**Group 3: Caring For Others (Parkinson’s disease)**

**Members:** Nick Gamarra, Nicholas Angiolilli, Genesi Gonzalez, David Gibson

**Abstract:**

This mobile app, Sync Care, aims to organize and sync patient updated medical information, care plan and progress with their providers, caregivers and the entire interdisciplinary team. We are trying to solve the problem of getting a complete Parkinson’s educational and physical activity app together for those who truly are in need of it. Our motivation for this is to get all of the information about Parkinson’s combined with the list of physical activities the patient needs to do to help their cause all in one easy access place for them. No more struggling through papers, just a click away and all the information they need is at the palm of their hands. We went about solving this by designing a user friendly app that allows the physical therapist or medical professional assisting the patient to input all of the necessary steps needed to ease their transition to help simplify this disease. The patient then can follow all the steps or tasks left by the medical professional and improve their physical and mental health. The implications of this app will help simplify the patient’s life so they can ease the struggle and burden placed upon them by being genetically predisposed to this disease.

**Background on Initial App:**

To start, our initial app was supposed to be geared towards an overall patient healthcare system. This would be for any individuals who are in need of a caretaker and/or a nurse to assist them in their every day living routines. It would include many things, starting with general information. It had general information about the patient along with information about their doctors, insurance, pharmacies, etc. If you, as the caretaker, needed to contact any one of their doctor’s on behalf of them all of their pertinant information would be accessible from the click of a button. If you needed any insurance information or pharmacy information while at a doctor’s visit, you would be able to access it without fidgeting through a lot of useless papers in your purse or bag. It would all be easily accessible through the app, any kind of information needed would be stored.

The app we made was completely user friendly and anything you needed was very self explanatory and a few clicks away. We made our app very simply yet aesthetically appealing to the user. As well as being for a caretaker taking care of a patient, what about family members who needed to access the information or if the patient had more than one caretaker? Well that was covered as well. The main caretaker had an account called “main” and any secondary accounts were labeled as “linked”. We had a separate link for any family members or other caretakers that wanted to have access to, but not be able to edit, the information. The link would be by a randomly generated user ID that we gave the patients, the family member or other caretaker would then go on to basically send a friend request of sorts to the “main” account, and once it was accepted the secondary, or “linked” account would have full access. We used this step of a friend request of sorts to make sure not anyone could just find out the randomly generated ID for a patient and look them up to view all the information. We wanted a sense of privacy for all the information each patient has and only they themselves can choose who is able to view it.

A couple other features we were going to add into this app were daily logs, daily routine and alerts. To start with the daily logs, they were geared toward the caretaker and used accordingly for the patient’s day. This kept a full record of the patient: what they ate that day, what exercises they did that day, any set backs or pain, any anything else the caretaker felt was noteworthy. This was you could see what the patient was doing on days they felt great and how their diet was, and what was lacking on other days where they did not feel so good. If the caretaker saw a downward trend for any reason they can go to the daily log, which is manually inputted, and track anything that may need to be reviewed. This way they can find patterns in a patients behavior that may need any improvement or adjustment. Daily routines were simple in the fact that it was an outline for the patient, by day of the week, what a general idea of their day looked like. Whether they had certain routines they did on certain days would be inputted and followed, as well as eating habits or exercise programs. Appointments were not set in here because they are not on the same day of every week, it is subject to change. Finally, the Alerts. The alerts were used to remind the patient of an upcoming doctor’s appointment, to take certain medication, or even as simple as reminding them they need to eat every 4 hours. The client could set when it reminded them (an hour before, a day before, etc) and it would be a pop up notification right on their phone.

Another portion of our app that we were very excited to get working on was the Augmented Reality portion of it. We had a couple different ideas on where to take this. Our first idea for the Augmented Reality was in regards to working directly with the doctors. Whenever you are in the doctor’s office, and he is viewing your information about past visits or current status on what is going wrong, he seems to be distant. He would be reading from a notepad, or looking on a computer for the information, seemingly in his own world while you sit there explaining the situation. You may feel he is not paying attention to you when you need his help the most. With our Augmented Reality we would make it so doctors had access to the app as well. The doctor would download the app, and with the use of a VuMark, they are able to have access and view all of the clients’ information through Augmented Reality.

We were going to implement a VuMark, which is similar to a QR code, as a part of our Augmented Reality. A QR code is a block of randomly generated blotters of black and white, similar to a bar code in a sense, which stores a type of information. Usually QR codes are limited to a URL to a website and not much else. With VuMark, we were able to store more than just a URL, we stored entire blocks of text and interactable information to display 3D alongside the patient. As long as the VuMark was on the patient, the information would then display around themselves. The doctor could then look through the screen at the patient while simultaneously viewing any necessary information. Whether that be diagnosis, daily log, or whatever else the doctor deemed useful.

After we decided that may be a bit out of our reach and the nursing director advised against it, we limited the scope to something a bit less general and more specific. We were going to focus our augmented reality on the perscription bottles. We saw an opportunity that, without having to memorize all information or write it all down somewhere, we could scan the perscription bottle. We would be working together with the pharmacy companies and have them input all necessary information while randomly generating these patient specific VuMark’s. Once we scan them, all the information about the perscription such as name, dosage, what it treats, when to take it, etc all shows up. That way, all the necessary information for that particular perscription bottle was able to be brought up for the caretaker in a matter of seconds with a scan. This was particularly useful in the case of a patient or caretaker not being able to remember dosages or find necessary paperwork for the perscription. Any misuse of certain drugs can result in deadly consequences so it is always useful to be as accurate and sure as possible.

