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Higher Colleges of Technology

Bachelor of Applied Science in Computer in Information Systems

Higher Colleges of Technology – Dubai

CIS 4906 Capstone Project

Project Title: - HealthIO

Reflection

Weighting -40%

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Submitted to: -

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Higher Colleges of Technology

Program	Computer and Information Science Division (CIS)
Course	CIS 4906 Capstone Project

Academic Honesty Statement

This assignment is entirely our own work except where we have acknowledged other sources in the text and listed those sources at the end of the assignment. The word count for this assignment meets the requirements as described in the Task Description. We have not previously submitted this work to the HCT and we understand that I may be orally examined on it.

Signature: _____

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Abstract:

HealthIO is a voice-based system device that represent as an AI device that is used by seniors' patients that helps them in managing their healthcare. The device helps senior patients in managing their healthcare, the device act as support system for seniors' patients who live independently or have no relatives. The device main objective to helps the patients remember to take their medication on time and monitor their health status. The device is developed through hardware & software tools, software tools consist of GitHub, Visual Studio Code & PlatformIO. As for the hardware it has its components that need to be connected.

Introduction:

In today's world, technology plays an important role in every industry as well as in our personal lives. Out of all of the industries that technology plays a crucial role in, healthcare is definitely one of the most important. This merger is responsible for improving and saving countless lives all around the world.

This merge between technology & medical field has become a huge part in giving the patient the best type of quality care when they are in the hospital & homes. Technology helps in recording, saving & managing the patient healthcare record. This database provides a useful information for both the patient & medical industry. It provides an insight view for how the patient to use it, to better his/her life & medical industry and to provide the best care.

One of the most challenging aspects in medical field is making sure your patients take their medicine on time. Especially elderly patients who live alone or has no relatives. Elderly patients tend to face problems following doctor's instruction on taking their medicines & activity. According to MediPENSE article one of the many reasons that seniors do not to take their medication is due to not remembering taking their medicine. "Half the patients surveyed could not recall the dose of their medication and nearly two-thirds did not know what time of day to take them (2018)." Another study at Duke University stated that "7 percent of the seniors required help taking their medications. Three years later, 11 percent of those who did not need help at the start of the study required some assistance, Jamerson's team found (2016)."

Therefore, we will build a voice-based device system that is connected to either a wearable devices or mobile application, with the ability to provide an assistance for elderly patients to take a better care of their health.

Planning:

In the planning phase our main objective is to create a depth plan for our project to collect more information about our client's requirements, project scope, WBS, project scheduling and both resources & risks. Staring with the client's requirement in this phase we didn't have a clear viewpoint on our clients, since we took the requirement based on researches & studies done by accredited people. We knew the targeted people were senior patients who face challenges and problems managing their health care alone. During this phase we focused

more on the researches & studies are done in order to get the need requirement and we done several meetings between the team members & instructor MR. Ram to make sure we are going in the right direction. The scope of our project is to develop a sufficient & productive for our clients where they are able to use it on simple and easy way with simple voice command line. After completing the client's requirements & project scope, we have to come up with WBS which work breakdown structure. The WBS consist of phases that the project will go through it from the start to end point. Each of these phases has their own tasks that need to be done in order the project need to be finished. Lastly, the resources & risks of the project. The resources will consist of what the project need from costs and tools, as for the risk it what the project will face from product to requirements risks.

Analysis:

In the analyze phase, we had more in sights view of our information & requirements for our project. In this phase we also had a clear view on who our clients and stakeholders are, since in the last phase we usually focused on the researches & studies that had been done by accredited people. The stakeholders in our project are senior patients, as a group we went to old people housing and met with the staff members who are working there as care takers of senior patients. The analyze phase has methods that's need to be done in order to get the need information in depth and more accurate. The methods that we used are both interview and survey's for information, the activity & sequence diagram both used to explain how the device works. The interview method was used on the staff members of old people housing to get more detailed information of what senior patients need and problems they face for the device to work, they stated that device should be able to connect to the external devices of the caretakers of the patients & the doctor in order to keep a close watch on their health states. As for the survey, it was used by the staff members who works in the old people housing & other people in general who have senior patients that lives with them or knows any senior patients who live independently. Lastly, are the sequence diagram that shows how the device will operate in sequence matter and the activity diagram or knows as swim lane where It describe the activity of the device while it functions.

Design Development, Testing and Implementation:

Design:

The Design Development, Testing and Implementation are the last phase in our project and it's also where we design, develop, test & implements the device. The process is the design, we start this process by using the design methods & tools. The methods that were used for the data are both Database ERD & Network Diagram or known as slack diagram. The entity relationship diagram (ERD) shows the relationships of entity sets stored in a database by defining the entities, their attributes, and showing the relationships between them. For our device, HeathIO has 4 main entities and they are User, HealthIO_Device, External_Device and Admin/Caretaker. That are used for the device database. Each of them will have a primary & forging key along with unique ID, and the relationships in this project are only 2 types and they are: one-to-one and one-to-many. As for the slack diagram it will shows the

duration of each task that has been chosen and it will calculate the start to finish & finish to start to get the critical path.

Development:

In the development process, we go through three main phase and they are: Device Installation, Programming Environment & Setup up of ESP (Voice Matrix) and Raspberry Pie. The device installation consists of combining all the hardware items together in order to have a whole device to program it. The programming environment is where we choose the voice matrix programming environment based on the background of coding skills and type of coding for the device. We choose Matrix Lit for the device since it's goes with our background of coding skills. The last sept is setting up ESP (Voice Matrix) and Raspberry Pie, we start by connecting both of them together and then running curtain codes through command line.

Testing and Implementation:

After completing the design & development comes the testing and implementation of the device. During this process we have faced a lot of problems since the guide of developing the device seems to be missing & us not having experience with both ESP (Voice Matrix) and Raspberry Pie and command line code. Therefore, the device was unable to receive or give output because of the missing steps.

Teamwork:

To have successful and complete project then you need a successful team member, who are able to communicate and assist each other during the entire time period of project.

Teamwork is one of the most important things in any project because it helps in completing the project faster, better & more accurate. In our project we were able to divide the work among us equally, the work was also divided based on each of our independent skills. As a team we took each task one by one and started working on it, then we conduct several meetings where we sit with each other to update each other of the work that has been done and where have we reached in the project. Help was always provided among us, any one of us that got stuck or faced a problem we would sit with each other solve that problem and complete the required task. My role in the project was more of team leader and the device hardware and software tools requirement, I would make sure that anything the device need is there.

Conclusion and Future development plan:

In end, working on project requires a lot of time and efforts specially if it's a group work. when a team is involved then it's requires that everyone give everything they have for the project and communication is must. During this project we have faced a lot of problems, stress, difficulties. We were able to overcome some and some not, but we have learned new

skills that will help us in the future that will strengthens our knowledge and skills. The project idea and concept are new thing and interesting topic to work on, but the topic is not any easy one to work, since it requires people with an expert coding background such we don't have. The topic was challenging and exiting to work that gives an idea how the medical area and technology are working together, also it gave us way to create a solution for the given problem that senior patients face. The future development for our device will be able to connect with apps and has more connection with for other people such caretaker to be updated on the senior patient's health. Another feature is that it will have smart human motion, where it will be able to detect every motion a patient does and keep update for future reasons. And lastly, it will have more advanced health care services for sleeping patterns, activities.

References:

- Project Charter Report.
- Project Plan Report.
- Project Analyze Report.
- Project Design and Implementation Report.



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