Dimitri Chrysafis

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 DimitriChrysafis • dimitrichrysafis.github.io

Education

University of Wisconsin–Madison　　　　　　　　　　　　　　　　　　　Expected May 2026
Bachelor of Science in Computer Science　　　　　　　　　　　　　　　　　　**GPA: 4.0**

Experience

Simplex Chat　　　　　　　　　　　　　　　　　　　　　**12 Approved Pull Requests**
- Engineered high-performance multi-device message synchronization system with intelligent network connection manager that dynamically optimizes active server connections, reducing message delivery time by $8\times$ (from 800ms to under 100ms) while using $20\times$ **less bandwidth** through efficient differential sync that eliminates duplicate messages and ensures seamless conversation continuity across phones and tablets

Taichi　　　　　　　　　　　　　　　　　　　　　　　　**8 Approved Pull Requests**
- Redesigned Apple Metal backend implementing buffer-image copy routines at GPU command list level
- Enabled direct GPU memory transfers between buffers and textures on macOS, removing CPU-side staging overhead

Projects

Gesture-Controlled Robotic Arm Using Fine-Tuned Vision Models
- Fine-tuned ResNet-50 and EfficientNet on hand and arm gesture videos to recognize 25 distinct gestures (pointing, grasping motions, directional commands), achieving **91% accuracy** in translating human movements into real-time control signals for a 6 degrees of freedom mechanical robot arm with sub-200ms latency

Interactive 3D Fluid Simulator Using Material Point Method [Demo] [GitHub]
- Built browser-based physics engine implementing Material Point Method (MLS-MPM) with WebGPU compute shaders, simulating **400,000+ particles** in real-time with interactive camera controls and dynamic boundary animations
- Optimized particle-to-grid transfers through GPU parallelization and fixed-point arithmetic, achieving smooth performance for dam break scenarios and real-time particle injection

High-Performance Web-Based Fractal Renderer [Blog]
- Engineered real-time fractal visualization system supporting $10^{15}\times$ magnification for Mandelbrot, Newton's, and Kleinian limit sets using GPU-accelerated WebGL fragment shaders with double-precision emulation
- Achieved **60× performance improvement** through adaptive sampling, tile-based rendering, and optimized complex arithmetic reducing computational overhead by 85%

Tennis Match Prediction System
- Built ensemble classifier using CatBoost on **92,000 ATP (Association of Tennis Professionals) matches (1982-2024)** scraped from historical archives, engineering features including player ELO ratings, surface-specific performance metrics, head-to-head statistics, recent form indicators, and fatigue scores from tournament schedules to achieve **83.7% prediction accuracy**, outperforming baseline models by **12%**

Skills and Interests

Languages: Python, C++, JavaScript/TypeScript, Swift, SQL, LaTeX, Bash
Technologies: PyTorch, TensorFlow, NumPy, scikit-learn, WebGPU, WebGL, Metal, CUDA, Docker, Git
Interests: Competitive marathon runner and triathlete; Calisthenics, Squash