



SLOT PLAN SCHEDULING FOR OPTIMIZING SHIPYARD UNIT FABRICATION PROCESS

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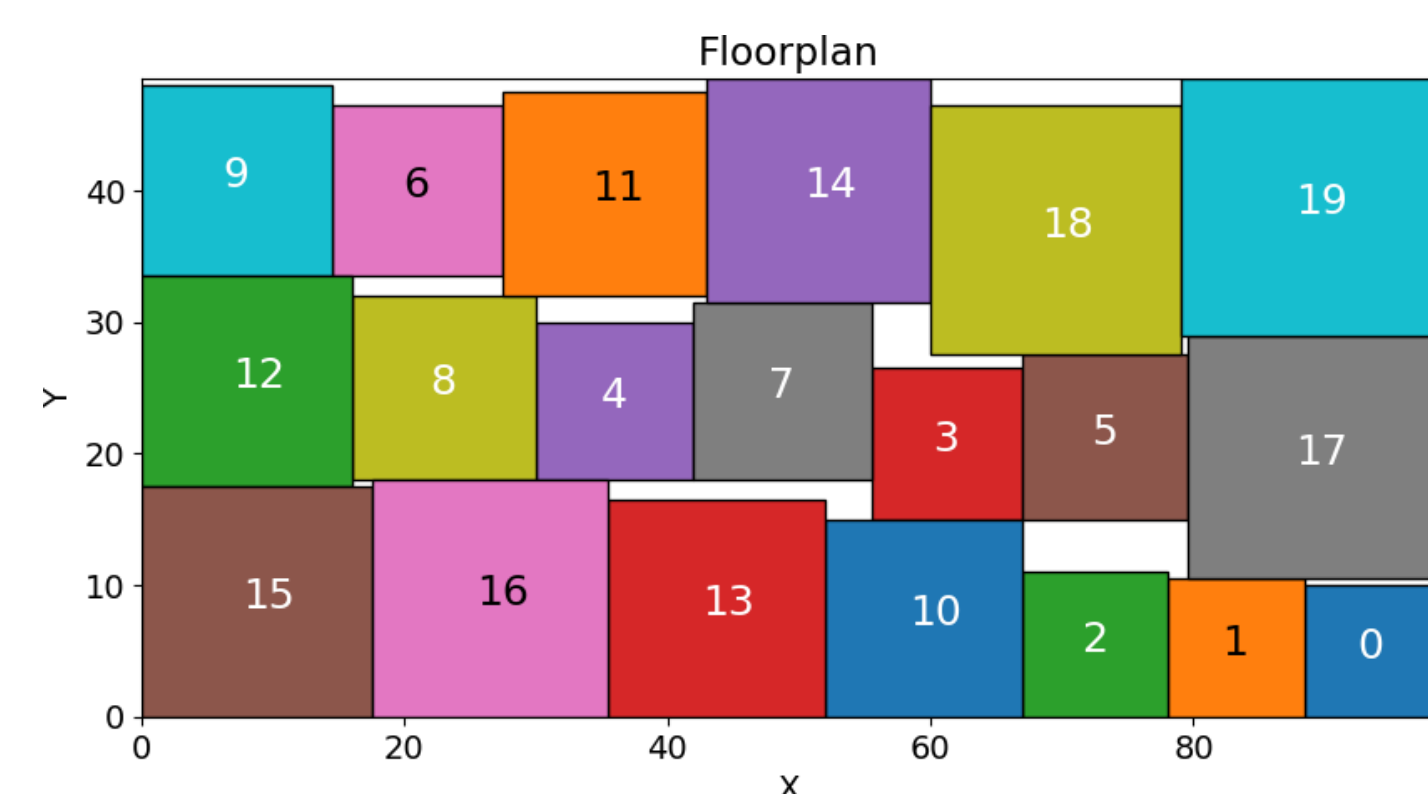
Abstract

The shipyard's unit fabrication process faces time and space allocation challenges. A novel approach, combining 2D bin packing and the critical ratio method, optimizes resource utilization and minimizes idle time. This streamlines operations, reduces bottlenecks, and maximizes resource utilization. Simulations and real-world case studies show significant improvements in space and time allocation, enhancing productivity and cost-effectiveness.

Introduction

Unit fabrication process of a shipyard plays a crucial role in the whole construction process of a vessel. Slot plan creation is usually a manual process which is done by senior engineers of the shipyard to endure the optimization of time and space. In this project the focus is to automate this complex problem by creating a web application for the task.

