



IDC School of Design
अभिकल्प विद्यालय

DEP 403 | Design Exploration Seminar

Exploring growth patterns in bamboo slats using 3D printed joinery

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Guided by Prof. R. Sandesh

Approval Sheet

This project report entitled 'Exploring growth patterns in bamboo slats using 3D printed joinery' by Kathir Eshvar M E, 18U130015 is approved for partial fulfillment of the requirements for Bachelors of Design Degree

Project Guide

Declaration

I declare that this written submission represents my ideas in my own words, and where others' ideas or words have been included, I have adequately cited and referenced the original sources. I also declare that I have adhered to all principles of academic honesty and integrity and have not misrepresented or fabricated, or falsified any idea/data/fact/source in my submission. I understand that any violation of the above will because for disciplinary action by the Institute and can also evoke penal action from the sources which have thus not been appropriately cited or from whom proper permission has not been taken when needed.

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Acknowledgments

I would like to sincerely thank my guide Prof. Sandesh, whose guidance and feedback throughout every stage of the project has helped me immensely.

I am also thankful to Prof. Chakravarthy and Prof. Kums for giving me access to the 3D printers and lab facilities without which this project would not have been possible.

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Motivation

I was very interested in working with bamboo as a material. In addition to this I really hoped to work on interesting explorations of form while also learning about the material. Considering what I was hoping to achieve over the course of the project, The design exploration project offered by Prof. Sandesh was one that I felt gave me the opportunity to do exactly that while also giving me the freedom to choose the finer details and explore on it.

Abstract

During the course of this project I attempted to combine different pieces of bamboo slats using 3D printed joinery to get interesting forms and patterns through the combination of both the materials. I began with few pieces and slowly refined and expanded them to as the project went on which I will be discussing in this report

Initial Iterations

I set about cutting bamboo slats and drilling 3mm holes along the grain. Then I resin printed some small joineries for testing. Following which I attempted connecting them to understand how the structure would be formed and connected



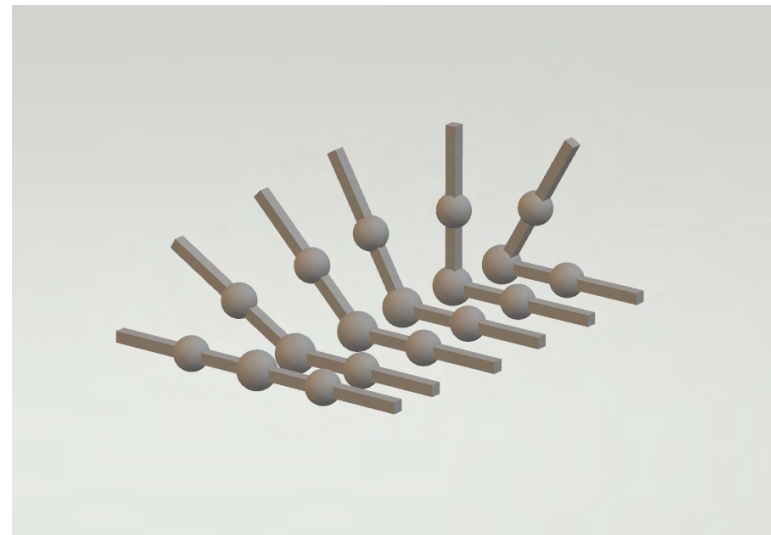
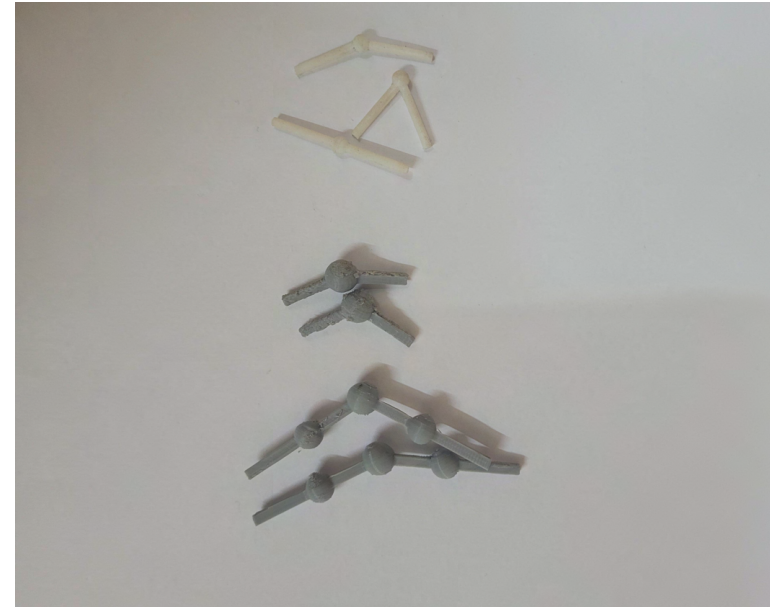
Final Explorations

