Every picture tells a story: predicting river levels & flooding

Strensham Lock, Worcestershire

Summary

Farson Digital Ltd and the DARE project partnered to provide a proof-of-concept use of high-definition river cameras as a new source of information on river levels. An open dataset was created of river levels for the Tewkesbury floods of 2012 as additional information for flood case studies and for validation of future automated river camera algorithms.

Why?

Farson Digital Watercams are a network of digital cameras which broadcast live from the UK's waterways. Whilst the pictures are of regular interest to a range of river users, the cameras can also provide essential impact and safety information in flood events. This research explored the derivation of water levels from camera images. This type of quantitative information is valuable for forecasters, emergency services and locals alike.

How?

Water level data was determined from images taken by four cameras on the Avon and Severn during the Tewkesbury flood event of 2012, including Strensham Lock (picture top right). River gauges were used for validation of the hourly water levels. One challenge was to use the correct coordinate system to measure the three-dimensional positions of items in the field-of-view of the camera, such as the top and bottom of buildings. The method used GPS digital surveying equipment. Another significant challenge was the concealment of water level reference points in the picture as the flood worsened.

What now?

This assessment of the Tewkesbury flooding produced useful observations of the water levels rising, peaking and receding with an accuracy of approximately a centimetre. The data, including extraction and analysis methods have been published for wider use. The flooding research partnership continues between DARE and Farson Digital, where we are working on greater automation of the extraction of information from the images. Visit the Farson Digital website for more on their services, including live water cameras.

Reference

Vetra-Carvalho, S., et al., Vetra-Carvalho, S., et al., Collection and extraction of water level information from a digital river camera image dataset, Data in Brief, Volume 33, 2020; https://doi.org/10.1016/j.dib.2020.106338

The DARE project aims to produce a step-change in the skill of forecasts of urban natural hazards by combining novel observations with data from state-of-the-art computer models.

Our work investigates the best way to include observations in the forecasting process.

This is one of a series of accessible summaries translating DARE projects to a wider audience, enabling the take-up and real-world application of the UK's world-leading research. See more at https://research.reading.ac.uk/dare/whywhatnow/

University of Reading

Further information
For more examples of flood research activities by the DARE team, see the blogs on the website.

Contact Sarah Dance

s.l.dance@reading.ac.uk