A Human Robot Interaction ToolKit for ROS (HRItk)

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HRItk => open source tool for researchers and roboticists for further research
OneStop ROS node for speech, gesture, face and dialog with your robot!

Key Components:

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Face Detection / Recognition (in progress)

Hand Gesture Recognition

- **Hardware**: Microsoft Kinect, MacBook Pro
- **Software**: Ubuntu Operating System, ROS, openni camera and openni tracker nodes in ROS, OpenCV, HRI hand gesture recognition code

Speech Recognition

- **Hardware**: HARK microphone array, microphone, MacBook Pro
- **Software**: Ubuntu Operating System, ROS, Julius 4.2

### Basic Architecture

#### Hand Gesture Recognition

**Tools**
- openni_camera
- openni_tracker
- OpenCV
- HRI Gesture Recognition Code

**Application**
- To fire up the ros topics:
  - openni_depth_frame
  - openni_rgb_frame
- To get the (3D) positions of various parts of the body, for example:
  - right_hand
  - left_hand
  - torso
- To convert the image into a depth image
- To get the box containing the hand
- To convert the hand image into a gesture ID

#### Speech Recognition

**Tools**
- Julius
- HARK microphone array

**Application**
- Speech recognition engine that converts input voice to sequence of words.
- To get the direction of the origin of speech