A Software Tool For Harp Designing

Zuomin Xie, Master of Science in Computer Science

University of Dublin, Trinity College, 2021

Supervisor: David Gregg

The harp can be a delicate musical instrument and only a well-designed harp may display pleasant sonic characteristics while also standing the test of time. The harp designing process involves many different aspects ranging from string band design to frame durability considerations. All of which can be made simpler and more reliable with the help of science and mathematics. This dissertation aims to explore the idea of creating a harp design tool to aid harp designers. Which provides essential features for performing string calculations to help design the string band of a harp and frame load calculations for estimating the durability of a design. To improve the usability of the design tool built for this dissertation and make it stand out from existing tools, several usability features have also been added including a user interface designed to be intuitive and easy to use, the functionality to save and load designs and the ability to visualize a design through a 2D rendering of the design. The harp design tool is implemented as a web application in JavaScript for easy accessibility. The React JavaScript framework is used for building the web application and creating the user interface; the HTML Canvas element is used for creating a 2D rendering of a harp design and the browser location storage is used to support the save and load designs functionality. The evaluation for the design tool consists of calculation results comparison and feature comparison against existing tools, as well as experiments on modelling real harps. The evaluation results show that the design tool built for this dissertation offers an extensive set of essential and unique features useful for harp designing, and is a valuable addition to the harp building community.