team cARE - InTouch Health

Sabal Malhan, Nate Pincus, Hanna Vigil, Donnie Li, Ethan Wang
The Goal

- Grant Access to Quality Healthcare
  - Location
  - Size of Facility
  - Cost
- Fully Utilize Specialist’s Time
- Entice and retain users
  - Important details
  - Easy and intelligent robot movement
Solution

Classification Module:

- DNN to classify personnel and objects of medical interest in a video feed
- Objects currently in mind - vitals monitors, foley bags

Robot Module:

- Provides an AR overlay on original video feed and performs contextual actions
- Manipulates video frames using information from classifier
Technologies Utilized

- **TensorFlow**
  - Classification and object detection
- **Where’s the Bear**
  - Creating a sufficiently large data set
- **OpenCV**
  - Drawing on images
- **Robot API provided by InTouch**
  - Building context sensitive actions
  - Camera control, movement, frame manipulation
- **Pivotal Tracker for scrum management**
- **Slack for team communication**
Current Status

Achievements:

- Trained neural net to detect object and output bounding box information
  - Retrained InceptionV3 on faces for now
  - Sliding Window classification to get localized detection
- Robot application that communicates with Robot API
  - Frames displayed with bounding boxes
  - Click action: Static drop down menu when user click on an object within the bounding box
  - Zoom and Center methods (unable to test on a laptop webcam, we need to test on the real robot in the future)

Challenges:

- TensorFlow - challenge with localized object detection. Sliding window is approximation, but very slow and inaccurate. (----> Explore Caffe, Microsoft Cognitive services)
- Unforeseen challenges when on the actual robot(e.g. Pixel based driving will be tricky, performing the actual zoom and center actions)
Demo

- Augmenting frames from Harry Potter
- Detected boxes displayed for each frame
- Inactive drop down menu