

Research on Carved Turns of a Skiing Humanoid Robot on a Real-World Slope *

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Abstract— Humans play sports to improve their athletic ability. The robot, especially humanoid robot, is also able to improve its athletic performances, such as reaction speed and balancing, through robot sports. Therefore, robots have been developed through performing various robot sports events such as robot soccer, robot marathon, robot fight and so on. In this reason, The Ski Robot Challenge was held in South Korea in commemoration of the PyeongChang 2018 Winter Olympic Games. The event was an Alpine slalom skiing competition in the almost same rules to human's but on a relatively short course (80m).

To participate in this ski tournament, the skiing robot DIANA has been developed. In this video, the skiing robot technologies were introduced. At first, she must be able to recognize the flags. The deep learning method was used to recognize them. Secondly, she had a motion pattern to perform the carving turn, the most difficult and fastest skiing technique. In order to improve the stability, she compensated her motion to follow reference COP, based on the measured F/T sensor data. In addition, IMU sensor was used to remove instantaneous disturbance. Using these methods, the humanoid robot, DIANA, that can perform the carved turn on a real-world slope was successfully developed.



Figure 2. Skiing Humanoid Robot, DIANA



Figure 1. The Ski Slope where the Ski Robot Challenge was held



Figure 3. DIANA on skiing with Carving Technique

* This work was supported by Korea Evaluation Institute of Industrial Technology (KEIT) grant funded by the Korea government.

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