Name of the Candidate Suresh BG
Degree Registered M Sc(Engg)
Department Computer Science & Automation

Title of the Thesis RLtools A Toolset for Visual Language Application Development Based on Relational Grammars

Abstract

The advances in the field of computer graphics have greatly influenced the way in which we interact with computers The use of graphical user interfaces in personal computer operating systems and visualization of scientific and engineering data are just two applications where computer graphics have already proven their usefulness The research area of *visual languages* (VLs) and *visual programming* (VP) aims to achieve the goal of using computer graphics in the field of computer languages and programming

In the visual language research two major approaches have been used to develop visual language interfaces and visual programming environments These are *syntax directed editing* and *visual parsing* Both have their advantages and drawbacks However visual parsing seems to provide more flexibility and expressiveness in visual language interface design A significant amount of research work has been done on visual parsing and visual language syntax specifications

Relational Grammars (RGs) are one of the very powerful generic and widely applicable visual language syntax specification formalisms Our work in this thesis is based on relational grammars and corresponding visual parsing algorithms proposed and developed by **K Wittenburg** Apart from Relational Grammars we have also surveyed some of the other very important visual language grammars

We have developed an integrated toolset called Relational Language Tools (**RLtools**) to support research in visual language applications based on unrestricted relational grammars The **RLtools** is a C++ implementation of **K. Wittenburg** s relational language system with significant extensions The toolset consists of several tools and libraries that includes a *relational grammar editor* a C++ based *relational grammar bottom up parser* a *graphical parser debugger* a *semantic actions interpreter* and a *build tool* We have tested the underlying RG bottom up parser implementation on several test visual languages We also compare **RLtools** with relational language system

K Wittenburg suggests that visual language researchers have to find right application domains for these technologies and design applications that are more amenable for technology transfer Keeping this in mind we have reviewed some of the existing applications of visual parsing and have attempted to propose a few new ones

The visual language grammars and visual parsers based on them can offer great flexibility power and expressiveness in the design of visual language interfaces and systems However so far the impact of these on visual language applications and commercial products has not been very significant We have taken a very practical approach towards increasing the impact of visual grammars and parsers in the area of visual language application development by developing an integrated toolset to assist in visual language application development based on visual parsing taking usability efficiency and practicality into account This toolset framework could be used as an aid to research in visual language applications and it could be a part of commercial visual language products

We conclude the thesis with some exciting possibilities and future directions for this research work

Abstract

The advances in the field of computer graphics have greatly influenced the way in which we interact with computers The use of graphical user interfaces in personal computer operating systems and visualization of scientific and engineering data are just two applications where computer graphics have already proven their usefulness The research area of *visual languages* (VLs) and *visual programming* (VP) aims to achieve the goal of using computer graphics in the field of computer languages and programming

In the visual language research two major approaches have been used to develop visual language interfaces and visual programming environments These are *syntax directed editing* and *visual parsing* Both have their advantages and drawbacks However visual parsing seems to provide more flexibility and expressiveness in visual language interface design A significant amount of research work has been done on visual parsing and visual language syntax specifications

Relational Grammars (RGs) are one of the very powerful generic and widely applicable visual language syntax specification formalisms Our work in this thesis is based on relational grammars and corresponding visual parsing algorithms proposed and developed by **K Wittenburg** Apart from Relational Grammars we have also surveyed some of the other very important visual language grammars

We have developed an integrated toolset called Relational Language Tools (**RLtools**) to support research in visual language applications based on unrestricted relational grammars The **RLtools** is a C++ implementation of **K Wittenburg** s relational language system with significant extensions The toolset consists of several tools and libraries that includes a *relational grammar editor* a C++ based *relational grammar bottom up parser* a *graphical parser debugger* a *semantic actions interpreter* and a *build tool* We have tested the underlying RG bottom up parser implementation on several test visual languages We also compare **RLtools** with relational language system

K Wittenburg suggests that visual language researchers have to find right application domains for these technologies and design applications that are more amenable for technology transfer Keeping this in mind we have reviewed some of the existing applications of visual parsing and have attempted to propose a few new ones

The visual language grammars and visual parsers based on them can offer great flexibility power and expressiveness in the design of visual language interfaces and systems However so far the impact of these on visual language applications and commercial products has not been very significant We have taken a very practical approach towards increasing the impact of visual grammars and parsers in the area of visual language application development by developing an integrated toolset to assist in visual language application development based on visual parsing taking usability efficiency and practicality into account This toolset framework could be used as an aid to research in visual language applications and it could be a part of commercial visual language products

We conclude the thesis with some exciting future possibilities and directions for this research work