ARI

TECHNICAL SPECIFICATIONS

GENERAL FEATURES

Height	Width	Depth
165 cm	53 cm	75 cm

DEGREES OF FREEDOM (DoF)

Head	Mobile Base	Arm (2X)
2	2	5

NECK
02DoF

UPPER ARM
01DoF

ELBOW
01DoF

SHOULDER
02DoF

WRIST
01DoF

BASE
02DoF

HARDWARE SPECIFICATIONS

COMPUTER POWER		
CPU	Intel i5 / i7 / i9.	
SSD	265 GB / 512 GB / up to 1TB.	
RAM	8 GB / 16 GB / 32 GB.	
GPU	Nvidia Xavier NX, CUDA compatible. *(optional)*	
	Nvidia Orin, CUDA compatible. *(optional)*	

DISPLAYS		
Touchscreen	Touch screen 10.1'' 1200x800 capacitive.	
Eyes	2X LCD screen with custom animations.	
LEDs	Ears (2x 16 RGB LED Ring), back (40 RGB LED Ring).	

CONNECTIVITY		
Wireless	WiFi 802.11ax Dual Band 5 GHz and 2.4 GHz.	
Wired	Ethernet 1000 BaseT.	

VISION*		
Head Camera	Head Camera 8 MP RGB. *(Optional upgrade to RGB-D)*	
Torso Camera	Front RGB-D (RealSense D435i).	
LIDAR	YDLIDAR TG15. *(optional)*	
Touchscreen	Cameras - RGB, RGB-D, Thermal *(Optional upgrades)*	

AUDIO		
Speakers	2 x 30 W Hi-Fi Full-range speaker.	
Microphones	4x high performance digital microphone array.	

BATTERY		
Battery	24V / 40VAh *(Optional 60Ah)*	
	8-12 hours autonomy.	

* or equivalent hardware based on component availability

ARI

CORE SOFTWARE

CORE SOFTWARE	**Operating system**	Ubuntu LTS 64-bit. RT Preempt Linux kernel.
	Middleware	Robot Operating System (ROS) Noetic. Orocos compatibility.
HUMAN PERCEPTION	**Face processing**	Face detection & tracking. Facial feature extraction. Face recognition. 3D gaze estimation based on head-pose.
	Skeleton tracking	Realtime 2D and 3D skeleton tracking. Compatible with monocular RGB head camera. *(increased accuracy with optional RGB-D camera)*
	Automatic engagement detection	Based on gaze, proxemics and voice activity.
	Probabilistic human model fusion	Transparently fuse face, body and voices detection for a complete realtime, multi-modal people detection.
	Full ROS support and custom visualisation tools	Full integration with the ROS4HRI standard. 2D and 3D tools to visualise in realtime humans surrounding the robot. Compatible with rqt and ROS rviz.
SPEECH AND DIALOGUE PROCESSING	**Always-on, on-board speech recognition**	Automatic voice activity detection. ASR based on vosk, includes support for 20+ languages and dialects.* *(optional Google speech integration)*
	Speech synthesis	Based on acapella, comes with support for 6 languages. *(additional languages can be purchased separately)*
	3D sound source localisation	Compatible with ROS tf.
	Customisable dialogue manager	Based on rasa, include machine-learning based intent detection comes off-the-shelf with casual chat capability. *(extendable by the user)* *(optional Google Dialog Flow integration)*
REASONING	**Knowledge base**	OWL/RDF compliant knowledge base. Fast first-order-logic reasonner. Fully integrated with ROS.

* speech recognition results may vary depending on the language, and are sensitive to background noise

MOTIONS AND BEHAVIOURS

Full compatibility with standard ROS interfaces

Includes ros_controllers support to control the robot's joints.
Standard differential drive API.
Support for standard ROS interfaces to sensors
(camera, depth cameras, LIDARs).
Full compatibility with MoveIt! for motion planning.

Whole-body Cartesian control

Whole-body Cartesian control of the robot arm, based on our
state-of-art technology for humanoid bipeds.

Custom tools to record and play animations

Easy-to-use and access (no install) via the integrated
web-based GUI.

Navigation

Support for ROS-based 2D navigation.
Purchase of the Autonomous Navigation pack,that includes
a LIDAR, is recommended for navigation in complex environments.

Expressive behaviours

Fully controllable expressive eyes with 20+ off-the-shelf
expressions. *(possibility to use custom eye designs)*
SSML support in the text-to-speech engine to control
speech prosody.

USER PRIVACY AND DATA MANAGEMENT

GDPR-compliant*

All data processed on-board (edge computing).
Connection to cloud servers opt-in only, and not required for regular use.
Privacy-sensitive data (eg face database) easy to delete.

USER INTERFACES

Web GUI interface

Build new motions.
Build new Presentations that coordinate robot speech, motions,
LEDs and touchscreen.
Create buttons that trigger motions, speech or presentations.
Create new touch screen content.
See camera outputs - Robot's camera live streaming.
Information Panel.
Graphical Joystick for teleoperation of the base.

Web Commander diagnostics

Diagnosis of software, actuators and sensors.
Text-to-speech triggering.
Execution of pre-recorded motions.
Execution of demonstrations.

Custom touchscreen-based interfaces

Load custom HTML/javascript onto the touchscreen to create your own
interactive display, includes ROS--Javascript bridge to interact with the
robot hardware from the tablet.

* if you opt-in for Google-based ASR & dialogue management, instead of the default on-board speech processing pipeline, your robot might not be GDPR compliant anymore

PREMIUM UPGRADES

Upgraded Sensors

Head RGB-D camera instead of RGB, additional Thermal Camera

Voice Processing

Add extra languages and voices

Autonomous Navigation Pack

Includes LIDAR - YDLIDAR TG15

Vision and laser based self-localization and mapping (SLAM)

Navigation to a point of a map

Obstacle avoidance using laser sensors and front RGB-D camera

Available RViZ Plugin and web plugin to navigation to a point in a map

Autonomous Docking Pack

Includes back stereo fisheye camera, dock station, Autonomous Docking Software

Additional Dock Station

ARI Premium Transportation crate

Spare ARI charger