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Machine learning and synthetic aperture refocusing approach for more accurate masking of fish bodies in 3D PIV data LOGAN FORD, ABHISHEK BAJPAYEE, ALEXANDRA TECHET, Massachusetts Inst of Tech-MIT — 3D particle image velocimetry (PIV) is becoming a popular technique to study biological flows. PIV images that contain fish or other animals around which flow is being studied, need to be appropriately masked in order to remove the animal body from the 3D reconstructed volumes prior to calculating particle displacement vectors. Presented here is a machine learning and synthetic aperture (SA) refocusing based approach for more accurate masking of fish from reconstructed intensity fields for 3D PIV purposes. Using prior knowledge about the 3D shape and appearance of the fish along with SA refocused images at arbitrarily oriented focal planes, the location and orientation of a fish in a reconstructed volume can be accurately determined. Once the location and orientation of a fish in a volume is determined, it can be masked out.

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