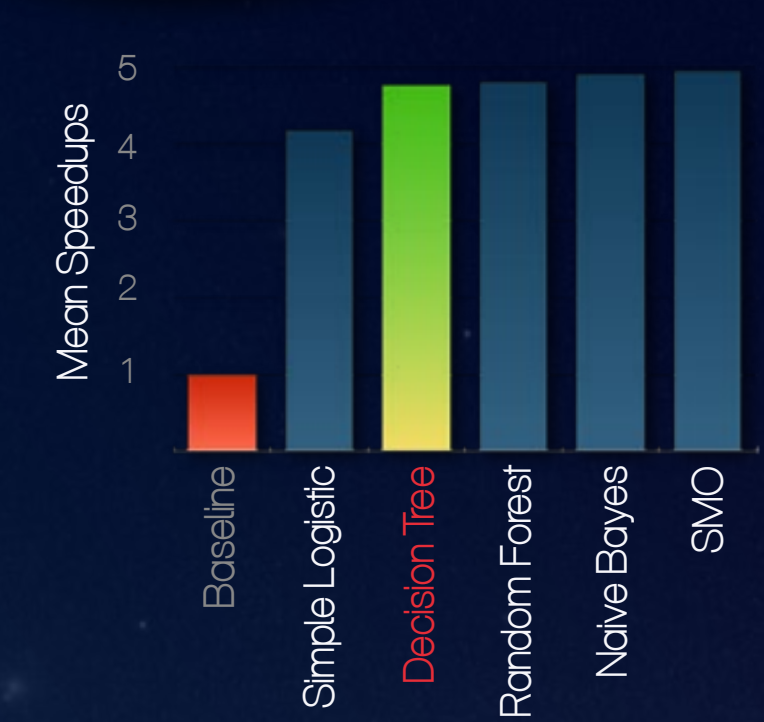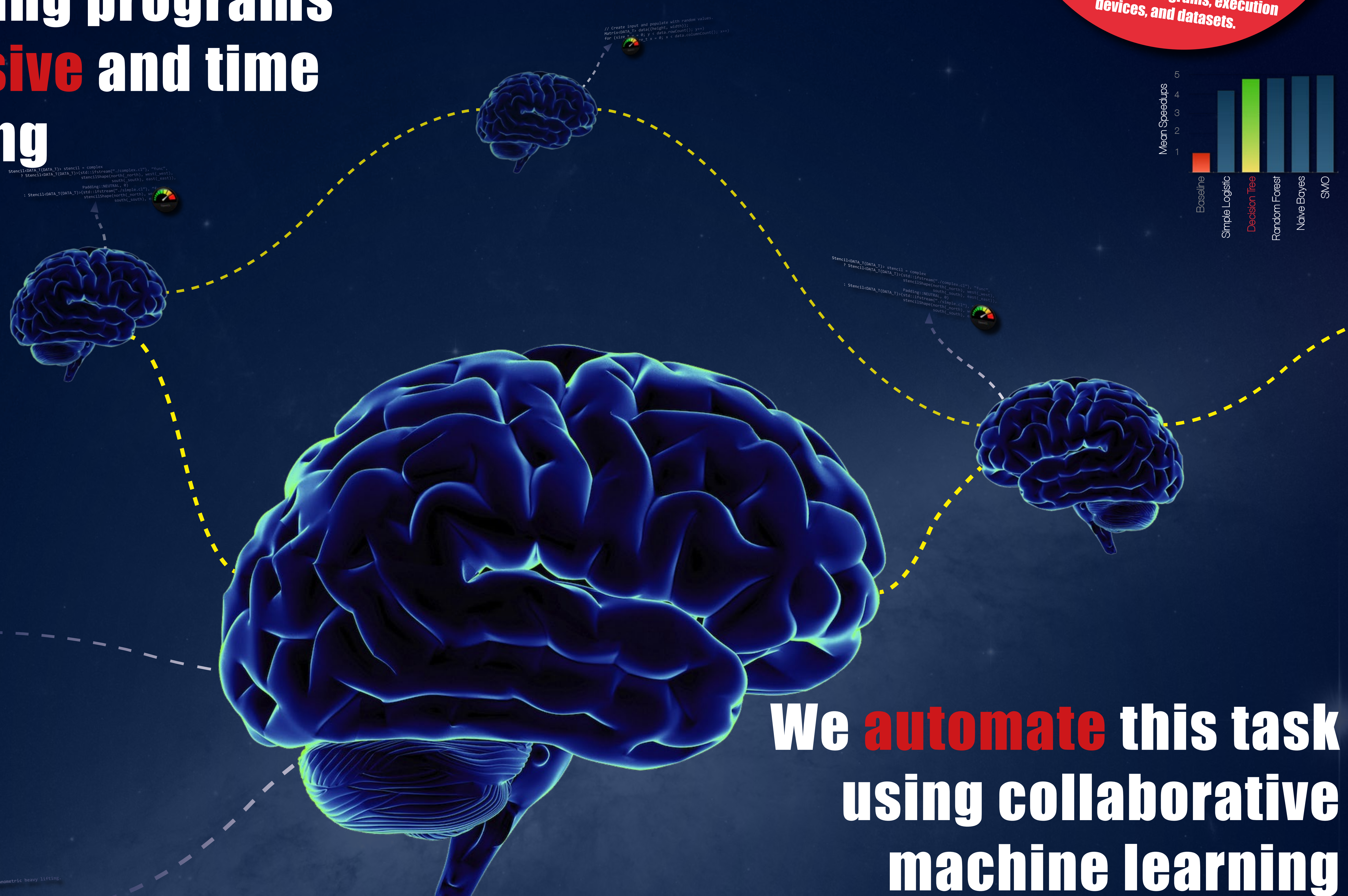