**SYSTEM ARCHITECTURE**

Perform sentiment

analysis and use NLP

Ask Questions and

get feedback,

performing interactive

conversation with the child

Based on metrics, decide volume, tempo, and music type

Gather heart rate data,

using an easy to use

sensor, and transmit data

via Bluetooth

Issue therapy, and keep collecting measured metrics, aka, heart rate

Command: Send text message,

using Twilio API to caregiver

and report child’s status

Ask another set of questions,

while being interactive.

Example below….

Do sentiment analysis on

Speech and make necessary

adjustments

**Sample conversation:**

var nodes = [{ "node": 1, "message": "Do you feel any type of pain today?", "yes": 2, "no": 3 },

{ "node": 2, "message": "I'm sorry to hear that. I hope I can help make you feel better. Have you been in pain all day", "yes": 4, "no": 5 },

{ "node": 3, "message": "I am happy to hear that you are free from pain, Samantha! Would you like to listen to a sing along song?", "yes": 6, "no": 7 },

{ "node": 4, "message": "I remember that vanilla is your favorite flavor of ice cream. With vanilla meaning the pain is not too bad, chocolate meaning the pain is really bad, and strawberry is in the middle, would you say the pain is more like strawberry?", "yes": 8, "no": 9 },

{ "node": 5, "message": "Did your pain just start?", "yes": 10, "no": 11 },

{ "node": 6, "message": "Ok, I will start with, Do you want to build a snow man. Is that ok?", "yes": 12, "no": 13 },

{ "node": 7, "message": "Ok. Would you like to listen to some music?", "yes": 14, "no": 15 },// Answers & descriptions

{ "node": 8, "message": "I'm sorry you feel this way. I would like you to listen to this song. I will speak with you right after.", "yes": 0, "no": 0 },

{ "node": 9, "message": "I'm sorry you feel this way. I would like you to listen to this song. I will speak with you right after.", "yes": 0, "no": 0 },

{ "node": 10, "message": "I'm sorry you started to feel this pain. I would like you to listen to this song. I will speak with you right after.", "yes": 0, "no": 0 },

{ "node": 11, "message": "I'm sorry you feel this way. I would like you to listen to this song. I will speak with you right after.", "yes": 0, "no": 0 },

{ "node": 12, "message": "Great!", "yes": 0, "no": 0 },

{ "node": 13, "message": "Ok, let's try Mulan.", "yes": 0, "no": 0 },

{ "node": 14, "message": "Great, I will start the music for you.", "yes": 0, "no": 0 },

{ "node": 15, "message": "Ok. I am really happy you are pain free. Talk to you next time!", "yes": 0, "no": 0 },];

In order to successfully design the musical therapy to relieve children who are suffering chronological pain, the following three major content pieces must be included…

Content 1: Build basic dialogue/conversation with children who are suffering from chronological pain. Alexa can assessment the basic level of children’s chronological pain level and locate the relevant conversational strategies with children.

* This addresses sub-targets 1
* This provides the user with the pre-medical assessment to measure the chronological pain.

**After the pre-assessment, Alexa can select specific music to** match ( musical rhythm, tempo and dynamics) children’s chronological pain depending on the children’s level of chronological pain.

* This addresses sub-targets 1
* This provides the user with the pre-medical assessment to measure the chronological pain.

**Encourage children to visualize the auditory image of the image and describe to the Alexa.**

By the end, Alexa can send a text-based conversation to children’s parents or caregiver and document the whole conversation happened between Alexa and the children with chronological pain.

* This addresses sub-targets 2 and 3
* This provides the user with the pre-medical assessment to measure the chronological pain.

**Scope: Functionality — No more than three maximum (even this can be too much)**

1. Functionality 1 → A built in conversational dialogue with children who suffering chronological pain.
   1. Alexa skills are able to briefly measure the level of pain and start conversation with children.
2. Functionality 2 → Select music to relive children’s pain based on their chronological pain level.
3. Function 3 – Send text message to document the conversation with children to parents and caregiver.

**Research Finding**

Musical Therapy:

-       <http://bjm.sagepub.com/content/5/2/14.short>

-       <http://www.tc.columbia.edu/arts-and-humanities/music-and-music-education/>

Chronological Pain

-       <http://pediatrics.aappublications.org/content/130/5/918.full>

-       <http://well.blogs.nytimes.com/2016/06/27/when-its-not-just-a-boo-boo-the-push-to-treat-childrens-pain/?_r=0>