

Requirement Gathering and Capture

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Project Description:

Our project will be using augmented reality in order to teach new learners how to play many different musical instruments. This will allow for a student to try different kinds of instruments like a piano, guitar, trumpet, drums etc. In order to truly learn an instrument one must own an instrument. Our system is designed to lower the cost of learning instruments by completely removing a real instrument out of the equation. This will lower the cost of our products overall. Our plan is to sell our own cheap instruments that will look identical to the real instrument they are replicating. The only difference is that they are offered at a much cheaper price, but will have no ability to produce sound without using our virtual reality device.



(Replicated Ukulele Product)

This will make it much cheaper for a user to want to learn an instrument since our instrument props will most likely be made of a cheap material to cut cost. The instrument prop will be there to walk the user through the motions of actually playing the particular instrument, but will not be producing sound. The sound will be produced through the augmented reality device allowing the user to hear the sounds they are producing through over the ear headphones implemented with our virtual reality device. This will give the user the sensation of actually playing a real instrument when in reality they are simply developing muscle memory which is the cornerstone of learning an instrument. This music tutorial application will allow users to track their progress through an online web portal. This online web portal will also allow the students to search a large inventory of many of the most popular songs that can be learned using our augmented reality system. The web portal interface will also display songs that have been uploaded by Intermediate Users (Teachers) and listen to other artist songs that they have created using our virtual reality music system. As stated earlier the basis of our product is to teach beginners wanting to learn an instrument in a fun and intuitive way. Our product will differ from other systems already implemented in the market with a very user interactive system, where different users can share social media in the form of songs they created for others to learn or listen too. The foundation of our user base will be of course the beginner user having the ambition to want to learn a new instrument. Below we will discuss more in detail instrument prop products we will sell along with descriptions of each user type.

Instrument Prop Products: We will offer several different replicated instruments for purchase by our customers. The included instrument prop product that we will offer are as follows: piano, guitar, drums, trumpet etc. We would also like for our users to be able to request an instrument that we do not offer already within our inventory such as a flute or clarinet. We plan to produce replicated instruments at a lower cost because we will not have to produce a fully functional instrument that produces audio. Our instrument prop product will simply be a device that allows for our users to have the sensation of playing a real instrument. Producing products like these that do not produce any sound will still feel real to your visual, audio and touch senses via our virtual reality device. The instrument prop product will be our physical reality while audio and tutorial interfaces will be produced using our augmented reality device. The image viewable to the right would be an example of a product that we could sell at a much cheaper rate since our product would have no ability to produce sound without our augmented reality device. The image above and to the right is a product produced on [this](#) website. They offer this product for around \$50. Our props would be offered at a much cheaper rate due to having minimal features that enhance the physical muscle memory experience of practicing a real instrument. The instrument prop will allow for a reduction in the price for our entire system and have a greater incentive for potential customers to want to buy our product.



Users Profiles:

Intermediate User (Teacher): These users are much more experienced and exactly know how to play a particular instrument. These users may not have access to a real instrument but our system will allow them to continue to practice and better themselves in an instrument they play. These users will also have the ability to upload their own tutorials for beginner users to attempt to learn. Not only can they create tutorials for beginner users to learn, but also create their own solo songs for others to listen too using our “fake” instrument prop and our augmented reality device.

Beginner User: These users will be the core of our customer base. They are the ones who are just starting out trying to learn an instrument they want. These users will be able to attempt to learn our different tutorials that we will offer from our database of tutorials. This is further enhanced by our intermediate users who will be uploading their own custom tutorials as they see fit.

Artist: These users will have the ability to upload their own original music for other users to enjoy. Intermediate Teacher users will have the ability to even create lessons on how to play artist originally composed songs that they upload to their user profile.

Project Feasibility:

(a) There are already products out there that teach users how to play instruments using augmented reality devices. These products are separated into two types; one is when the user has a real instrument, and the other is learning music without the a real physical instrument, such as paper that has printed piano keys, and a model which looks like a drum set. In both cases, people can use the sensor to identify the instrument's configuration and position and use it to their own advantage. Our product is very similar to those that currently exist throughout the world, but the way in which users interact with each other through our user base would make our system very diverse. Our product deviates from others systems out in the market by offering our own low cost instrument prop product for many instruments. However, we will differentiate functions and the information displayed by augmented reality goggles from existing products. For example, our group will add recordings that do not support the current products properly. In addition, our group will add several visual graphs and useful UI for the user's visual satisfaction to allow them to track their progress and interact with other users.

(b) After discussing with team members, our project would be feasible using augmented reality and our prop instruments that we would provide with our product system. We believe this project would be a great alternative product for clients who love to learn new musical instruments, but don't have enough resources to learn or afford music lessons. This product would not only show them how it's being played, but also learn while playing using the suggestions provided by our product. Including a feature that will also have additional features like we mentioned in part a;

1. **Record what you played:** This feature will record the lessons that you have been playing this will allow you to always go back and see how much you have been improving.
2. **Graph:** To see the clear results, our portal will show a bar graph or a pie chart and show the client progress about a particular song that the client is trying to learn with an instrument.
3. **User Interaction:** Each user will have their own profile each with their own features.

Beginner (Student): Have the ability to attempt to learn songs already within our database or song tutorials from intermediate Teacher users. This profile will also have the ability to track their progress with certain songs they are attempting to learn.

Intermediate Teacher: These types of users will have to ability to upload their own tutorials for beginners to attempt to learn. They will be able to offer many different different songs bundled all into several lessons for beginning users to learn.

Artist: These users will be able to have to the ability to upload their own composed music using our augmented reality system with our physical prop instrument.

Features like these would definitely standout as compared to the other existing technologies and attract the clients to definitely try it out. Since most instruments are extremely expensive our product will give all our customers a reduced price to begin to start to learn an instrument, teach others to learn instruments or simply create their own original music for others to enjoy.

Understanding the context Diagram: Below is our context diagram which uses several different components. The actual instrument prop component that we will offer as one of our low cost products. This instrument prop will be our input for the entire system to begin computation and exporting a response from our instrument system. Within our system we will have a main administrator (change administrator) system that can communicate with a Music database which is the backbone of our application. The music database will store all of our songs that can be learned by the user as well as new songs that we will upload for users to begin to try and learn. This database will also store all of our user profiles such as beginners, intermediate teachers and artist. We will also have our augmented reality device which will be our user interface essentially allowing for interaction with the instruments and the sound being heard within the user's own ears. The last component we decided to implement is a Web Interface component which will allow our users to view their products with each of the instruments they are attempting to learn. The web interface will allow our user profiles to access other users to learn their uploaded tutorials or simply listen to artist songs that have been created using our product.

Context Diagram:

