Elia Gatti

Master's Student in Computer Science | Software Developer

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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

DWT-SVD Digital Watermarking Tool ⬤
- **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) ⬤
- **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.

P2P Key-Value Storage System ⬤
- **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.

MPEG-DASH Performance Analysis (Bachelor's Thesis) ⬤
- **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.

HPC Project: Parallel MST Implementation ⬤
- **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**.

MovieMatch (Microservices Project) ⚙

- **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.

Crosstrack Italia - Flutter Application ⚙

- **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.

Education

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

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)