Elia Gatti

Master's Student in Computer Science | Software Developer

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Summary

Master's student in Computer Science with practical experience in backend development (Java, Python, C) and performance analysis. Proven ability to contribute to complex projects, from microservices architecture to GPU computing.

Work Experience

Dedagroup - Software Developer May 2024 - Sept 2024

- Developed and maintained backend (Java, Spring) and frontend (HTMX) features for 'TEN', a web-based treasury services application.
- Managed the application's deployment to a new Linux server environment, migrating from a legacy Windows setup.
- **Technologies:** Java, HTMX, SQL, Shell scripting.

Projects

Crosstrack Italia - Flutter Application Link to Repo

- **Developed** a cross-platform (Flutter/Dart) mobile app for motocross track discovery and management.
- **Implemented** core features: map visualization (OpenStreetMaps), user authentication, and track management.
- **Utilized** Firebase (Firestore, Auth) for backend and Riverpod 2.0 with Freezed for responsive state management.

MPEG-DASH Performance Analysis (Bachelor's Thesis) Link to Repo

- **Analyzed** MPEG-DASH protocol performance under simulated (Mininet SDN) and real-world (AWS) network conditions.
- **Deployed** a custom Node.js/dash.js client-server to stream video and capture performance metrics.
- **Performed** data-analysis using Python (Pandas, NumPy) and prepared multimedia assets with Bash/FFmpeg.

P2P Key-Value Storage System Link to Repo

- **Engineered** a distributed P2P Key-Value storage system in Java 21 using the Akka framework (v2.6).
- **Guaranteed** Sequential Consistency and high availability using a Quorum Consensus protocol.
- **Enforced** data reliability through configurable replication across designated consecutive nodes.

MovieMatch (Microservices Project) Link to Repo

- **Designed** a scalable, service-oriented web app for movie search and personalized recommendations.
- **Engineered** a **15-service microservices architecture** (Python/FastAPI), deployed via Docker Compose.
- **Implemented** features including AI-generated quizzes, streaming availability, and a unified JSON API structure.

DWT-SVD Digital Watermarking Tool Link to Repo

- **Winner** of the "Capture the Mark" university competition.
- **Implemented** a novel algorithm (Python, OpenCV) by embedding singular values (SVD) within high-entropy Discrete Wavelet Transform (DWT) blocks.
- **Engineered** a parallel automated attack suite using binary search and regional masking to test resilience, optimizing detection thresholds via ROC analysis.

GPU Computing: Sparse Matrix-Vector Multiplication (SpMV) Link to Repo

- **Optimized SpMV kernels** (C/CUDA) to analyze parallel computing performance on CPU (AMD EPYC) and GPU (NVIDIA A30).
- **Engineered** a Hybrid Adaptive CUDA kernel to dynamically switch strategies and maximize GPU utilization.
- **Benchmarked** all implementations, measuring Execution Time, Memory Bandwidth (GB/s), and GFLOPS.

HPC Project: Parallel MST Implementation Link to Repo

- **Developed** a hybrid parallel Minimum Spanning Tree (MST) algorithm using **MPI and OpenMP**.
- **Analyzed** Speedup, Efficiency, and Scalability on cluster configurations up to **32 nodes**.

Education

2024 – Present	**Master's Degree in Computer Science**	**University of Trento**
2020 – 2024	**Bachelor's Degree in Computer Science** *Grade: 101/110*	**University of Trento**

Skills

Languages	Java, Python, C/CUDA, Dart, Shell Scripting, SQL
Frameworks & Libs	Spring, FastAPI, Akka, Flutter, Riverpod, NumPy
Tools & Platforms	Docker, Git, Linux, Firebase, Mininet, PBS Schedulers
Concepts	Microservices, Distributed Systems, HPC (MPI, OpenMP), GPU Computing
Human Languages	Italian (Native), English (B2 Professional Proficiency)