataset**, achieving the best **94.5% mAP@0.5(IoU)**.
- Contributed to generating **Novel Synthetic Datasets using CycleGAN** using extensive style-transfer of real-world components attributed to CAD Models.
- Tested various tracking algorithms like Kalman Filters, AprilTags, and Deep-Learning-based models; **ByteTrack improved overall detection accuracy to 97.8%**.
- Developed and validated a **Gaze Estimation Mapping module**, achieving a 95% accuracy in **predicting user intent** during a pick-and-place scenario with a robotic system.

Part-Time CS Teacher, Polytechnic College Suriname, Suriname, SA

March'23 – Sept'23

Data Science Program

Appointment Letter

- Conducted classes, designed test & assignments, and evaluated 15 enrolled students for **University-level Mathematics II and Statistics I Courses** for the semester with 10 hours avg. per week.
- Undertook **50+ students** for guidance in Programming & Prototyping in a hackathon.

### Publications

1. Murthy L R D, **Gyanig Kumar**, Pradipta Biswas  
"*Efficient Interaction with Automotive Heads-Up Displays using Appearance-based Gaze Tracking*"  
**Published** in Work-In-Progress Track of *14th International Conference on Automotive User Interfaces and Interactive Vehicular Applications 2022* — Supplementary Material.
2. Subin Raj, **Gyanig Kumar**, Pradipta Biswas  
"*Mixed Reality and Deep Learning based System for Assisting Assembly Process*" **Published** in *Journal on Multimodal User Interfaces 2023*
3. Mukund Mitra, **Gyanig Kumar**, Pradipta Biswas  
"*Enhanced Human-Robot Collaboration with Intent Prediction using Deep-IRL*" **accepted (full paper)** in *IEEE International Conference on Robotics and Automation (ICRA) 2024*
4. Mukund Mitra, **Gyanig Kumar**, Pradipta Biswas  
"*Multimodal Target Prediction for rapid Human-Robot Interaction*" **accepted (short paper)** in *29th ACM Conference on Intelligent User Interfaces (ACM IUI) 2024*

## Technical Skills

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**Languages:** C, C++, Python, C, Bash, L<sup>A</sup>T<sub>E</sub>X

**Frameworks:** TensorFlow2, Pytorch, Tensorflow.js, SciKit-Learn

**Libraries:** Numpy, Pandas, Matplotlib, Keras, Librosa, Kivy

**Softwares:** MATLAB, R.O.S., OpenCV, Fusion 360, Unity-3D

## Academic Projects

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### Chat rooms with multilingual conversation support

Feb'22 - April'22

*Supervisor: Prof. Bindu Agarwalla | [Heroku](#) — [Github](#)*

- Novel introduction of **translating any incoming messages** on a chat platform using **Google Translate APIs**.
- Intricate Web server application using Express.js & Socket.io for creating **bi-directional messaging** passing with efficient query handling subroutine.

### Audio-Visual Correspondance Task using Few Shot Learning

Dec'21 - June'22

*Supervisor: Dr. Rajdeep Chatterjee*

- Reproduced the results from "*Look Listen & Learn*" paper model – L3Net.
- Extracted a subset of **34 Classes** from **KINETIC600** Dataset for training a modified Zeroshot Learning Architecture with RCNN Backbone with two subnetworks of **Audio Encoder & Vision Encoder**
- used different *FFT, Mel-Filter Bank spectrum* for Audio Feature Extraction corresponding to Image Samples.
- Achieved **0.180 (Vision)** & **0.245 (Audio)** accuracy with substantial room for improvement and optimization.

## Personal Projects

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### Lox: Interpreter for Python-like language | Compiler Design, OOPs | [Github](#)

Sept'20-Dec'20

- Built an **end-to-end interpreter** that takes Python-like syntax based on [Crafting Interpreters](#).
- Implemented features such as *parsing, control flow, hashes, garbage collection, superclasses* etc.

### V-BIKES: Deploying Enhanced Safety Measures in two-wheeler vehicles | [Award](#)

Sept'17-Feb'18

- Based on the field of robotics, we developed an **array of non-evasive sensors for collision detection** in a helmet
- Built End-to-End support for Immediate **Ambulance Alert & injury Profile** using ESP32 Kit.
- Awarded as **best in Smart Mobility Project in Atal Marathon** by Government of India among 1200+ projects and **3rd Position** in **C.S.I.R. Innovation Awards**.

## Volunteering

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### Teaching Assistant, Konnexions Society, KIIT

Nov'21 - April'22

- Teaching Assistant to a class over 100+ Students. — [Appreciation Letter](#)
- Managed a No-Credit Course focused on **Mathematics in Machine Learning** for a semester.

### Student Member, Google Developer Student Community, KIIT

Oct'21 - Oct'22

- Contributed in Organizing Online Seminar, Hackathons & Workshops.
- Worked with the ML team on a "*PetFinder.my - Pawpularity Research Contest*" on Kaggle, using ensemble with **custom Vision models**. (e.g. BiT, ViT, EffNetB2-B5)
- Secured **2<sup>nd</sup> Position** out of 50 teams in KIIT university.

## Certifications

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**[TensorFlow DeepLearning Specilization](#)** , *DeepLearning.ai* - Jan'22

**[5th Summer School on AI](#)** , *CVIT, IIIT Hyderabad* - Sept'21

**[Coursera course on Machine Learning](#)** , *Stanford* - July'20

## Achievements

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**[Official Twitch Affiliated Streammer](#)** under Science & Technology. - 2020

Participated in Water Rover Competition **IIT BOMBAY Techfest**. - 2019

## Hobbies

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Soccer, Competitive Programming, Electric Guitar, Composing Music