|  |  |  |  |
| --- | --- | --- | --- |
| Algorighm | Model | Paper | complexity |
| Addition | Grid-LSTM  No generalization |  | O(n)/O(1)  编码方式很重要 |
| LSTM  No generalization | Learn to execute  Curriculum Learning |
| HAM |  |
| Improve Neural GPUs |  |
| Copy | NTM |  | O(n) |
| Grid-LSTM  No curriculum learning or other training strategies  No generalization |  |
| LSTM  Curriculum learning | Learn to execute  c |
| NRAM |  |
| Repeat Copy | NTM |  | O(n) |
| Sort | NTM |  | O(nlgn)/O(n^2) |
| HAM |  |
| Multiplication | Neural GPUs |  | O(n^2) |
| Improve Neural GPUs |  |
| 多项运算 | Improve Neural GPUs |  | … |
| Access/Recall/Search  (given a value k and an array, return A[k]) | NTM |  | O(n) |
| NRAM |  |
| HAM |  |
| Increment  数组每个元素加1 | NRAM |  | O(n) |
| Reverse | NRAM |  | O(n) |
| NTM |  |
| HAM |  |
| Swap | NRAM |  | O(n) |
| Permutation | NRAM |  | O(n\*m) |
| LiskK | NRAM |  | O(n) |
| ListSearch | NRAM |  | O(n) |
| Merge | NRAM |  | O(n\*m) |
| HAM |  |
| WalkBST | NRAM |  | O(n) |
|  |  |  |  |
|  |  |  |  |

复杂度

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | FNN | CNN | CNN for detection | RNN | NTM | Grid LSTM | N-GPUs |
| Input Size | O(1) | O(1) | O(n) | O(n) | O(n) | O(n) | O(n^2) |
| Number Of Steps | O(1) | O(1) | O(n) | O(n) | O(n) | O(n^2) | O(n^2) |

This table compares the number of computational steps performed by various architectures as a function of their input size.