

# Elia Gatti

Master's Student in Computer Science — Software Developer

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## SUMMARY

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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

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### 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

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### 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

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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

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