We had a team member, Gus, who was very knowledgable on the subject and had been working with us quite diligently on creating our logo and designing the augmented reality portion (AR for short) and we would help implement everything together. Unfortunately, around early March he got sick and we hadn’t heard from him for about a month. He eventually had to drop the course and we had to scrap the idea completely. We ended up no longer doing Augmented Reality or this focus on the app because we had no experience with Augmented Reality. There was no way we could learn and implement it in enough time to have it fully functional. The nursing director also wanted us to limit the scope of our app from such a general topic to one specific disease, and we chose Parkinson’s.

**Background on Parkinson’s disease:**

I want to start by giving a bit of background on Parkinson’s and why we decided to choose this topic with a few weeks to put everything together. Parkinson's disease (PD) is a neurodegenerative brain disorder that progresses slowly in most people. Most people's symptoms take years to develop, and they live for years with the disease. In short, a person's brain slowly stops producing a neurotransmitter called dopamine. With less and less dopamine, a person has less and less ability to regulate their movements, body and emotions. Parkinson's disease itself is not fatal. However, complications from the disease are serious; the Centers for Disease Control and Prevention (CDC) rated complications from PD as the 14th top cause of death in the United States. There is currently no cure for Parkinson's. Your doctor's goal will be to treat your symptoms to keep your quality of life as high as possible.

Patient assistance at home includes: Assistance with medication management exercise programs to improve strength, endurance, and ability to do activities of daily living. Personal care assistance by the caregiver. Update nutritional and meal planning to help strengthen muscles and bones.

A healthy diet is essential for those with Parkinson’s disease to help strengthen muscles and bones. Studies have shown that people with Parkinson’s disease are also at increased risk for bone thinning, a combination that can lead to injury. Therefore, it is especially important for people with Parkinson’s to eat meals that provide bone-strengthening nutrients, such as calcium, magnesium and vitamins D and K. Regular exposure to sunlight is also helpful, as it increases vitamin D in the body. Parkinson’s medications can raise the risk for dehydration, leading to confusion, weakness, balance problems, respiratory failure, kidney problems and even death. Drink plenty of fluids throughout the day to avoid dehydration; work toward eight 8-ounce glasses daily.

Some adverse effects: Weight loss may occur with advancing Parkinson’s. Difficulty swallowing, feeling full or bloated, and improperly fitting partial plates or dentures are all potential reasons. Also, some people with Parkinson’s feel full after eating a small quantity of food. Eating smaller, more frequent meals can help. Unplanned weight loss along with malnutrition can lead to a weakened immune system, muscle wasting, loss of vital nutrients and risk for other diseases and possibly even death over an extended period of time.

**Discussion on Current App:**

With the current app, we had Nick Gamarra work on the database with initially MySQL on his lamp server and transitioned to SQLite browser. That is where we are storing all the clients’ information. We have moved away from the insurance and pharmacy information because that is currently not needed for Parkinson’s patients. We have kept doctors information because there are several doctors or medical professionals that Parkinson’s patients will need to be visiting with to improve everything from their diet to their motor functions and mental health.

Nick Gamarra was also the main Java developer and has done a great job assisting myself (Nicholas Angiolilli) and David along with our code. He has taught us a good amount on how to go about connecting the XML with the Java and creating a complete app. Nick has handed off about half of the layouts and supporting Java code to myself. I went about creating a good amount of the layouts for our app and tied them all together while putting some content on each page and Nick Gamarra has done the same if not more. He was the final overseer as well as main developer and helped make everything intricate and flow seamlessly. He connected all the Java code to the PHP and SQLite to make this a complete app as well as the syncing of the patients and medical professionals. Our nursing partner had a lot to do this semester so we have not heard much but lately within the last few weeks she has been presenting us good information on nursing care and Parkinson’s as well.

With our app now we have kept a good amount of components from our initial app like most of the layouts and displays but we have had to tweak a good amount of it as well to fit our new topic of Parkinson’s. We were not able to get as much done as we would like with the unfortunate change but we are moving forward as efficiently as possible in the time and circumstances given. Our app has a lot of functionality and we are able to have a patient create their profile and have themselves or the medical professional edit in any necessary information needed. Whether that be for the daily logs, or the doctor’s information as well as the appointments, all of that is covered. We would have liked to develop an Augmented Reality portion as well that either dealt with displaying the information around the Parkinson’s patient or displaying exercises that they would need to perform. We are going to have a good amount of physical therapy information in there as well as overall information about the disease. This will be on the home page so the caretaker or family members are also well aware of what they may encounter or expect when dealing with someone with this particular disease.

**Conclusion:**

In conclusion, our app is going to be geared towards patients with Parkinson’s and we want to make their lives as simple as possible with the transition onto the next phase of their life. Our app is mainly geared towards medical professionals or caretakers who have a patient with Parkinson’s disease. We want to have all their pertinent information all in one place as well as daily logs to keep track of the patient’s daily living situation as well as exercise regimen and diet. The combination of these factors will help ease the patients’ transition into this stage as well as make it less stressful for the caretaker with their duties.

**References:**

Locsin, R. (2005). Technological Competency as Caring in Nursing: A model for practice. Indianapolis, IN: Sigma Theta Tau International.

“National Parkinson Foundation: Believe in Better.” *National* *Parkinson* *Foundation*. Web.

Smyth, Neil. *Android Studio Development Essentials.* 2015. Print.