Shuntian Liu

Final Year Computer Science Student

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Education

2019–2023 **BA & MEng Hons Computer Science**, *Magdalene College, University of Cambridge*, Grade: first class
Research project: Eventual Consistency in Mnesia.
Modules include: Distributed Ledger Technologies: Foundations and Applications, Object-Oriented Programming, Cloud Computing, Concurrent and Distributed Systems, Databases

2017–2019 **A-Levels**, *Dulwich College*, Dulwich Common, London, *Maths (A*), Further Maths (A*), Physics (A*), Computer Science (A*)*

Work experience

July–Sep 2022 **Optimal Resource Scheduler**, *University of Cambridge*, Systems Research Group
Implemented a distributed scheduler with an asynchronous consensus algorithm for Kubernetes.
Schedulers reach consensus as they are deployed into a (simulated) cluster of up to 900 nodes.
Scheduling algorithm achieved 100% latency reduction compared to the default centralised Kubernetes scheduler.

July–Sep 2021 **Trace Optimisation for DynamoRIO**, *University of Cambridge*, Computer Architecture Research
Ported trace support for the dynamic binary instrumentation tool DynamoRIO onto AArch64 architecture.
Developed skills in low-level assembly and C/C++ programming.
Feature successfully merged into the master branch of DynamoRIO.
Achieved optimisation of up to 40% running time on SPEC benchmarks.

July–Sep 2020 **String Compaction in OCaml GC**, *University of Cambridge*, Programming Language Research
Implemented rope (tree-like) representation of strings and compared its efficiency with the array version.
Practised programming and debugging in OCaml and C with unit tests and using debuggers such as `ocamldebug`.
Improved performance of string concatenation up to 200x while maintaining the same iteration speed.

Projects

Dec 2022 **Cryptocurrency price prediction app**
Built an online ML model in Python for cryptocurrency with the ARIMA time series model.
Set up the full stack with Apache Kafka for message queuing, Apache Flink for stream processing, and InfluxDB for results analysis and visualisation.

2021–2022 **Distributed Datalog engine**
Designed a distributed datalog (a database query language) engine in Erlang that computes datalog queries in a MapReduce fashion.
Awarded as a highly commendable dissertation (top three) by the University of Cambridge Computer Laboratory.

Sep 2021 **Raft consensus protocol**
Implemented the Raft consensus protocol in Go that achieved linearisability and fault tolerance.
Stretched abilities to debug concurrency errors by systematically searching through the log.

Feb–Apr 2021 **Android ILS simulation app**
Developed an instrumented landing system (ILS) simulation app for Android in Java with a team of six fellow students and one client from the industry.
Application successfully used in the real flight environment by the client.

Skills

Programming C, C++, Java, Python, Go, Erlang, OCaml, Shell, SQL, LaTeX
Frameworks Flink, Spark, MapReduce, Kubernetes, Mnesia, Android, TCP, Raft, AWS

Interests

Music Play the Erhu — a Chinese musical instrument.
Involved in the University's Chinese Orchestra Society.