Suman Saurav Panda

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OBJECTIVE   **Seeking guidance for seminar in IIT Bombay, spring semester, 2023**

EDUCATION

IIT Bombay,Mumbai, Maharashtra.   July 2022 – present
M.Tech.(CSE)   (CGPA 8.56/10.0)

IIT Palakkad,Palakkad, Kerala.   August 2015 – July 2019
B.Tech.(CSE)   (CGPA 8.76/10.0)

TECHNICAL SKILLS
Programming: C, Cpp(*), Python
Version Control System: Github, Bitbucket
Database Management System and Tools: Postgres, MySql
Operating Systems: Linux(Ubuntu), Windows

COURSEWORK - M.TECH.
Core-course: Software Lab
Electives: Algorithm and Complexity, Implementation of Relational Database Management System, Foundations of Machine Learning, Design and Engineering of Computing System

COURSEWORK - B.TECH.
Core-course: Software Engineering and Lab, Database Management System and Lab, Networking and Lab, Operating System and Lab, Compiler and Lab, Paradigms of Programming, Data structure and Algorithm and Lab (implemented using 'C'), Languages Machines and Computation, Computer Organisation and Lab, Digital system and Lab
Electives: Design and analysis of algorithm, Theory and Practice of Data Science, Advanced Computer Architecture, Information Theory and Coding, Machine Learning, Artificial Intelligence, Game theory, Combinatorics, Probability and Computing, Model Checking
Math and logic foundation: Calculus 1, Calculus 2, Linear Algebra and Numerical Analysis, Discrete Mathematics, Probability Stochastic process and Statistics, Graph Theory

M.TECH. PROJECTS AND COURSEWORK
Email analyzer
https://github.com/sumanpanda1997/email_analyzer/tree/develop
Project description - extracts google mail and summarises them, classifies them into predefined categories and outputs various plots(pie charts, histograms, word clouds) for data visualisation

Image Segmentation Using MRCNN
https://github.com/sumanpanda1997/mrcnn-analysis
Project description - In this project we are exploring one state of the art method e.g.- Masked R-CNN prominently used for instance segmentation tasks. For our experiments we have used this dataset https://github.com/rastislavkopal/brain-tumor-segmentation (manually annotated data set for brain tumor segmentation) and this kaggle notebook https://www.kaggle.com/code/rastislav/mri-brain-tumor-segmentation-w-mask-r-cnn/notebook as our starting point for all our experiments on various parameters associated with the algorithm.

Distributed Caching in PostgreSQL

`https://github.com/sumanpanda1997/distributed_caching_in_postgres/tree/libpq`

Project description - Exploring how caching at database level may improve the overall query processing task where we have a distributed client-server database architecture for data storage.

Implementing Neural network from scratch for regression and classification task on Timbre dataset - course assignment CS725

`https://github.com/sumanpanda1997/neural_network_from_scratch/tree/develop`

Project description - For detail check the below link

`https://github.com/sahasrarjn/cs725-2022-assignment`

Buidling Simple Shell - course assignment CS744

`https://github.com/sumanpanda1997/simple_shell/tree/develop`

Project description - For detail check the below link

`https://www.cse.iitb.ac.in/~mythili/os/labs/lab-shell/shell.pdf`

Load testing of multi threaded web server - course assignment CS744

`https://github.com/sumanpanda1997/multi_threaded_web_server/tree/develop`

Project description - for detail check this

`https://github.com/cserl-iitb/bootcamp2022`

PROFESSIONAL EXPERIENCE

Software engineer at Trimble Inc, Chennai, Tamilnadu   July 2019 – July 2022

Project1 - Optimisation for Trimble Visual Odometry Pipeline(CPP)

Project abstract - achieving a lower execution time suitable for a real time system.

- Identifying software bottlenecks in the existing code base
- Refactoring and redesigning code flow to utilize memorization over repeated computation
- Experiments with various cost function(epipolar error/ 3d triangulation error/ hybrid of both) for the pose optimization module
- Parallelizing part of code base using SIMD(NEON ARM architecture) instruction for speed up(data level parallelism)
- verifying Matlab source code for output stabilization(RANSAC algorithm)
- hands on experience on CV concepts related to delta pose computation in a stereo camera setup

Project2 - Implementation of modified SIFT(CPP)

Project abstract - Implementation of SIFT algorithm (customized to better suit FPGA hardware). This task was aimed to remove the dependency of hardware by porting all the logic to High Level Language(CPP), that can be tested on a regular system. It provides faster alternative to testing and debugging without need of any hardware

Project3 - Testing and automating Prototype REVAN

Project abstract - explored the basic principles of pose estimation, camera calibrations, tag based mapping systems. Performed test and accuracy validation for tag based indoor localisation and mapping systems. I got exposure to ROS platform and various open-source slam library like tagslam, ORB-SLAM. Creation of synthetic data and evaluation of different slam library on the data was part of this project. Creation of synthetic data and evaluation of different slam library on the data was part of this project.

