

Final Project Proposal

Year: 2017 Semester: Spring Team: 12 Project: Guitutar
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Team Members (#1 is Team Leader):

Member 1: Austin Peterson

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Member 4: Jennifer Isaza

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1.0 Project Description:

Guitar is one of the most common instruments people try to pick up and learn, but if you have never played an instrument before, this could be a difficult feat to accomplish. Lessons may be too expensive, or maybe you are taking lessons but want to improve your practicing efficiency to show your teacher that you can move on to harder songs. One of the unique parts about learning guitar compared to other instruments are the chords and strumming combination. Tablature, or tabs, was created to be an alternative to learning how to play a song without learning how to read sheet music. While tabs are easy to find, guitar sheet music is usually not made and strumming patterns aren't connected with the tabs. In order to learn the combination of notes and strumming, users have to listen to a song over and over or find an instructional video on YouTube.

As the process of learning to play any instrument is difficult, our goal is to simplify this ordeal for someone trying to learn to play the guitar. To simplify the learning process, we have chosen to create Guitutar, a tutoring device that is implemented in the neck of an electric guitar. The custom fretboard will help its user learn songs and scales by lighting up fingerings on the correct frets, recognize correct chord and note inputs.

2.0 Roles and Responsibilities:

Austin Peterson: Team Leader

Austin has had multiple leadership experience ranging from leading engineering class projects to facilitating meetings and groups during his internships. In addition, Austin has experience in both mechanical and electrical design. Given these experiences, Austin would be best suited for the Team Leader role and would handle multiple aspects of the project including organization of the team, electrical hardware, printed circuit board, and mechanical design.

Jennifer Isaza: Systems Engineer

Jennifer has had significant involvement in Purdue EPICS in a vertically integrated environment with diverse majors, making her best suited for overall project functioning. Jennifer worked in an electronics position in her internship with GE and a signaling and systems position with GM, making her qualified to assist with any hardware or software tasks when needed as well.

Cole Giannotti: Hardware Engineer

Cole Giannotti has a wide range of electrical and computer skills due to multiple work rotations through the co-op program. With the ability to make hardware decisions with firmware and software requirements in mind, Cole will be excellent at designing hardware that is a perfect fit for any situation. Having signal processing experience, Cole will be responsible for designing hardware that allows for proper implementation of digital signal processing on the guitar input.

Brian Rieder: Software Engineer

Brian Rieder has acquired a significant background in software and low-level development through three years of industry experience and undergraduate experience in computer engineering. Given his software background, Brian is an ideal candidate for the role of software engineer to head up development of microcontroller Flash and Bluetooth drivers as well as the control of the LED array. In addition to software development, Brian is expected to work on the alteration of the guitar to support the LED array.

2.1 Homework Assignment Responsibilities

<i>Design Component Homework</i>		<i>Professional Component Homework</i>	
3-Software Overview	CG	9-Legal Analysis	CG
5-Electrical Overview	AP	10-Reliability and Safety Analysis	AP
7-Mechanical Overview	JI	11-Ethical/Environmental Analysis	BR
8-Software Formalization	BR	12-User Manual	JI

3.0 Estimated Budget

Mechanical	Estimated Cost
Electric Guitar	100
Guitar neck	30
Strings	5
Packaging	20
Electrical	
PCB	50
LEDs	15
Batteries	10
Bluetooth Module	25
Microcontroller	20
Flash Memory	40
Other	
Shipping	50
Total	365

The guitar and guitar neck costs are optional as Austin will be donating his guitar for the project. Extra strings are a necessity in case strings break. Packaging includes everything that would be involved in the final packaging of the product. The electrical components were selected based on our idea of the design and estimating total number of parts and spare parts. Shipping estimates would be the shipping costs to receive all the above products.

4.0 Project Specific Success Criteria

These are our success criteria:

1. An ability to interact with the system through an external user interface such as a phone or remote.
2. An ability to interface the microcontroller with an external device via Bluetooth.
3. An ability to recognize and process pitches played by a user through a sensing interface.
4. An ability to display chords and notes on an LED array on the guitar neck.
5. An ability to have the microcontroller support two modes for user learning and full playback.

5.0 Sources Cited:

No external sources were used in the making of this proposal.