Automatic analysis of animal and insect behaviour using computer vision techniques is a growing research area with many interesting studies. The traditional way of analyzing the behaviour of animals is by visual inspection of human observers which is very time consuming and also limits the size of data that can be processed. In this study, we present a novel framework for abnormal behaviour detection and especially focus on fish trajectories. Fish behaviour analysis is a fundamental research area in marine biology as it is helpful to detect environmental changes by detecting abnormal fish patterns and to detect new behaviours of fish. Detecting abnormal trajectories is useful when the system does not have any prior knowledge about the data which especially happens in the real-world data due to the uncontrolled naturalness.

When we compare fish trajectory datasets from underwater videos with the other abnormal behaviour detection datasets (traffic surveillance, human abnormal trajectory detection etc.), there are certain differences:

- Fish in the open sea can freely move in 3 dimensions hence there are no defined rules or roads such as exist in a traffic surveillance scenario.
- Fish are not goal-oriented which produces highly complex trajectories in contrast to people or vehicles.
- Fish usually make erratic movements due to currents in the water which increases the complexity of trajectories and also makes encoding the behaviour more difficult than is in human or animal behaviour recognition.

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