

Development of Real-Time Detecting Sensor for Amphibian Migration to Prevent Its Road-Kill on Pavement Road

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Abstract :

According to the development of a city, many linear roads are constructed and these kinds of the roads would divide the ecosystem into several pieces. In a fragmented ecosystem, animals cross roads during their activity to survive, which is induced road-kill by unfortunate accident. In the spawning season, amphibians move from their habitat to spawner. In order to ensure safe migration of amphibians, eco-ducts are installed under the roads. However, due to the lack of technology which induces the amphibians to enter into the eco-duct, and due to the difficulty of ecological analysis of amphibian migration, it is impossible to prevent road-kill.

This study develops the real-time amphibian movement detection sensor, which enables for people to detect amphibians and can avoid road-kill. Based on 'Raspberry Pi', a type of low-priced computer board, the sensor used object detection technology in real-time to detect amphibian moving on the road. If an moving object is judged to be an amphibian, it is designed to display a sign board message informing that an amphibian is moving on the road. Also, when the sensor detects the amphibian, people can recognize easily its location by turning on LED lamp.This research was supported by a grant (12-TI-C02) from Advanced Water Management Research Program funded by Ministry of Land, Infrastructure and Transport of Korean government.

Key Words : amphibians migration; road-kill; habitat; spawner; Raspberry Pi

References

[1] Cyganek, S.B.; Boguslaw, R.D. Object detection and recognition in digital images: Theory and Practice, John Wiley & Sons, Ltd: Chichester, UK, 2013; pp. 151168.

[2] Frank Seebacher; Ross A. Alford. Shelter Micro-habitats Determine Body Temperature and Dehydration Rates of a Terrestrial Amphibian. Journal of Herpetology 2002, 36, 1, 69-75.

[3] Hey, R.D. Mathematical models of channel morphology John Wiley & Sons Ltd: Chichester, UK, 2015; pp. 125130.

[4] Hey, R.D.; Newson, M.D. Applied Fluvial Geomorphology for River Engineering and Management, John Wiley & Sons Ltd: Chichester, UK, 1996; pp. 3842.

[5] Lee, C.S.; Cho, Y.C.; Shin, H.C.; Park, S.A. Differences between Sand and Gravel Bars of Streams in Patterns of Vegetation Succession, Journal Ecological Field Biology, 2009, 32, 1, 55-60.

[6] Niezgoda, S.L.; West, T.S. Stream restoration design discharge for snowmelt dominated stream, Proceedings of World Environmental and Water Resources Congress, 2007, 2, 126-130.

[7] Soar, P.J. Channel restoration design for meandering rivers. Ph. D. Thesis, University of Nottingham, Nottingham, 2000, UK.