HUMAN ACTIVITY CALORIES CONSUMPTION CALCULATION BASED ON SKELETON DETECTION

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ABSTRACT

Statistically, obese people are three times more likely to have dyslipidaemia, diabetes and metabolic syndrome, and twice as likely to have osteoarthritis of the knee, high blood pressure, gout and cardiovascular disease as the average person. While the calorie content of a food product can be determined from its nutritional label, there is no way of knowing the calorie consumption corresponding to the different activities in life in order to maintain a calorie balance. Although calculations can be made using wearable sensor devices such as smart watches or smart phones, the sensors on these devices are mainly accelerometers, gyroscopes and magnetometers, which do not allow a clear breakdown of each activity and therefore cannot calculate the corresponding amount of calories consumed for a particular activity. This study therefore reviews previous research on human activity heat expenditure and proposes a robust, non-contact method of identifying human activity that does not require any sensor device to be worn or carried, but only requires an image to calculate the corresponding amount of heat consumed by different actions. In this study, human activity recognition is used to replace the traditional sensor function, and the continuous motion features of the human body in the image are obtained by the Open Pose posture model. These continuous features are categorised by Convolutional Neural Networks and Long Short-Term Memory, and the Metabolic Equivalent of Task is used to calculate the corresponding amount of heat consumed for each movement.

Keywords: Human Pose Estimation, Deep learning, Computer vision, Calorie consumption, Human activity recognition, Metabolic equivalent of task.