Programming Languages Literature Review

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Chapter 1

Functional

1.1 Data Structures

An Introduction to the Theory of Lists [1].

> Formal definitions for lists and list operations. Discusses common list operations (map, filter, reduce, etc.) and offers best use cases. Provides examples of multiple interacting operations and operation equivalences.
> What are infinite lists?

Chapter 2

Machine Learning

2.1 Type Safety

Typesafe Abstractions for Tensor Operations (Short Paper) [2].

Typesafe tensors for tensor operations and machine learning. Tensors created with two types, the type (primitives) of the elements, and the phantom types used to label dimensions. This allows operations to be checked at compile time to ensure that all tensor operations are valid. Typesafe tensors are differentiable and can be type-checked. Computation graphs are also typed, and inputs/ outputs are also type-checked. Examples given for tensor operations - matrix multiplication, tensor contraction. Examples given for NN layers - FC, conv, recurrent (recursive).

Bibliography

[1] Richard S Bird. An introduction to the theory of lists. In *Logic of programming and calculi of discrete design*, pages 5–42. Springer, 1987.

[2] Tongfei Chen. Typesafe abstractions for tensor operations (short paper). In *Proceedings of the 8th ACM SIGPLAN International Symposium on Scala*, SCALA 2017, pages 45–50, 2017.