

Manas Kale

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Education

Master of Science (Computer Science, Thesis under Prof. Paul Kry) - McGill University

COMP 558 (COMP. VISION), COMP 550 (NATURAL LANGUAGE PROCESSING), COMP 551 (APPLIED ML), COMP540 (MATRIX FACTORIZATION)

Montreal, Canada

Sept. 2021 - May. 2023 (expected)

Bachelor of Engineering - Pune University

COMPUTER SCIENCE AND ENGINEERING, FIRST CLASS WITH DISTINCTION

Pune, India

2014 - May. 2018

Work experience

TA - COMP 202 (Foundations of Programming), COMP 250 (Intro. to Computer Science)

Department of Computer Science,

McGill University

PYTHON, JAVA

Fall 2021, Winter 2022 (ongoing)

- Responsibilities include preparing assignments, writing tests, grading, conducting live coding/presentation sessions and holding office hours.
- Approximately 500 registered students with 13 TA's for COMP 202 and 9 TA's for COMP 250.

Data Scientist - Infinite Uptime

Pune, India

PYTHON (APACHE KAFKA, SCIPY, SCIKIT-LEARN, FLASK), C++ (EMBEDDED FFT LIBRARIES), JAVA (APACHE FLINK), FOURIER ANALYSIS, STREAMING

February 2019 - February 2021

ANALYTICS, DOCKER, GIT

- Customer-facing contributions to embedded IoT device (**C++**), analytics algorithms (**Python**) and data processing backend (**Java**).
- Designed, implemented and deployed stream processing pipeline for 5k+ IoT devices (**Apache Flink - Java**) to detect alarms, track machine state (using session windows) and reduce infrastructure cost.
- Proactively created framework to collate and explore organization wide sensor data (**Python - HoloViews**), improving data analytics workflow.
- Modeled automated thresholding functionality as a Constraint Satisfaction Problem, implemented and deployed solution (**Python - SciPy, Flask, Docker**) saving tedious man-hours per customer.
- Modeled time to alarm prediction as a Linear Regression problem, implemented and deployed solution (**Python - scikit-learn, Flask, Docker**), providing customers with an approximate time to machine failure.
- Improved peak-detection algorithm using data-driven heuristics (**Python - SciPy, Flask, Docker**), allowing peak detection in noisy signals.
- Implemented extensible **serialization data format** for transmitting edge device's FFT data (**C++**), reducing size of typical data packet by **3x**. Wrote server side deserialization library in **Python**.
- Improved edge device's FFT (**Fast Fourier Transform**) sampling block size from **512 to 4096**, improving frequency resolution **from 6Hz to 0.2Hz** while working under tight memory constraints. Wrote **extensive documentation (C++)** for the previously undocumented codebase.
- [Patent published : 02/10/2020]** "SYSTEM AND METHOD FOR SEGMENTING TRANSMISSION OF DATA", Application No.202021020386 A

Associate Software Engineer - NICE Interactive Solutions

Pune, India

JAVA (SPRING FRAMEWORK), JAVASCRIPT (ANGULARJS), AMAZON AWS, GIT, AGILE

July 2018 - January 2019

- Part of team responsible for **Tenant Management** microservice - a service which handles creation, maintenance, billing and license/subscription tracking of third party vendors on NICE's CXOne cloud platform.
- Implemented new features per business logic using **Spring** framework and **AngularJS** in an agile project management environment.

Selected projects

Raytracer

C++

May. 2019

- Source code & screenshots :** github.com/manas96/Raytracer
- [Open Source Contribution]** Contributed to improving all three of **Peter Shirley's Ray Tracing in One Weekend** book series.

[Undergrad thesis] Multimodal emotion recognition

PYTHON (FLASK, SCIKIT-LEARN, OPENCV), MACHINE LEARNING (SVM, MULTINOMIAL NB, DNN), JAVASCRIPT (BOOTSTRAP, HIGHCHARTS.JS)

June. 2017 - June 2018

- A novel approach to determine user's emotion using a **weighted sum** of inputs: **facial features**, **spoken text** and **voice characteristics(tone)**.
- Contributed to the facial module, dynamic weight adjustment algorithm, webpage UI and web server.
- Project report :** manas96.github.io/project_thesis.pdf

1st Runner Up in SmartIndia Hackathon 2017

C++, OPENCV, NVIDIA CUDA, QT FRAMEWORK

April 2017

- Led a team of 5 in a national level non-stop 36 hours hackathon with 351 participating teams. Problem statement: **create real-time video stabilization software for use on Unmanned Aerial Vehicles**.
- Implemented a working prototype in 36 hours using **OpenCV (C++)** for video processing and optimized that with **NVIDIA CUDA** bindings for near real time video stabilization. Contributed to stabilization algorithm optimizations using **CUDA**.
- Awarded prize of ₹75,000 and source code handed over to Ministry of Defence.

3D Rendering Engine

OPENGL, JAVA (LWJGL), GLSL SHADERS

June. 2017 - September 2018

- Source code and screenshot(s):** github.com/manas96/3D-gameEngine-v2
- An **interactive** 3D rendering engine using **OpenGL**.
- Implemented features: • **Lighting (ambient, point)** • **OBJ geometry file loader** • **Fog blending** • **Entity system architecture** • **Collision detection** • **Particle system** • **Skybox** • **Raycasting** • **Normal mapped textures** • **Fresnel reflection shader**

[Undergrad publication] Driver profiling using realistic racing games

C++ (SDL,OGRE3D), PYTHON (SCIKIT-LEARN, MATPLOTLIB), MACHINE LEARNING (SVM,KNN,NB)

March 2017 - April 2018

- M. Kale and M. V. Bedekar, "Driver Profiling Using Realistic Racing Games", 2018 Second International Conference on Inventive Communication and Computational Technologies (ICICCT), Coimbatore, 2018, pp. 13-17. doi: 10.1109/ICICCT.2018.8473154

Skills

Languages: Python (6/10), Java (6/10), C++ (4/10), GLSL (4/10)

Visualization: HoloViews, Bokeh, Matplotlib

Big data: Apache Flink, Apache Kafka, Redis

Web frameworks: Flask

Graphics: OpenGL, OpenGL Mathematics (GLM)

Data science: Numpy, Scikit-learn, Pandas, SciPy

Tools: Git, LaTeX, Doxygen, Jupyter

Machine Learning: Tensorflow