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Image Processing-Based Flood Detection

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Abstract This paper discusses about the design of an online flood detection and early warning system which integrated to using Raspberry-PI and optical sensor. Raspberry-PI is a single board of computer which in this case we design as an image processor to process image obtained from the webcam and update the result to the twitter. This research can help some of the citizens who live near the river to get the updated information regarding water conditions and the possibility of flooding so that they can take action to secure their properties and families as soon as possible. We use OpenCV as an image processing application. The steps are as follows: (1) Region of Interest to create a portion of an image to filter or perform some other operation. (2) Brightness and contrast adjustment in order to get brighter and better image before the next process. (3) Grayscale and threshold to create segmentation object with Otsu-thresholding. (4) Edge detection algorithm to find edge points on a roughly horizontal water line and riverbank height. By using the above method, the system can read and monitor the water level of a river or other water bodies. If the water level exceeds the specific threshold, the system will generate notification as early warning for the possibility of flooding by uploading the text and image to the twitter regarding that condition. The citizens will get the information if they follow that account (early warning system) on Twitter. The result of this simulation using prototype that we have made is that the system can read the water conditions with an increase in accuracy reaching 99.6%.

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