After the preliminary testing I realised that the holes and joinery was too small and lacked the necessary strength. So I made the holes larger by 1mm (to 4mm) , which had a significant impact on the strenght.

But this was 3D printed and as a result of the process would have irregularities due to the small dimensions and cylindrical shape. I solved this by changing the joints to cuboidal shapes to make the printing process easier and have finer results.

After discussion with my guide I changed the joineries a bit more in order to make them visible and involve them as part of the overall form. As opposed to them being invisible parts that just acted as the joining mechanism.

Then I printed multiple parts that all had the connections at different angles to have a variety of joints between the bamboo parts.



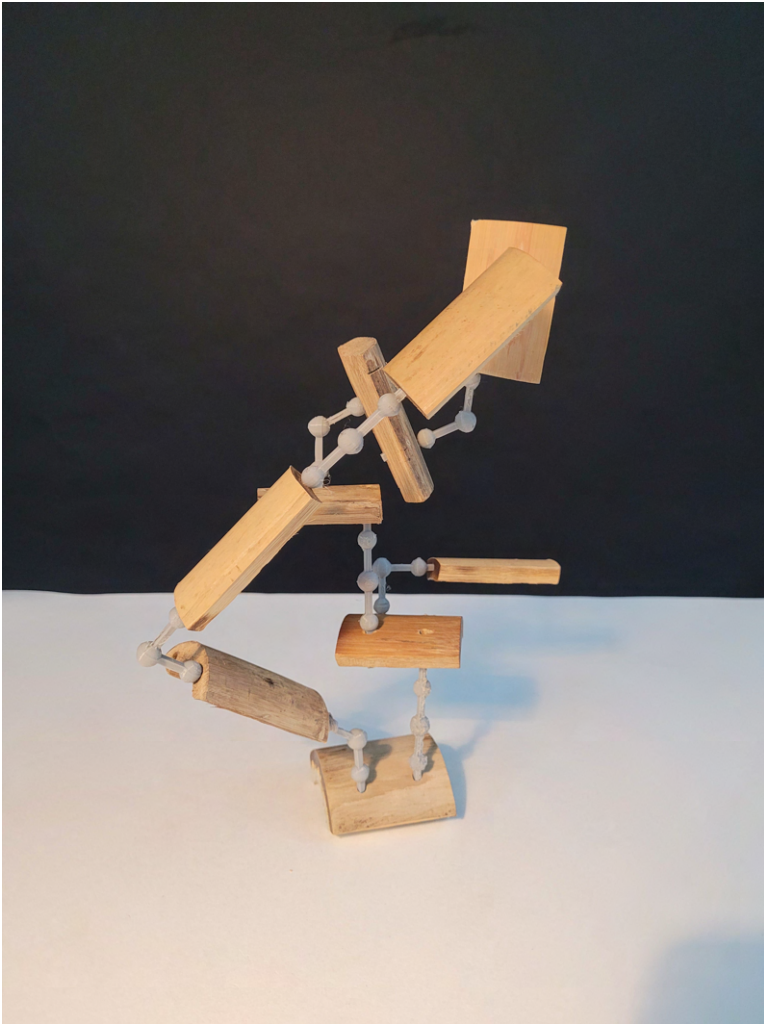
Final Explorations

With all of this in place I made some more variations of the bamboo slats, making them with different number of holes, making them in different sizes and drilling lateral holes as another method of joining them.

