

## Context Detection in Spreadsheets Based on Automatically Inferred Table Schema

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**Abstract :** Programming requires years of training. With natural language and end user development methods, programming could become available to everyone. It enables end users to program their own devices and extend the functionality of the existing system without any knowledge of programming languages. In this paper, we describe an Interactive Spreadsheet Processing Module (ISPM), a natural language interface to spreadsheets that allows users to address ranges within the spreadsheet based on inferred table schema. Using the ISPM, end users are able to search for values in the schema of the table and to address the data in spreadsheets implicitly. Furthermore, it enables them to select and sort the spreadsheet data by using natural language. ISPM uses a machine learning technique to automatically infer areas within a spreadsheet, including different kinds of headers and data ranges. Since ranges can be identified from natural language queries, the end users can query the data using natural language. During the evaluation 12 undergraduate students were asked to perform operations (sum, sort, group and select) using the system and also Excel without ISPM interface, and the time taken for task completion was compared across the two systems. Only for the selection task did users take less time in Excel (since they directly selected the cells using the mouse) than in ISPM, by using natural language for end user software engineering, to overcome the present bottleneck of professional developers.

**Keywords :** natural language processing, natural language interfaces, human computer interaction, end user development, dialog systems, data recognition, spreadsheet

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