Data Visualization From a Category Theory Perspective

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Category Theory in Programming

Perhaps the most influential application of Category Theory has been in programming, specially within Functional Programming. Orchard and Mycroft [1] states that the application of CT to programming can be divided into two distinct approaches, namely *categorical programming* and *categorical semantics*.

- Categorical Semantics formally interprets programming languages through the structures of Category Theory;
- Categorical Programming uses categorical concepts as design patterns for organizing and structuring programs.

Category Theory in Programming

In **Categorical Programming**, programming can be loosely interpreted as a subcategory of $\mathbf{Set}$.

- Sets = Types;
- Functions = Programming functions;
- Functors = Parametric type with an `fmap` function;
- Natural transformations = Parametric polymorphisms.

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Julia's Type System

Notebook

Functional Programming

Notebook

Categorical Programming in Julia

Notebook

References

[1] Orchard, D. and Mycroft, A. (2012). Categorical programming for data types with restricted parametricity. *Unpublished note*.