

MACHINE GUIDED ENERGY EFFICIENT COMPILATION

What is MAGEEC?



Research into modelling and measuring energy usage

Current energy modelling techniques can produce data within 10% of real world values. However the effects of single compiler optimisations can be much more subtle than modelling allows.

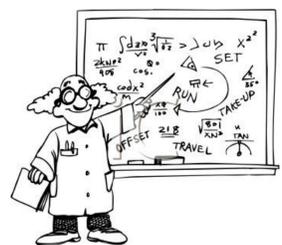
We have developed low cost, open source energy measurement hardware that measures at a much finer resolution, making it suitable for use in analysing software energy consumption.

Funded by the Technology Strategy Board
 The MAGEEC project is funded by the UK Government via the Technology Strategy Board as part of the Energy Efficient Computing initiative. This joint project between Embecosm and the University of Bristol project started in June 2013 and will be complete by November 2014.

What's new?



BEEBS (Bristol/Embecosm Embedded Benchmark Suite) is an open source benchmark suite for measuring the performance of deeply embedded systems. These tests are platform agnostic and have no reliance on any operating system or language support libraries.



Research into machine learning for optimization

Between 2006 and 2009, the MILEPOST project demonstrated that iterating through compiler optimisations can produce code that executes up to twice as quickly as -O3.

The project demonstrated that using through static analysis and traditional machine learning, a compiler can select good passes without needing to resort to the immensely time consuming approach of iterative compilation.

```
// Machine guided
class EnergyEfficientCompilation {
public:
    Machi
    ~M...
    ...
    void Predict...
    bool choose...
private:
    MagicWand...
};
```

MAGEEC combines energy measurement with machine learning to develop an open source hardware and software system capable of optimising code for any platform and compiler.



Platform and Compiler Agnostic

MAGEEC extends and generalises the MILEPOST concept to work with any architecture and compiler. Currently support exists for both GCC and LLVM.



Real Energy Measurements

By taking measurements of a platform instead of relying on any underlying model, MAGEEC can optimise code based on its actual energy consumption.



mageec.org

github.com/mageec

