Help, I've Fallen and I Can't Get Up!

Team Members:

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Project Topic: Fall identification using pose detection

Project Goal: Detect falls of elderly persons by determining fallen poses versus standing or sitting poses

Target Deliverables:

Primary Deliverables:

- A model that outputs the likelihood that an image contains a human in a fallen pose given some input image
    - *Ideal*: Use existing neural network that detects poses, then apply that to detect fallen poses
    - *Back-up*: Train a new neural network to detect fallen poses
    - ***Glenna Manns***: Create Convolutional Deep Neural Network (or similar technique) that takes as a picture as input and outputs a rough pose estimation
    - ***Amir Gurung***: Add extra neural network layers that take as input the rough pose estimations, then determine the probability that the image contains a fallen person
- A classifier that takes a probability as input, and then classifies the initial pose
    - ***Divya Bhaskara:*** Create a support vector machine, neural network, or similar technique that classifies the initial pose as either "fallen" or "not fallen" based on the probability value
- A preprocessed dataset: A data set containing a fallen person in a multitude of different positions, orientations, luminances, etc.
    - ***Dominic Ritchey***: Augment existing data sets
        - Create additional orientations of images
        - Background subtraction using OpenCV
        - Create various luminances/colorings of images
- Final Report
    - Primary author: ***Dominic Ritchey***
- Performance metrics

    - Measure whether “fallen” or “not fallen” states are accurate by comparing our system’s output predictions to ground truth from dataset labels
    - Attempt to minimize misclassification of true fallen poses as not fallen
    - Speed: The whole process should not take a long time (< 1 minute) in order to increase the likelihood that a caretaker is able to help the fallen individual.

Secondary Deliverables:

- A system to take as input a video, then run each frame of the video through the trained neural network, and output “fallen” or “not fallen” for each frame.
- An alert system that sends a notification of some form given an image labeled as containing a fallen person