Design of a Scheduling System for Academic Timetables

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***Abstract*—This thesis addresses the academic timetabling problem, a well-known and highly practical issue in school management. The author focuses on applying genetic algorithms to a specific school, Trung học phổ thông Khoái Châu, in Hưng Yên province, Vietnam. The study covers the theoretical foundations of genetic algorithms and their practical application to the school's timetable, including constraints and the stopping criteria of the algorithm. The author acknowledges the complexity of the problem and the challenges faced during the implementation, emphasizing the need for further improvements and feedback. The application of genetic algorithms resulted in a reasonable arrangement of subjects, ensuring that teachers in the same block do not have overlapping schedules. However, the practical implementation of the timetable for teachers required manual adjustments due to real-world constraints. The study highlights the importance of feedback from teachers and colleagues to enhance the practical applicability of the system.**

***Index Terms*—genetic algorithms, timetabling, secondary school, Vietnam, evolutionary algorithms**

I. Introduction

The academic timetabling problem has garnered significant attention from researchers and practitioners due to its practical applications. This thesis explores the application of genetic algorithms to create a timetable for Trung học phổ thông Khoái Châu, a secondary school in Hưng Yên province. The author highlights the complexity of the problem and the importance of the timetabling process in school operations. The study delves into the theoretical foundations of genetic algorithms, including their evolutionary mechanisms and principles. The author applies these algorithms to a specific dataset from the school, using basic operations such as crossover, mutation, and recombination. The study focuses on the theoretical aspects and a small step of the algorithm's application, acknowledging the difficulty in fully implementing the solution within the given time constraints. [1]

II. Methods

The thesis delves into the theoretical foundations of genetic algorithms, including their evolutionary mechanisms and principles. The author applies these algorithms to a specific dataset from the school, using basic operations such as crossover, mutation, and recombination. The study focuses on the theoretical aspects and a small step of the algorithm's application, acknowledging the difficulty in fully implementing the solution within the given time constraints. The author emphasizes the importance of understanding the constraints and stopping criteria of the algorithm. The implementation involved applying genetic algorithms to the school's timetable, ensuring that teachers in the same block do not have overlapping schedules. However, the practical implementation of the timetable for teachers required manual adjustments due to real-world constraints. The author discusses the challenges faced in the implementation of the genetic algorithm solution, emphasizing the need for further improvements and feedback. [1]

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III. Results

The application of genetic algorithms to the school's timetable resulted in a reasonable arrangement of subjects, ensuring that teachers in the same block do not have overlapping schedules. However, the practical implementation of the timetable for teachers required manual adjustments due to real-world constraints. The author acknowledges the limitations and the need for further work to improve the system. The study highlights the importance of feedback from teachers and colleagues to enhance the practical applicability of the system. The author also mentions the use of Visual Basic.Net for the implementation, but no specific details on the software's performance or success are provided. [1]

IV. Discussion

The author discusses the challenges faced in the implementation of the genetic algorithm solution, emphasizing the need for further improvements and feedback. The study highlights the complexity of the problem and the importance of feedback from teachers and colleagues to enhance the practical applicability of the system. The author acknowledges the limitations and the need for further work to improve the system. The implementation involved applying genetic algorithms to the school's timetable, ensuring that teachers in the same block do not have overlapping schedules. However, the practical implementation of the timetable for teachers required manual adjustments due to real-world constraints. The author emphasizes the need for a more comprehensive approach to address the complexity of the problem and the limitations of the current implementation. [1]

V. Conclusion

The thesis concludes that the implementation of a genetic algorithm for academic timetabling is a complex task. The

author acknowledges the limitations and the need for further work to improve the system. The author expresses gratitude for the support and collaboration of teachers and colleagues. The study highlights the importance of feedback from teachers and colleagues to enhance the practical applicability of the system. The author also mentions the use of Visual Basic.Net for the implementation, but no specific details on the software's performance or success are provided. [1]

References

[1] Nguyễn Đức Hải, "Design of a Scheduling System for Academic Timetables," undergraduate thesis (original in Vietnamese), Thai Nguyen University of Information and Communication Technology, 2007.

[2] T. s Nguyễn Đình Thúc, Trí tuệ nhân tạo- Lập trình tiến hóa. NXB Giáo dục

[3] Phạm Hữu Khang , Kỹ thuật lập trình Visual Basic.Net. NXB Lao động – Xã hội

[4] MSDN Visual Basic.Net

[5] Books Online SQL Server 2000

[6] Website : http://www.dot.net.vn

[7] Website: http://www.thnt.com.vn

[8] Website http://www.devexpress.com