Prathamesh Tagore

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Education

Veermata Jijabai Technological Institute **Aug. 2019 – Jul. 2023**
*Bachelor of Technology in Electronics and telecommunication(**CPI - 9.69/10**)* *Mumbai, India*

Experience

Research intern in PLCT lab, Beijing **Dec. 2021 – Present**
Compiler, runtime and deep learning intern *Mumbai, India*

- Writing a **research paper**(design draft) for documenting **platform independent** approach of **vectorised 2D correlation** in MLIR **developed** during my **Linux Foundation fall mentorship**.
- **Working** on **adding** more IP operations in **DIP dialect**(image processing dialect in MLIR) starting from **morphological processing** and **affine image transformations**.

Linux Foundation Mentee with RISC-V **Sep. 2021 – Nov. 2021**
Open Source Developer *Mumbai, India*

- Created a novel **MLIR dialect** named digital image processing(**DIP**) dialect which encapsulates operations and lowering passes used for **generating high performance IR** for **image processing**.
- **Added support** for **vectorised 2D Correlation** in DIP dialect using a custom algorithm built on top of coefficient broadcasting and strip mining(**CBSM**) approach.
- Developed implementation was **benchmarked** using **Google benchmarks** and was found to perform **around (1.5-3.0)x faster than OpenCV** for **usual kernel sizes**(3x3, 5x5). Performance optimization for larger kernels(7x7, 9x9, etc.) is still under investigation.

Google Summer of Code Mentee with Boost C++ Libraries **May 2021 – Aug. 2021**
Open Source Developer *Mumbai, India*

- Redesigned and optimized **Boost Gil's** implementation of **2D convolution and correlation** with a **performance improvement** of **more than twice** to that of the earlier version.
- Wrote an **algorithm** for detecting and separating **spatially separable kernels**. **Temporal locality** of original algorithm was also improved.
- Created API was **at par** with other major computer vision libraries like **OpenCV** in terms of **feature completeness**.

Intern at AIRPIX, Inc **May 2021 – Aug. 2021**
AI, ML and Edge Computing intern *Mumbai, India*

- Created a **Multi Object tracker** which accepts inputs from **multiple cameras** and **tracks** the intended entity through all of them.
- Tracker model used **YOLO object detection algorithm** and **SORT tracker** with an **output frame rate** of **13fps**.

Projects

SMORT | *Python, OpenCv, Computer Vision, Deep learning* **Jan. 2021 - May 2021**

- A **research oriented project** with an aim of creating a robust **object tracker immune to real world scenarios such as occlusion, contrast difference, etc.**
- Implemented **custom versions** of popular **object tracking algorithms** such as **Boosting tracker, MOSSE tracker, SORT tracker, DeepSort tracker etc.** for the purpose of understanding their methods along with their pros and cons.

Catch bot vision | *Python, OpenCv, Computer Vision, Deep learning, IoT* **Jun. 2020 - Aug. 2020**

- **Computer vision solution** designed for a **catch practice bot**.
- The **system detects a person** and **plucks** out a **point** in its surrounding suitable for the **person** to **catch** a **projectile** thrown at them. **Coordinates** of this **point** are **extracted** and returned to the throw mechanism.

Technical Skills

Languages: C++, Python, C, Matlab, Dart
Technologies/Frameworks: Boost C++ libraries, OpenCV, MLIR, LLVM, ESP-IDF, ROS, Gazebo, Multisim
Developer Tools: Git, GitHub, Flask, Jekyll, Arduino, Esp 32, CMake, Make, Ninja, GitHub Actions, Google benchmarks

Other highlights

* **Official member** in **Boost C++ Libraries**.
* **Presented** my **work** in **The Linux Foundation's mentee showcase**.
* **Core member/volunteer** in **SRA VJTI**.