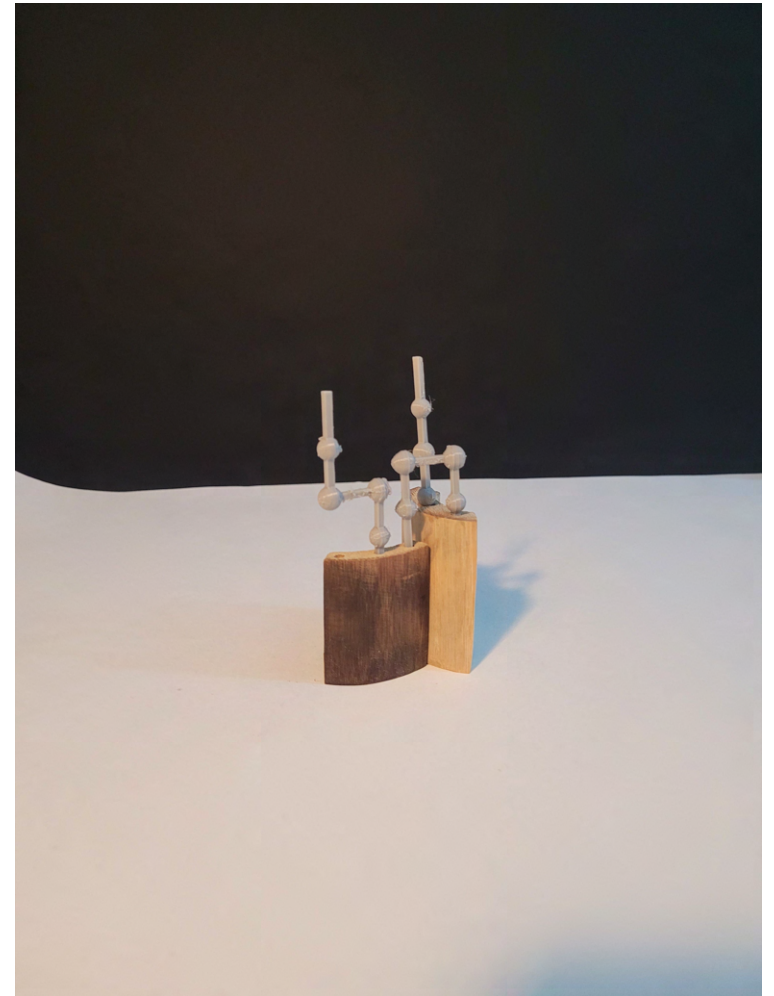
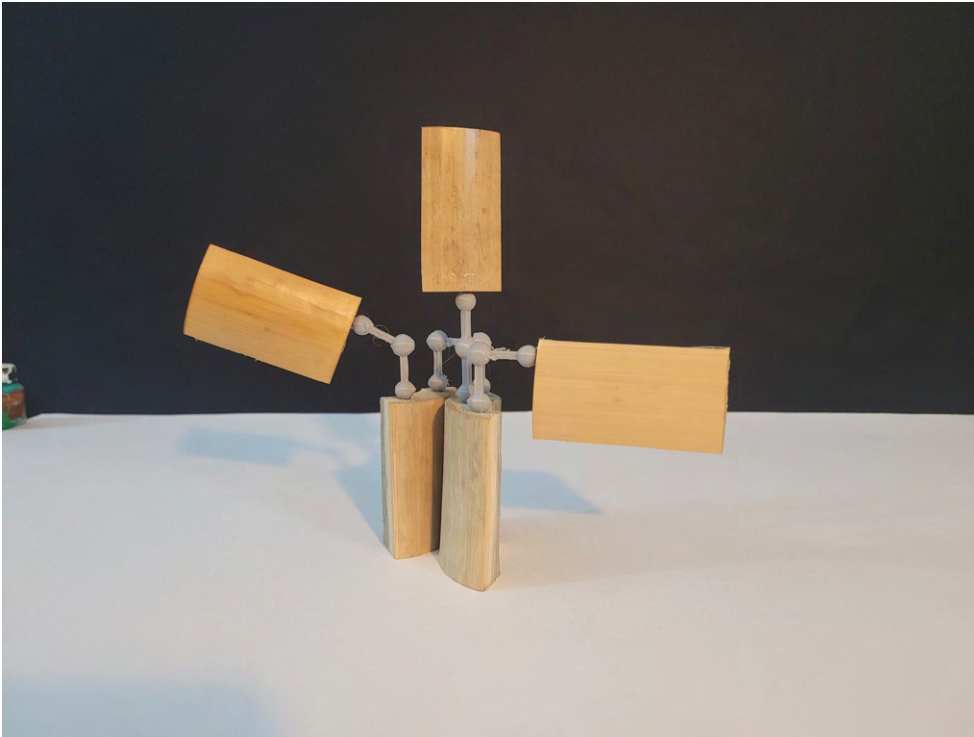
Finally I put them together and tried to come up with different forms and shapes to see what type of explorations were achievable.



