

# FishNET

## Automating the Fish Doorbell

Putting this guy to work while making grandpa obsolete

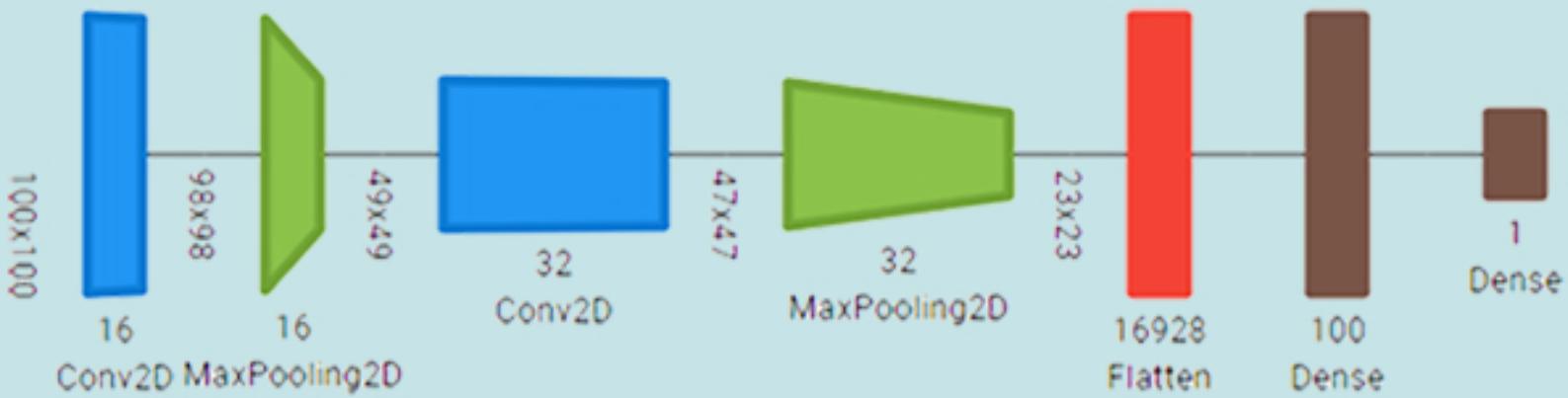
Manager of the Weerdsluis in Utrecht



The fishdoorbell

### Data annotation

In 2-3 days, we collected pictures of over 7000 potential fishes, of which we manually annotated around 2500. We distinguish 2 classes: fish (30%) and no-fish (70%), images that are unclear are ignored.



