NeuroCodeBench: a plain C neural network benchmark for software verification

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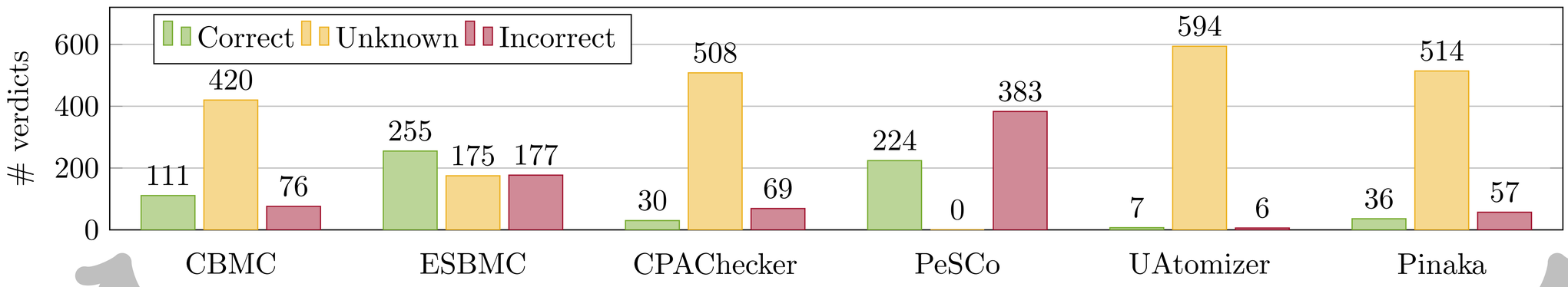

Incorrect verdicts due to incomplete support of `math.h`

Existing software verifiers struggle on neural code!

Unknown verdicts due to timeouts on large instances

Neural code challenges existing software verifiers:
float operations, calls to `math.h`, nested loops, multi-dimensional arrays.

We release *NeuroCodeBench*, a benchmark of neural code verification:
6 categories, 14 functions from `math.h`, 32 neural networks, 607 properties;
safe/unsafe verdicts are either known a priori or independently verified.

Benchmark Category	Safe	Unsafe
`math_functions`	33	11
`activation_functions`	40	16
`hopfield_nets`	47	33
`poly_approx`	48	48
`reach_prob_density`	22	13
`reinforcement_learning`	103	193
Total	293	314

Paper submitted to the 2023 AFRiTS workshop. Find out more at `github.com/emanino/plain_c_nn_benchmark`