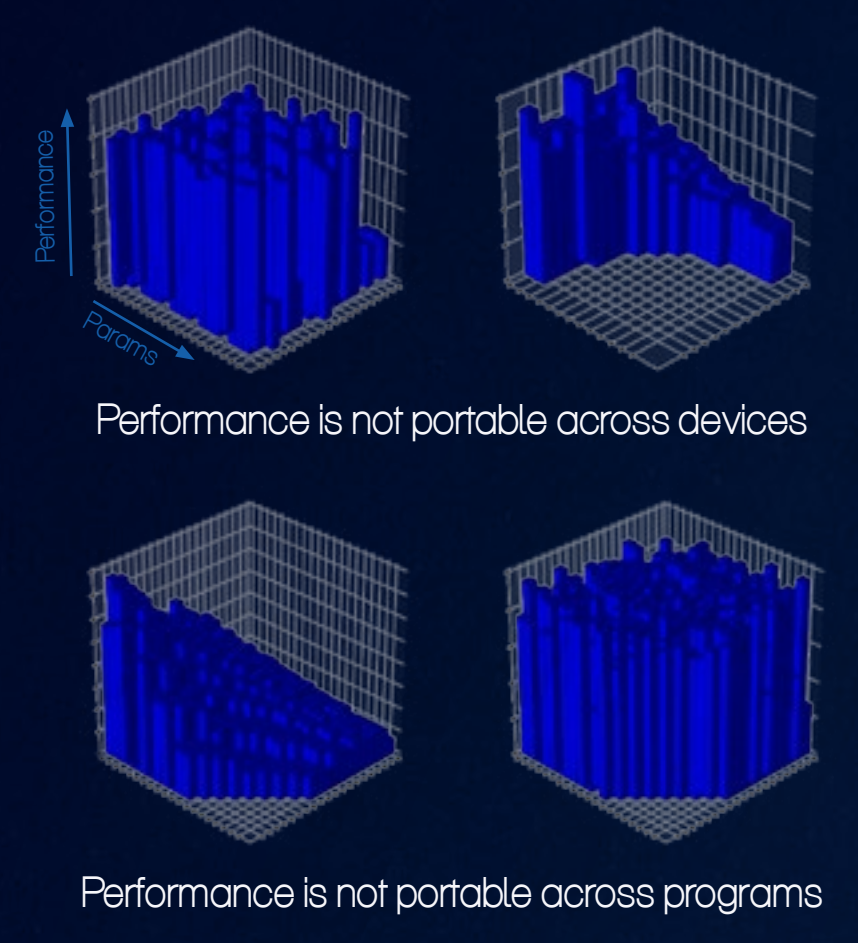# Humans Need Not Apply

