Chapter 1

Literature Review

Objective: Design and implement a type-safe eDSL (embedded domain specific language) and a framework for spreadsheet generation in Haskell.

1.1   Chapter overview

This chapter presents the literature review process and a survey of previous works on eDSL design and functional programming approaches to spreadsheets generation. Section 1.2 lists the literature review questions. Next, section 1.3 summarizes the initial literature search process and its results. Section 1.4 presents a set of relevance criteria. Finally, section 1.5 overviews the answers to the literature review questions presented in section 1.2.

1.2   Literature review questions

The literature review aims at answering the following questions:

1. What were the previous attempts at type-safe spreadsheet generation via Haskell?

2. Which Haskell features were used in the existing eDSLs?

3. Which DSL design techniques were used in such eDSLs?

1.3 Search engines and queries

To begin with, the following search engines were used: Semantic Scholar [1], Hackage [2], HaskellWiki [3], Google [4], and GitHub [5]. These platforms were selected as all of them provided short annotations of stored resources. Later on, such annotations accelerated the preliminary selection of relevant articles and projects. Additionally, different sets of queries were used on each platform depending on: 1) a platform's search mechanism; 2) numbers of on-topic results obtained via other queries on that platform. Table I demonstrates the search engines, queries, and the numbers of preliminary selected search results, excluding duplicates.

TABLE I
Search results

Search engine	Search queries	Results
Semantic Scholar	haskell embedded domain specific language	25
	spreadsheet functional programming	11
	haskell edsl	7
	spreadsheet generation dsl	6
	spreadsheet functional language	2
	functional excel	2
Google Scholar	spreadsheet generation	3
	functional excel	2
	spreadsheet dsl	2
	spreadsheet functional programming	1
Hackage	languages	755

Search engine	Search queries	Results
	sheet	4
HaskellWiki	Research papers/Domain specific languages	48
	Embedded domain specific language	6
GitHub	excel language:Haskell	7
	spreadsheet language:Haskell	7
YouTube	Lambdaconf DSL	2

1.4 Relevance criteria

It was decided that each relevant work should:

1) Be published 1999 or later. A significant number of papers on eDSLs were published between the publications of *Haskell 98* and *Haskell 2010* standards;

2) Be written in English;

3) Show Haskell implementation source code or contain a link to such code;

4) Desirably, explain how DSL design techniques were implemented in Haskell.

5) Desirably, demonstrate a way to model or generate spreadsheets via Haskell;

1.5 Selected literature overview

Bibliography cited

[1] "Semantic scholar | AI-powered research tool." (), [Online]. Available: `https://www.semanticscholar.org/` (visited on 10/25/2022).

[2] "Packages by category | hackage." (), [Online]. Available: `https://hackage.haskell.org/packages/` (visited on 10/25/2022).

[3] "HaskellWiki." (), [Online]. Available: `https://wiki.haskell.org/Haskell` (visited on 10/25/2022).

[4] "Google." (), [Online]. Available: `https://www.google.com/?hl=en` (visited on 10/25/2022).

[5] "Build software better, together," GitHub. (), [Online]. Available: `https://github.com` (visited on 10/25/2022).