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Professor Chang
Milestone 1
24 March 2020

Kinect Gesture Recognition to Detect Needs

For this class project, I want to create a way for the elderly to express their needs. Whether it be in a clinical setting or an at-home setting with a caretaker, the elderly cannot be carefully monitored at all times. If they experience weakness, fatigue or other more severe symptoms related to memory-loss, they could really benefit from a system which can automatically detect their needs, and translate them into a notification to be sent to a caretaker. This caretaker could then be called to attention to fulfill the desire of the elderly patient or take more drastic action in the case of a fall or a runaway patient. In addition to elderly patients, this system may be beneficial to non-verbal autistic individuals who have a hard time expressing themselves in words. This system could interpret gestures from these individuals also to translate them into needs for the caretaker to fulfill.

Thus this system will have several components which must be working together in order for the system to function properly. There will be the input from the Kinect machine, this will be ingested into the SIS testbed where it will be processed. The body gestures of the individuals being monitored by the Kinect will then be detected and categorized. There will be several gestures which will be implemented. These include “need pillow”, “need water”, “need food”, “need heat”, “need cool”, “need walk”. Each of these gestures will be denoted by an easy to perform combination of arm positions. These will be somewhat intuitive and easy to remember for the patient using the system. These gestures will then be translated into a notification which will be sent to the email of the caretaker. It is envisioned that this e-mail alert could easily be translated into a more direct push notification on a cellular device, but I do not have access to a cellphone to create such a push notification, so an email notification will be sufficient.

In addition to these basic patient needs, I will implement some emergency notifications as well. These cases include when the patient falls and is laying horizontally on the floor. This is a very bad occurrence with elderly patients, as a bone fracture or heart attack could be occurring. So an emergency notification will immediately be sent to the caretaker with an emergency declaration in the subject header of the email. In addition, if a patient falls out of detection on any side of the screen for more than five minutes (or shorter), an emergency notification will be sent to the caretaker that the patient is no longer being monitored. This could be a benign situation such as a patient using the restroom, but could be more severe like a confused patient running out of the house.

For the next milestones of the project, the following is what I envision. For milestone two, I envision the core functionality being built out and gestures at least being interpreted using the Kinect SDK. For milestone three, I envision the gestures being categorized and notifications being sent out. For the final submission, I then want the bonus material below to be properly implemented.

Bonus:

As a potential bonus to implement within this project, I would like to do one of two things. Firstly, when a gesture is detected for them to be a sort of pictorial feedback to the user. For example, if the patient wants a pillow, a picture of a pillow should be displayed. This will allow the patients to learn the gestures more intuitively and allow them to stop performing a gesture if they made a mistake. Secondly, I would like to interpret audio data to splice in with the gesture data in order to make better determinations as far as distress levels in a patient.