Self-tuning programs are here, and they outperform human experts
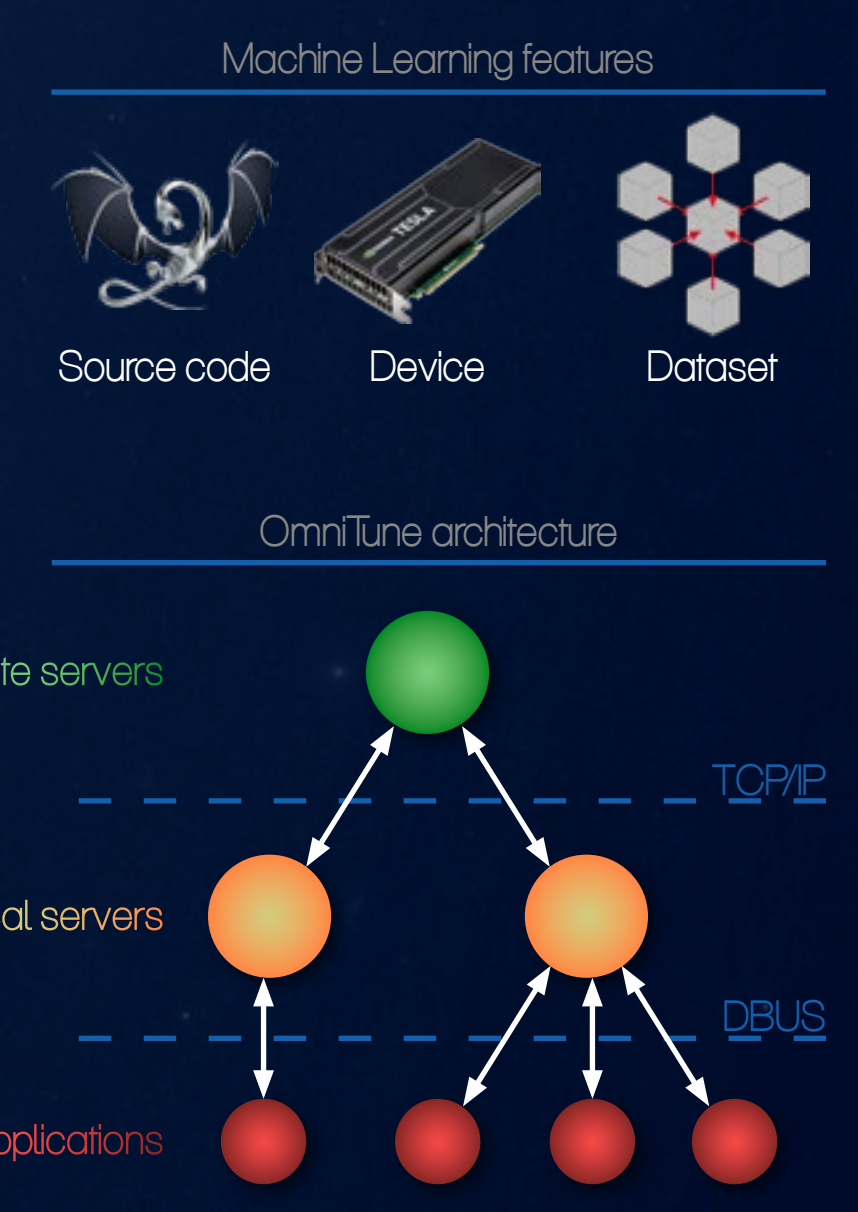
Chris Cummins   Pavlos Petoumenos   Michel Steuwer   Hugh Leather
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5.0x speedup!

Predicting OpenCL workgroup sizes of 429 stencil programs, execution devices, and datasets.

Hand tuning programs is expensive and time consuming

Performance is not portable across devices

Performance is not portable across programs

We automate this task using collaborative machine learning

Machine Learning features

Source code   Device   Dataset

OmniTune architecture

Remote servers

Local servers

Client applications

Introducing OmniTune ...

OmniTune generates synthetic benchmark programs to use for empirical testing

OmniTune collaboratively gathers performance data by testing different parameter values

OmniTune uses machine learning to predict parameters for unseen programs at runtime

Read more ...