SpreadSolver. Deductive spreadsheets for decision support

The combination of spreadsheets with automatic deduction techniques allows identifying common errors, working with incomplete information, solving complex problems and facilitates networking.

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Technological Offers type

Technological solutions

Research and innovation areas

- Digital Technologies, Artificial Intelligence, Cybersecurity, 5G, Robotics

ODS

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Brief description of the technology solution and the added value it provides

SpreadSolver integrates advanced programming language technology with spreadsheet interfaces to attack some of the most common causes of errors, such as operations between incompatible operands (e.g. adding yards and euros), handling undefined or incomplete values, or circular references among cells. Our solution extends the traditional spreadsheet model in which each cell is either a constant or a value calculated from other cells, allowing the possibility of complex relationships between cells that are able to detect inconsistencies or reconstruct values out of partial information. Moreover, these new features allows applying the spreadsheet model to new problems, even when some of them had not been addressed before in this way. SpreadSolver has been developed by the Babel research group at the Technical University of Madrid.

Description of the technological base

SpreadSolver allows you to use spreadsheets differently as you were used to. Having cells with incomplete values (e.g. set a range of values), establishing relationships between sets of cells (e.g. force them totaling 100) or properly handle circular references among cells is possible through the use of automated deduction techniques.

These same techniques also detect inconsistencies that are the source of some of the most common mistakes in the use of spreadsheets. Our smart spreadsheets solution allows addressing issues previously not supported by traditional spreadsheets including combinatorial problems such as planning, scheduling or resource allocation.

"SpreadSolver, a smart sheet with powerful deductive capabilities without sacrificing the ease of use of traditional spreadsheets"

Market demands

- Millions of users around the world have interacted with a spreadsheet some time or another. They are considered one of the earliest and most successful examples of what has been called end-user development (EUD), perfectly embodying its three defining characteristics: high availability; immediate effect of the changes, and easy reuse. These same features (especially the last one) lie also behind some of their drawbacks.
- Repeated and unrestricted copy, cut and paste actions by unskilled users can lead to large, difficult to maintain and understand sheets, which can lead to unpredictable behavior.
- According to a study from PWC, 95% of the Excel™ spreadsheets examined had errors out of which 80% had significant monetary errors (i.e. spreadsheet gives an incorrect result). Moreover, errors seem to occur in a small percentage of all cells, meaning that for larger spreadsheets, the issue is not whether errors exist but how many errors there are. Consequently, a number of companies base critical decisions on misstated numbers and questionable analyses [PwC, 2009]. KPMG makes similar estimations.
- The societies are increasingly dependent on mobile devices and technologies that support and foster networking. So, collaboratively developing documents among several people using the cloud is no longer an option but a necessity, as evidenced by the rise of tools like Google docs.

"SpreadSolver can integrate data from multiple sources without losing consistency"

Competitive advantages

- Our solution reduces the possibility of errors in spreadsheets, especially those that handle sensitive company data, such as financial, causing millions of euros in losses.
- Integration with Google docs, which facilitates its use in mobile and collaborative environments.
- The extended model of spreadsheet advocated by SpreadSolver solves problems like time and resource planning using a graphical language already known to users of spreadsheets.
- SpreadSolver, being based on open, semantically rich textual formats, facilitates collaborative work through versioning systems, because the sheets can be merged more easily than traditional ones.

Development stage

- Concept
- Research
- Lab prototype
- **Industrial prototype**
- Production

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