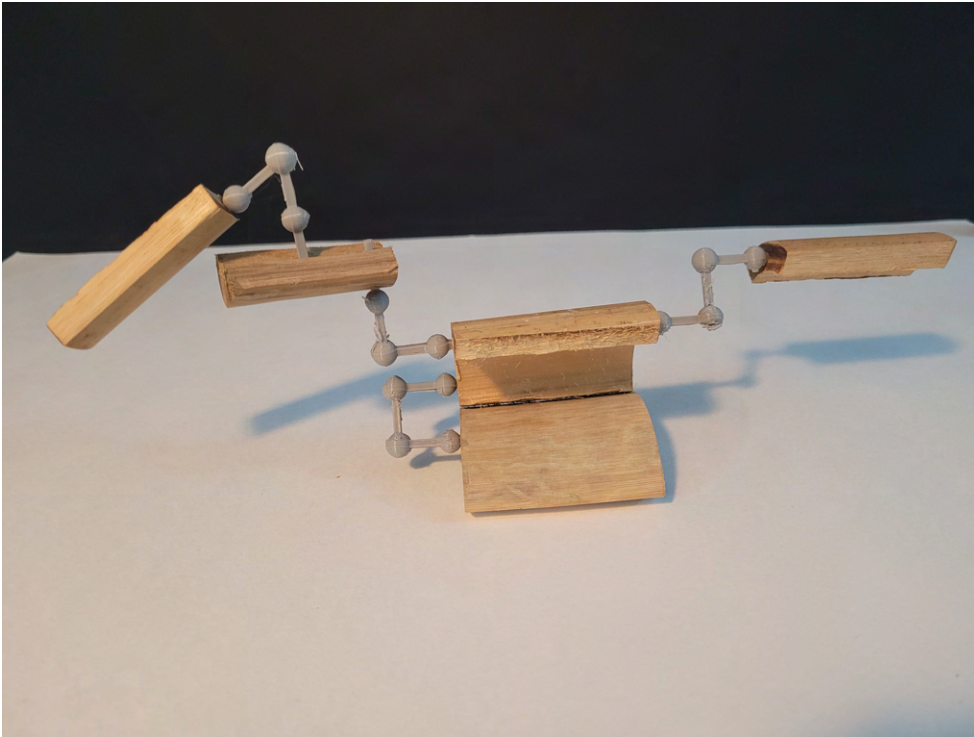
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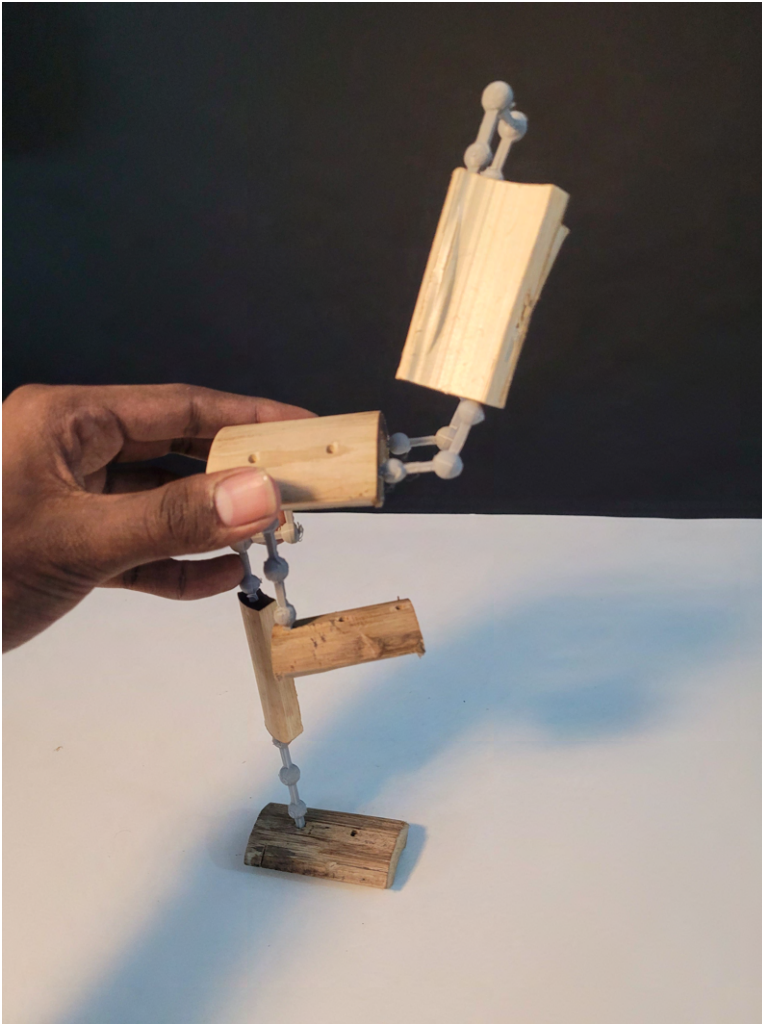
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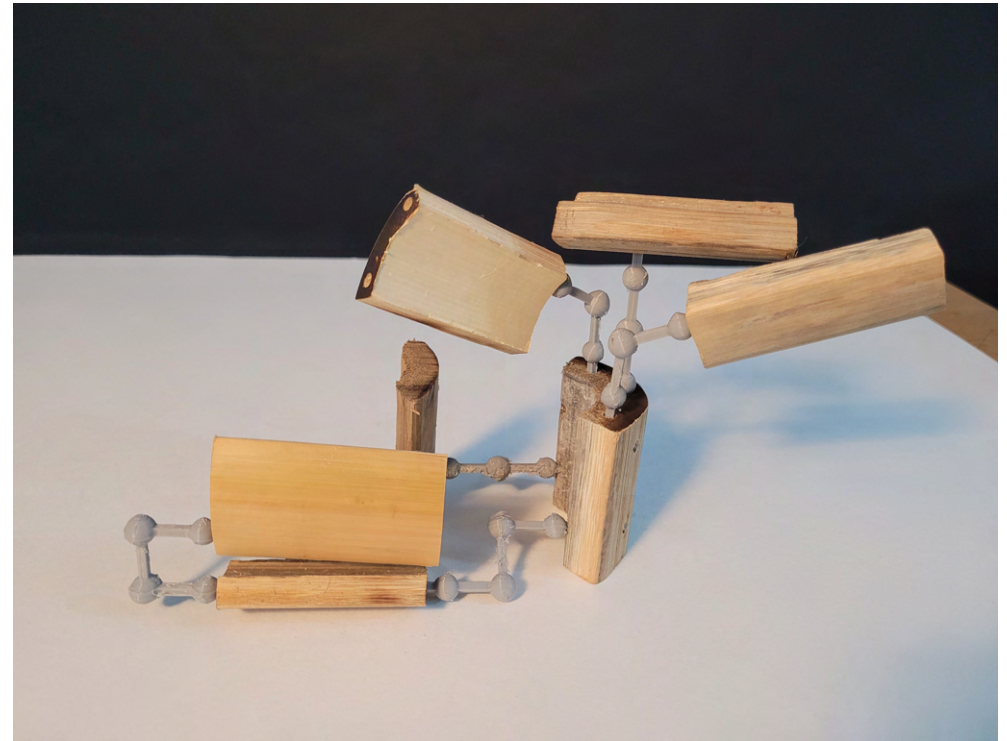
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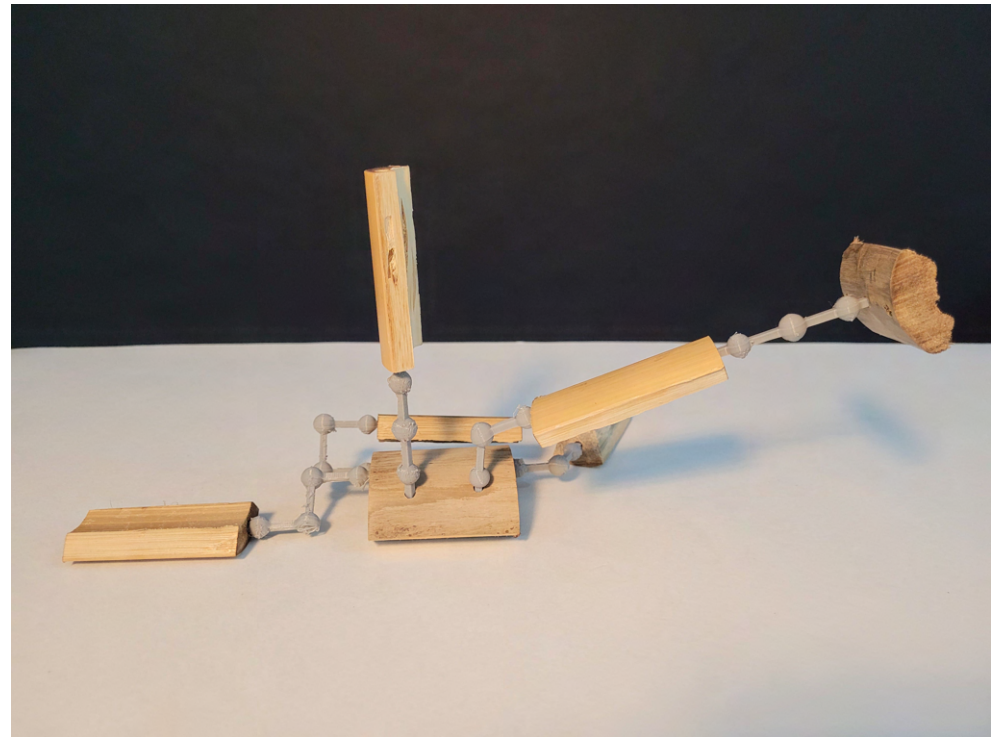
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Final Explorations



Conclusion

I started out with only a very general sense of direction in which I wanted to take the project. But as over the course of the project I was able to solidify and have a more concrete idea of where I wanted to take it. It was a very engaging project and I was able to make improvements and refinements throughout the process to achieve a final outcome. Through this I was able to learn and understand how the materials functioned and the processes involved and how the combination of them created interesting forms