Description of HITS dream Team "Firstep" by Honda International Technical School (HITS)

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Abstract. Honda International Technical School (HITS) is a vocational college for automotive design & engineering established in 1976 by Mr. Soichiro Honda, the founder of HONDA Motor Co., Ltd. We recently started the educational course including basic robot technology in our school program and decided to participate in the humanoid league of RoboCup 2003 Padova with our humanoid named "Firstep".

1. Introduction

Fig. 1 Firstep.

Firstep is named after "first step" and based on a prototype version of famous humanoid robot "ASIMO" manufactured by HONDA.

For over 10 years, HONDA has been researching the biped walking humanoid robot as the challenge to a new field of mobility. In 2000, HONDA developed the primary model of "ASIMO" named after "Advanced Step in Innovative Mobility". Through the research of ASIMO, HONDA developed a new walking technology, "behavior prediction system" i.e. the robot can freely and smoothly change his walking motion without intermission.

After the success of ASIMO's demonstration at the first humanoid league in the RoboCup 2002, HONDA decided to provide one of prototypes for HITS as an educational platform in order to enable us to learn the basic humanoid technology and cultivate the "challenging sprits" for the new technology.

As ASIMO is a mass of HONDA's confidential new technologies, HONDA R&D has never allowed the outside party to directly treat ASIMO. Therefore, we can say that it is very first case that ASIMO's technology is partly opened for the outside party.

2. Firststep's physical ability

Firstep's height is 125 cm and weigh 50kg, with so-called "26 degrees of freedom" two for head, six for each arm and six per leg. He is powered by 38V/10AH Ni-NH cell and needs 100V AC /15A outlet for charge the cell and operation.

Fig. 2. Kick while walking.

He can walk at approx. 1.5km/h speed as maximum. His actuator is servomotor with harmonic speed reducer and his face is made by a PC monitor to indicate what his thinks and his expression. That is the biggest difference from ASIMO in his appearance. His operation is directed from a workstation or wireless handy controller. He can kick a ball while he is walking.

3. HITS dream team

"HITS Dream Team" is composed of the selected 4students and 2 teachers belong to the System Engineering Department. We received ASIMO from HONDA in this February and have been working so hard to modify into since then. Through the challenge of the RoboCup, we aim at reminding our "HONDA Challenge Sprits" and contributing to the research of humanoids. In addition, we consider the communication with the worldwide robotics researchers at the event is very fruitful for the young students not only for the technical exchange, but also for opening a new vista.