Project4 - Live Trajectory Visualizer

Project abstract - Receive Latitude longitude and altitude information from GPS receiver over a network, process them and show a live trajectory on computer screen. Skills associated with this project were basic networking and socket programming, basic animation using matplotlib library and standard C parser integration with python for processing GPS data

Research intern at Tata Consultancy Service, Innovation Lab, Hyderabad, Telangana
May 2018 – July 2018

Project1 - Algorithm for sequence alignment in Genome Graph
Project abstract - Existing implementation was not able to align sequence where length of query sequence was exceeding 500 because of huge memory requirement whereas our implementation solves it within limited memory space. For short length query, our implementation is 4 times faster than the existing sequential algorithm.
- Responsible for designing the algorithm which can align the read sequence in a reduced space
- Responsible for SIMD parallel implementation of the above to reduce the runtime

Intern at CogniCor technologies, Kochi, Kerala.   May 2017 – July 2017

Project1 - XML to graphical user interface
Project abstract - Application which will take XML document as input and create a graphical representation of that XML document which will be easier for non-technical people to edit and then convert them back to XML document. (Python and graphical library and XML parsing library)
- Responsible for graphical design representation of XML document
- Responsible for integration of XML doc with graphical representation so that modification will be reflected in XML doc after editing in the graphical representation

Project2 - English sentence classification
Sentence type classification using deep learning (Python and tensorflow library). A predictive mechanism to predict the type (declarative, question, imperative) of an English sentence using convolutional neural network. (using google word2vec for the mathematical representation of words)
- Responsible for designing the neural network for the classification task
- Responsible for preprocessing and formatting the available data for the training of the classifier

B.Tech. projects and coursework

Algorithms for Minimum Vertex Cover: Theory and Experiments
https://github.com/sumanpanda1997/Solving-Minimum-Vertex-Cover-for-Graph-
Project description - The aim of the project is to study how efficient theoretical algorithms for the classical Vertex Cover problem are in practice. We study reduction techniques, exact algorithms and heuristics to find a minimum vertex cover. Then, we implement these algorithms and study how well they perform on instances that may be useful in practice. Finally, we make certain observations on the results obtained and conclude with directions for future work.

MASTI- chat app for students and instructor(C#)
https://bitbucket.org/ashutosh2411/pse-project/src/master/
Project description - An application that facilitates interaction between multiple students and a teacher. This app supports Live screen-sharing and texting between student and teacher
- Responsible for the video processing of the chat app

Online retail database management
https://bitbucket.org/__Suman__/online-retail
Project description - Created a database management system for an online retail system. It was aimed towards understanding the concept of DBMS and implement them in mysql. Also implemented a minimal interface using PHP for demonstration purpose.
- Responsible for designing and creating the database
- Responsible for creating a minimal interface for maintaining the database for user

Bit torrent client
https://bitbucket.org/__Suman__/bit-torrent
Project description - Created a client app in python. Understood bit torrent protocol and its working.

- Responsible for getting the peer list
- Responsible for handshake events from the peer and message passing for a request

Privacy-Aware Gaussian Mixture Model
https://github.com/sumanpanda1997/privacy_aware_gmm/tree/develop
Project description - Differentially Private Parameter estimation of a clustering dataset, where we used Gaussian Mixture Model Expectation Maximization algorithm to find the parameter of the data set. (implementation in Python) DP-EM Paper

JPEG compression
https://bitbucket.org/__Suman__/jpeg_compression/src/master/
Project description - Used discrete cosine transformation for JPEG image compression.(Python)

EXTRACURRICULAR ACTIVITIES	• Club member of Robotics club and Design club IIT Palakkad (2016-2017) • Active participation in cricket, volleyball
HOBBIES AND INTEREST	Travelling, Listening to songs
REFERENCES	Available upon request.