### The model

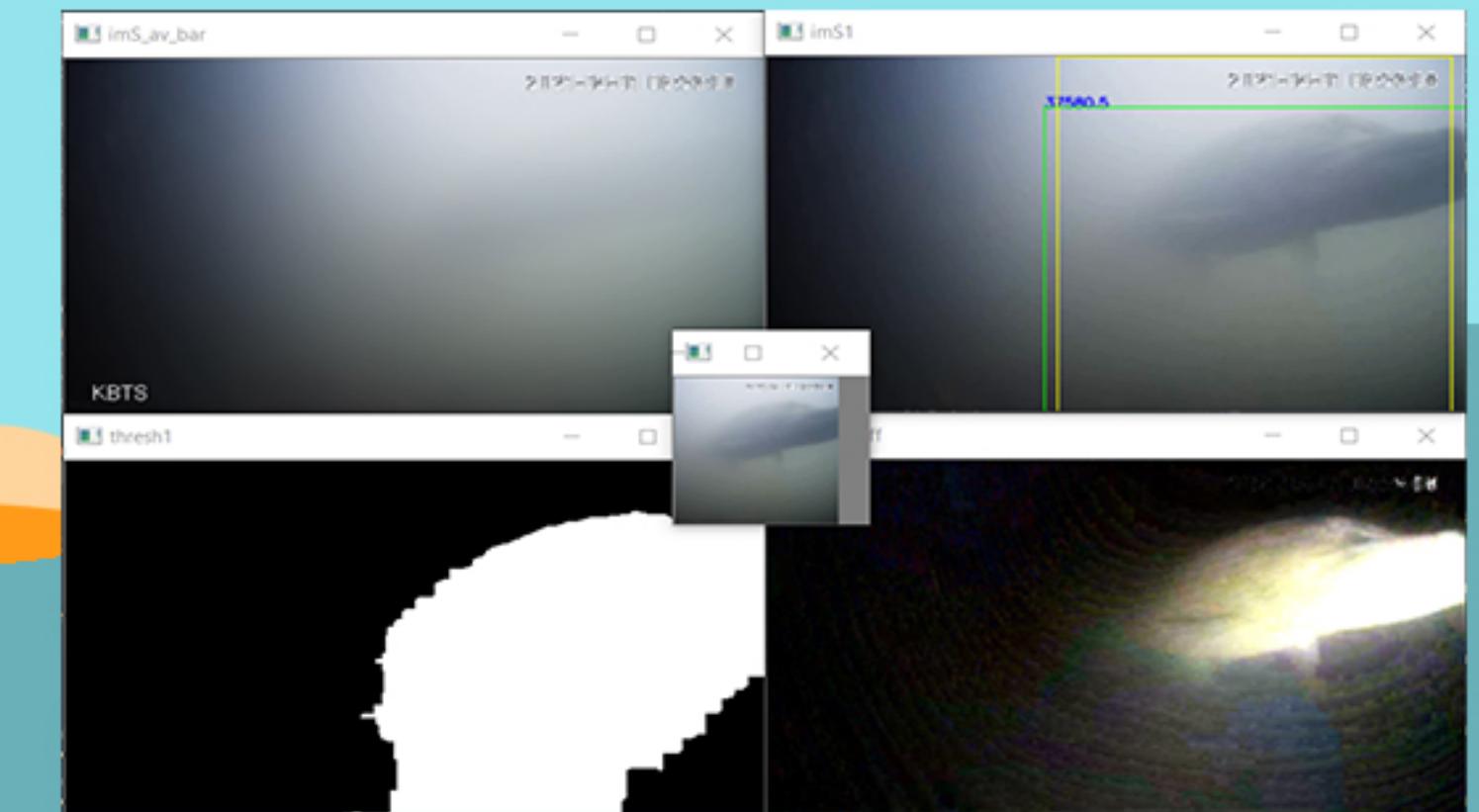
The model should be able to run in real-time in order to work with the livestream. We opted to use a simple CNN for binary fish classification. In testing we found that adding more layers did not have a significant positive effect.

### What is the Fish Doorbell?

Many different fish species travel vast distances every year to reach their breeding grounds. This journey is becoming harder every day due to obstacles in the rivers, such as water locks. The Weerdsluis in Utrecht is one of these water locks placed along a popular route for migrating fish. In order to raise awareness an initiative was launched together with the municipality of Utrecht: The Fish Doorbell. Here, citizens of Utrecht and beyond could watch a livestream of the waters at the lock, and 'ring' a bell if they spotted a fish. The lock could then be opened to let any waiting fish through. The initiative quickly went viral and the doorbell is pressed over 100.000 times. We aim to automate the Fish Doorbell to make it more efficient. We hope to make it possible to install more automated fishdoorbells so more fish can reach their breeding grounds!

### Data collection

We read the livestream and use an exponential moving average to obtain a background image, followed by background subtraction and amplification. If a threshold is reached and the fish is in frame for more than 20 frames, 2 pictures are taken and resized to 100x100 pixels.



### The result

After training, the model reached a consistent 93% accuracy on the validation set. This result is satisfactory. Combined with some instance tracking when implemented on the livestream, we suspect to be able to reach an accuracy of over 98%. Sadly the livestream went down a few days before we could start testing, putting an end to the project. See you back in 2022!