Hardware

Our previous robots (KUbot1, KUbot2, KUbot3) used Dynamixel MX-28. Robots need a lot of torque when walking, dribbling, or kicking a ball. But the power of the MX-28 is not enough to drive the robot. The mx-64 has three times more force than the mx-28. Therefore, by replacing the knee and ankle actuator with MX-64, the KUbot4 can operate more easily than our previous robots. Also, good results were obtained in kicking and walking.

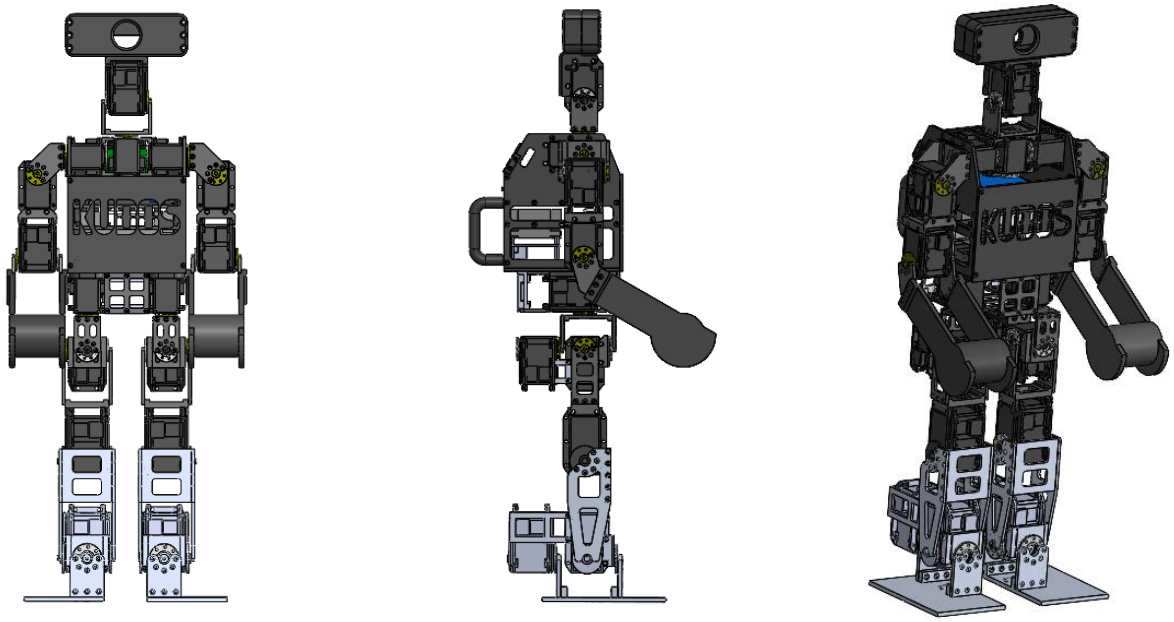

Fig 1. KUBOT3 Design

Also, by replacing the existing PC and cm730 with PC and openCR, the body space was increased considering the lack of space. The head part with the camera was also designed in the form of a straight line rather than the existing bent state because the tan value of the object must be used unlike before. The bottom of the robot's feet was narrow, but it was expanded to spread various forces to the floor.

Table 1. KUBOT3 Specification

Series		KUBOT3
Height		550 mm
Weight		3.9 g
Walking speed		6 cm/s
Number of DOFs		20 in total
Actuator		Dynamixel MX-28, MX-64
CPU	Main	Jetson TX2 (Dual-Core NVIDIA Denver 2 64-Bit CPU Quad-Core ARM® Cortex®-A57 MPCore)
	Sub	OpenCR
Camera		Logitech C920
Intertia measurement unit		3-axis Gyroscope, 3-Axis Accelerometer, A Digital Motion Processor™ (ICM-20648)
Other specs		Display: Body LED