The usage of signals and slots mechanism for custom software development in case of incomplete information

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Abstract - **In this article the approach to the software under incomplete information about its final structure. It is based on the use of library Qt from the company Nokia.**

Keywords - **software project, incomplete information, signals and slots.**

I. INTRODUCTION

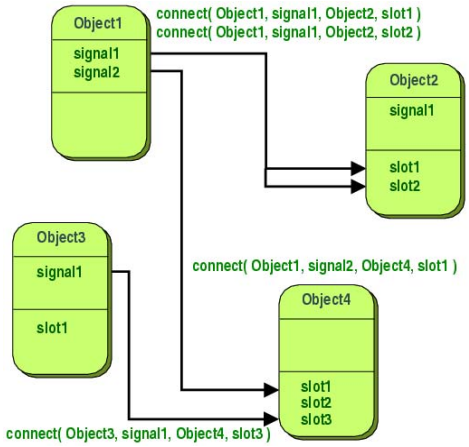
In terms of development of new software project, which is the result of research in most cases, the final structure is unknown. The traditional approach, based on procedural approaches to development and implementation of projects leads to cyclic reps and recycling of programs, their different versions, that will be never used in final version. Certainly, the powerful companies that have extensive experience in the market of software development have a prepared strategies, highly skilled programmers, who are well known with design patterns and are able to implement a flexible system architecture that could be easily modified, regardless of future requirements of the new project. Application of this approach often leads to unnecessary complication of the software structure, establishment of certain requirements for data representation and algorithms by developers at the stage of research.

II. MECHANISM OF SIGNALS AND SLOTS

Qt - a cross-platform software development tool for C++ programming language. Qt extends C++ syntax, because it has several additional features. First, program code is treated with special Qt compiler (Meta Object Compiler), and then we can apply normal compiler. One of this extensions is the of
signals and slots mechanism.

Signals and slots in its functionality are similar to events and their processing, which are present in most object-oriented languages [2], for example, the event such as keypress on the keyboard, mouse movement, etc… Unlike the events, this mechanism can work not only with user actions, but also with actions of classes. That is, each class may do one or more actions to trigger the reaction of other classes.

Signal actually performs only the role of action emitter, which makes all the slots that are connected to this signal, perform actions to which they are programmed. One of the biggest advantages of this method that we can implement the many to many relationship, ie one signal can be connected to any number of slots and one slot can be connected to any number of signals. Also, each class is not limited in number of signals and slots.



This structure is shown in the scheme above

III. MECHANISM APPLICATION IN EXERCISE

When working with signals and slots there is no need for the development of complex system structure, no necessity to add additional levels of hierarchy in order to create a flexible structure in the future. So, each developer or group can work separately on each module and not be afraid that any problems may occur with interfaces compatibility.

For the interconnection of two modules there is a need to create additional signals and slots, that will call each other depending on current situation.

Its easy to add new system functionality. To do this, create a new class with implementation of functionality, create slot in this class and connect it to appropriate signal.

"TERMET" project is an example of the effectiveness of signals and slots mechanism. We had a necessity of simultaneous development of methods for visual design of composite materials and information environment, research and implementation of mathematical models of heat conduction based on numerical and analytical methods. The final software system configuration depends on the results of research and testing.

IV. ADVANTAGES AND DISADVANTAGES OF METHOD

The advantages of the presented approach are the possibility of implementation and deployment of software in conditions of simultaneous research, on which depends the outcome of the final configuration and functionality of the system.

As design patterns, signals and slots have certain

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disadvantages. The first drawback is speed. According to statistics, this mechanism works 10 times slower than normal method invocation. But it should be noted that any system work will not be based only on method invocation. The bulk of CPU time is consumed by mathematical calculations, memory allocation and deallocation, data displaying. Therefore, small delays will not be significant on modern computers.

Another disadvantage is a departure from standard design patterns. Though this method provides greater flexibility, but still it does not give such advantages as system design patterns. Later there may be some difficulties with system support. In this case, its possible to remake system fragments with aim of its structures optimization, and simultaneous usage of previous version.

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VI. CONCLUSION

Signals and slots mechanism is a perfect solution for software development under incomplete information. Their use certainly has a few drawbacks, but design patterns are also not without flaws. Application of given approach allows to reduce the number of project iterations in implementation of of a new research project, increase costs for research by partially reducing them to maintain a staff of highly skilled programmers.

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