Methodology



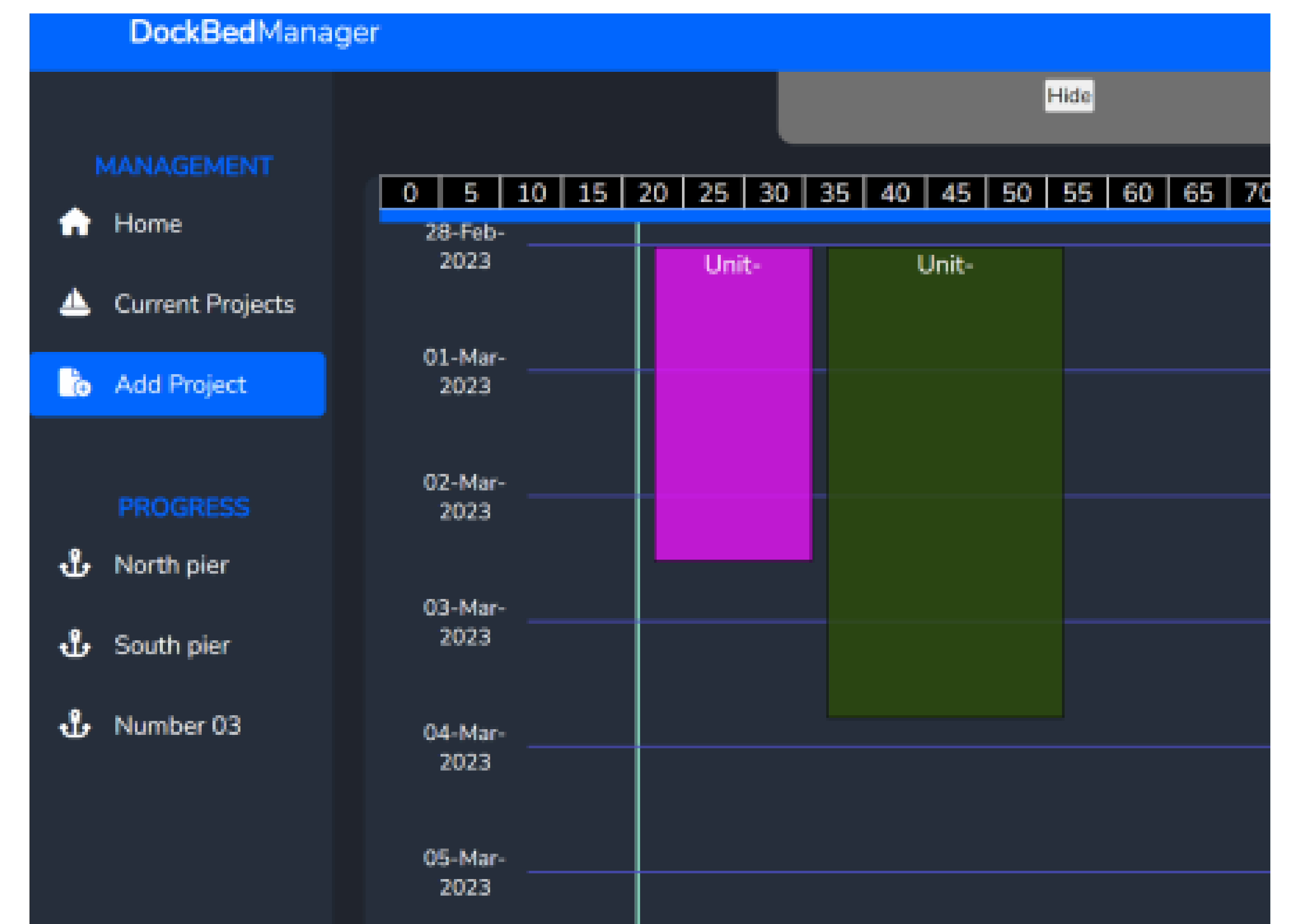
2D bin packing optimizes space usage by efficiently arranging items in rectangular containers, reducing waste and improving logistics efficiency. 3D bin packing optimizes spatial efficiency by strategically arranging items in three-dimensional containers. This method minimizes wasted space, enhancing overall storage and logistics efficiency.



Objectives

- Creating an automated way to make the slot plan scheduler.
- Optimizing the time and space using a suitable algorithm to maximize the profits

Results and Discussion



By using the 2d bin packing method this project could optimize the scheduled to be 60% reliable and to save 20% of time and this made the scheduling process 5x faster compared to the manual method. Final output was a web application which generated the slot plan automatically when the data is fed in to the program. The backend was made using python and skyline bin packing method front end was HTML, Js and CSS.

Conclusions

This automated program could give a better solution with compared to the manual method. But this had following limitations. Packing algorithm reliability- Packing algorithm only pack according to the schedule 60%.

- UI adjustments - user interactive messages.
- For the future development of the software, following suggestions can be made.
- Adding user interactive messages
- Creating a custom bin packing method
- Using gravity fall method with bin packing

References

1. Optimization of shipyard space allocation and scheduling using heuristic algorithm (J. D. Caprace, C. Petcu, et al.)

