Patrick Prunty

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Optum Healthcare / UnitedHealth Group (UNH)

Senior Full-Stack Developer
Dublin, Ireland, 2020-Present.

Worked across three organizations, leading full-stack development and optimizing performance for large-scale web applications, with additional experience in AI/ML engineering, focusing on scalable model deployment, cost optimization, and reproducible machine learning workflows. Key contributions:

- **Performance Optimization**: Optimized a data-intensive interface handling 50k+ rows and 15+ filters in Next.js, leveraging caching (Redis/React), skeleton loaders, and virtualized scrolling. Applied similar optimizations to Recharts/Plotly, cutting dashboard load times by 40% and boosting Lighthouse scores from 55% to 90%+.
- **Modular UI Component System**: Built 12+ modular React components for an internal shared library, featuring modern design with animations (e.g., animated modals, skeleton loaders, dynamic graphs, hover tooltips, sliders, icon library support). Documented in Storybook and tested with RTL/Jest. Library usage rose by 25% after company-wide announcement of new major release.
- **AI/ML Infrastructure Development**: Contributed to internal Python SDK for AI/ML models in Databricks, improving execution time by 25% and cutting compute costs by 40%. Designed dedicated metadata schema to track model lineage, parameters, and performance metrics across runs, enabling comprehensive reproducibility through Databricks Data Catalog and Workflows. Standardized execution environment using cluster policies (Photon, GPU, auto-scaling) with consistent logging frameworks. Solution adopted by 6+ data science teams, supporting 40+ disease prediction models running reliably on daily/monthly basis with complete auditability.
- **Cloud Architecture & Microservices**: Developed cloud-based microservices on Azure (AKS, Functions, Blob Storage, Event Hub, Key Vault, Container Registry) and AWS (ECS, ECR, S3, API Gateway, Route53, VPC), ensuring event-driven communication via Kafka. Built RESTful APIs with Node.js (TypeScript) and FastAPI (Python) for large-scale data ingestion and SQL storage via ORMs. Collaborated with DevOps teams to automate infrastructure with Terraform, Jenkins, and GitHub Actions for CI/CD.
- **Stakeholder Engagement**: Partnered with stakeholders and product managers to align development with business goals and user feedback on 2-week sprint cadence. Led bi-weekly demonstrations of new features, refined roadmaps, and prioritized user stories to accelerate high-impact releases.

Education

Trinity College Dublin

MSc in High-Performance Computing
Dublin, Ireland, 2019-2020.

- **High-Performance Programming**: Developed expertise in C++17/20, adhering to STL and community standards with focus on memory optimization and parallel computing patterns using MPI/OpenMp/CUDA libraries.
- **Advanced Computational Modeling**: Built disease simulation (survival models), financial option contracts pricing engine, and chess RL model using Monte Carlo methods and dynamic programming.
- **Large-Scale Distributed Computing**: Ran MPI/OpenMP/CUDA workloads on Trinity's supercomputer, achieving 92% strong scaling efficiency on 256-core Voronoi mesh generation as part of academic dissertation.

University College Dublin

BA Mathematics & English Literature with a Minor in Portuguese
Dublin, Ireland, 2016-2019

- **Applied Mathematics Specialization**: Focused on PDEs (Finite Element Analysis), stochastic models (Brownian motion applications), and advanced linear algebra (matrix decomposition techniques).
- **Computational Foundations**: Excelled in introductory courses in Python/C++, laying foundation for HPC studies.
- **Academic Recognition in Modernist Studies**: Awarded competitive scholarship to the James Joyce Summer School at Boston College (2019) for exceptional research analyzing modernist literary techniques in Joyce and T.S Eliot's works.
- **Language Acquisition**: Achieved CEFR B1 Portuguese through immersive study at NOVA Lisbon in Portugal, with additional basic Spanish proficiency.

Technical Skills

Note: Skills marked with an asterisk (*) denote advanced industry proficiency.

- **Languages**: SQL, Python*, C++*, Java, TypeScript*, JavaScript/HTML/CSS*, SQL, bash*.
- **Frameworks & Libraries**: FastAPI*, Django, Spring, Node, React*, Next.js*, TailwindCSS, PySpark.
- **DevOps**: Linux/Unix systems*, Jenkins, GitHub and GitHub Actions (CI/CD)*, Docker*, Kubernetes.
- **Cloud Computing**: Terraform*, 4+ years Azure (AKS, Functions, KeyVault, Apps), AWS (EC2, ECS, ECR, Route53, VPC).
- **MLOps**: Airflow*, Databricks*, Pandas, PySpark.

Hobbies

Triathlon, Football, Hiking, Skiing, Travel, Film & TV, Blogging, Videography, Web Design & Development.