

Software Design

AARDVARK

User Groups

- Elderly individuals
 - At risk of falling/seriously injuring themselves
 - Between 60 and 78 inches in height
 - Weight of no more than 250 pounds
- Responders who come when they are contacted by the robot
 - Disable the emergency state of the robot

Communication Architecture

Model-View Controller for interface

AARDVARK

USER ID:

PASSCODE:

New user? [Click to add an account](#)

SET UP

SECURITY

USERID:

PASSCODE:

RE-ENTER:

Your passcode should be a 4-digit code

EMERGENCY CONTACT INFO

NAME:

NUMBER:

RELATIONSHIP:

Your emergency contact should be someone you trust to respond in case of an emergency. Please verify that you have submitted the correct name and number, as this will be used to call your contact.

SUBMIT

AARDVARK

EMERGENCY RESPONSE

CALLING...

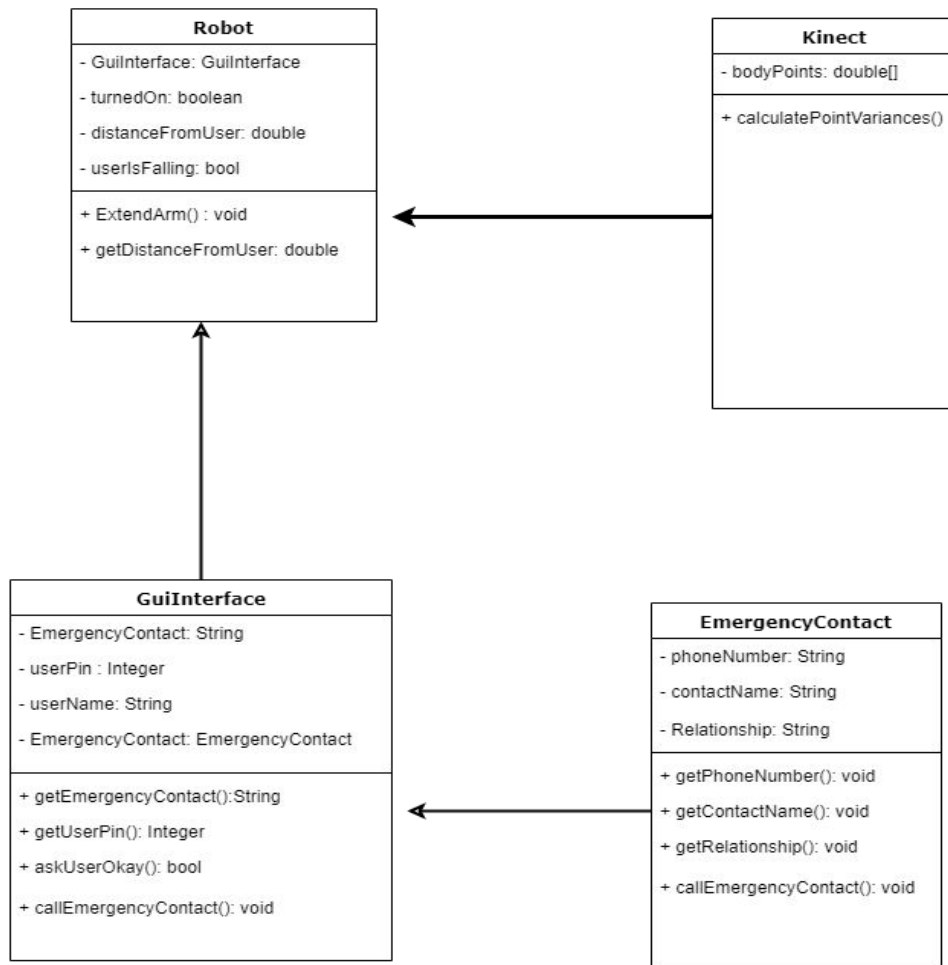
NIK LAMB

(123) 456-7891

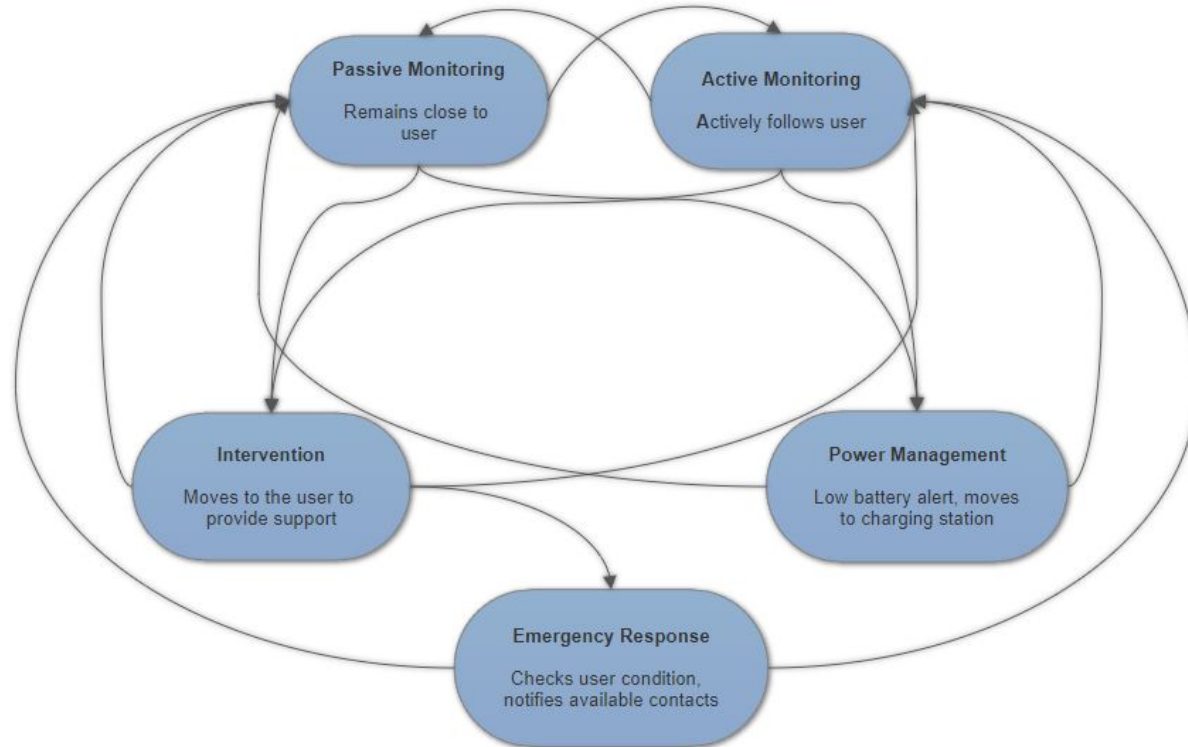
RELATIONSHIP: FRIEND

RESET

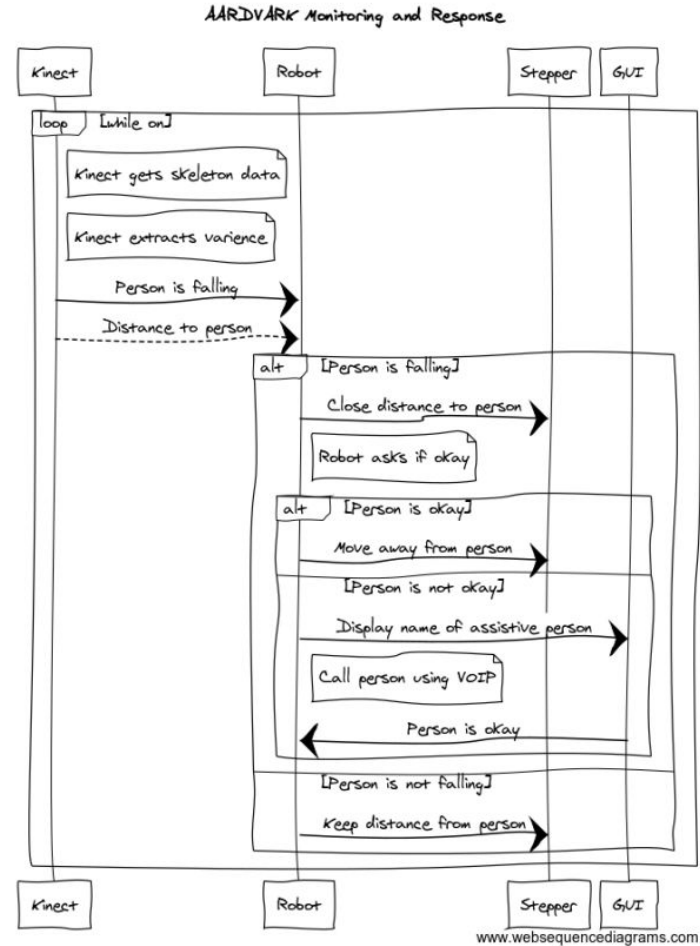
CALL EMS



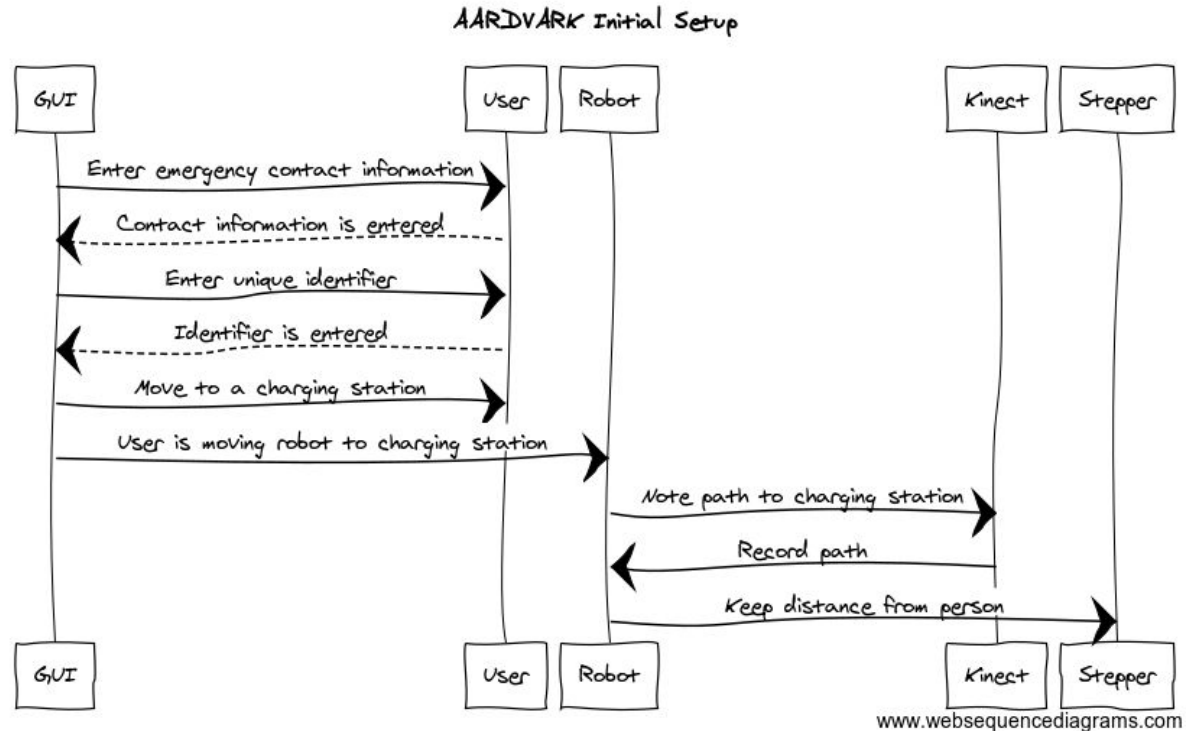
Operations: State Transitions



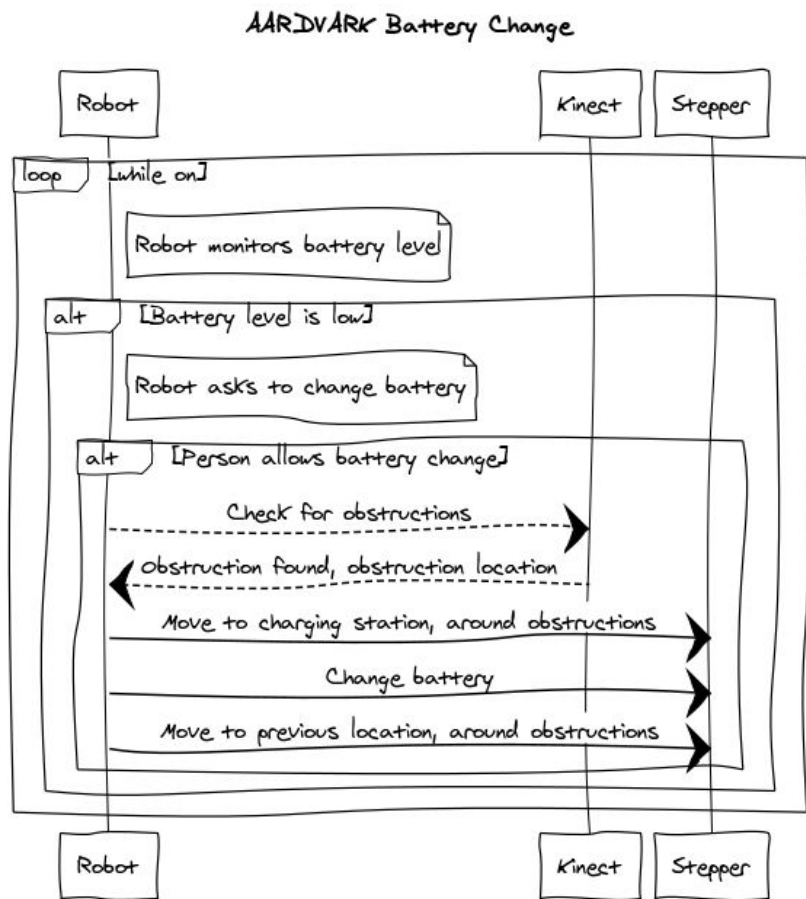
Sequence Diagrams



Sequence Diagrams



Sequence Diagrams



Data Flow

- What data is actually being processed/looked at/used
 - Locations of 25 points -- input
 - An array that stores position data over time period
 - Variances of each point -- calculated over array
 - Random forest classifier (built from test data)
 - Fatigued/Nonfatigued marker -- gets sent to robot to execute command
 - z-coordinate sent as well to give distance from robot

Testing Plans

- Gather simulated data
 - Normal walking data (0)
 - Exaggerated sway data (1)
- Build fall-risk classification software on gathered data
 - Cross-validate random forest decision tree, check accuracy
- Run system with new set of data (normal/swaying movements)
 - Check if proper fall-risk classification (0/1)
 - Check if robot responds
- Run system in real time
 - Check if proper response
 - Check if robot response adheres to requirements