CS CAPSTONE PROBLEM STATEMENT

OCTOBER 8TH, 2017

CDK GLOBAL: NO MORE TOUCH. NO MORE KEYBOARD. BRING IT ALL TOGETHER. USING TECHNOLOGY TO TEACH HUMANS.

PREPARED FOR

CDK GLOBAL

TREVOR MOORE _____ _____
Signature *Date*

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LOOK BOSS, NO HANDS

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Abstract

For the project, CDK Global: No more touch. No more Keyboard. Bring it All Together. Using Technology to Teach Humans. After talking to our client (Trevor Moore) to get a better explanation of the project scope. It largely boiled down to the concept of displacing using a keyboard and mouse to interact with a computer. The goal being to take some data from CDK Global, and being able to do some data visualization techniques to place the analyzed data and the graphs in a Virtual Reality or Augmented Reality environment. Where a user can interact with the data presented to them and physically move and interact with the data. Then have their reactions monitored by a wearable that incorporates some machine learning about what data surprises the user.

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1 DESCRIPTION

Overall, the aim of the project is to encompass using multiple new technologies: AR/VR, voice recognition, and wearables around data visualization. Our client broke it down further stating that someone should be able to have an Amazon Alexa/Siri, ask it to display some data (which CDK Global will provide) such as, Alexa, show how many dealerships are running the latest version of ____. Then, from the voice activated commands will populate a VR or AR device with some data for the user, either with a map, graphs, or simply numbers. As the user sees/experiences the data, should they be wearing something that can monitor a heart rate. The device will send back data to a server, learning at what point the users heart rate spiked. And will send optional alerts to the user when the data starts to get that high or low to prevent further reactions. The plan being that CDK can use this project to demo to clients and show them data in new way.

2 SOLUTION

To start with, for a VR solution we will most likely settle on using an HTC Vive. Due to the development environment being relatively friendly, economical, and possessing a large market share. Moving onto the voice processing, Amazon Alexa seems to fit our needs well. Our client says that CDK already has all the development set up done. We simply just need the credentials to log in before being able to personalize commands. Plus, using the Alexa when deploying it doesnt have to be thoroughly reviewed by Apple which might become a blocker later on. Then for the wearable probably a Fitbit, again since their developer environment isnt as strict like Apple.

The main challenge here would be to get the Amazon Alexa and the VR to work in tandem. After a Google search, it looks as if a young developer has already integrated Alexa to work with their VR system. And they had posted how they did it online, when using Amazon Alexa you can customize what a matched sentence into an action. We should route the command to hook up with the PC and run a program to display data to the VR headset. We would also need to create an app for the Fitbit or Apple watch to constantly monitor the heart rate of the user. And whenever a command is issued, the wearable sets a marker to know what data the user is observing. The wearable should then send the marker to a server about what data was on the screen when the users heart rate had spiked. Creating a profile on every user in the database, should map custom thresholds about what data the user was observing, and what the numbers of that data were shown when they reacted.

From there, there would need to be a server process running monitoring the data that the user was looking at and observing the numbers. If the numbers get too high or low on the data set then the user can get a notification via email, text or whatever they choose.

3 Performance Metrics

To gauge performance and success we will hold these values:

- Regular contact with the client, to ask questions, via IM or emails. Updating them weekly about any new progress that has been made, what is planned to be done, and any blockers for the planned progress. Much like the agile methodology.
- Constant contact with each other on the capstone team via IM. And at least a weekly personal face to face meeting to work on the project together.
- Having a space to test the voice processing, virtual reality, and wearables in one spot.
- A schedule to ensure that everyone has a chance with the hardware to test any new changes theyve added.
- Creating a suite of unit tests to the project such that any refactoring must pass the same set of tests that ensure functionality is still present.
- Using continuous integration (Travis CI), to ensure any feature or functionality added to the project is tested before being added.
- All proper hardware needed for the project should be acquired, setup, and usable by the end of the Fall term.
- Synchronizing the Amazon Alexa and the virtual reality headset to process commands such as Alexa, show me Fords sales data for 2016. Then having Alexa process that command, and populate the headset with some data visualization of the request.
- The time it takes to get into a proper virtual reality system, ready to interact with the program should be no more than just putting on the headset and asking questions to Alexa.
- The time it takes to ask Alexa a question, and being able to see it in virtual reality should take 5 - 10 seconds.
- Being able to interact with the data in virtual reality. For example, the user should be able to ask Alexa something, pull up the data visualization, and be able to swipe away graphs that they dont want to see, to bring up new graphs. Or touch buttons in VR to bring up new data plots.
- Wearables will properly report what the users heart rate is while being in virtual reality. Sending data to the server, monitoring the data sets that were reacted upon and sending out notifications whenever a certain users reaction meet a threshold number.
- Everything should be synchronized in which the Amazon Alexa, virtual reality headset, and Fitbit should be monitoring the user.
- The wearable should know what data is being looked at by the user in VR, as synchronized by the Alexa command.