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Enhanced Feature Descriptors for Detection of Underwater Objects

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ABSTRACT
The research paper focuses on identifying an object of underwater using feature set approach. The features extracted from an image are used as a reference to identify objects of videos. Enhanced Speeded up Robust Features are used for extraction of features from a reference image. The reference image may contain objects of different orientations, which are addressed with improvised Speeded up Robust Features Algorithm. The robust features extracted from a reference image are identified using the scaling and rotation techniques of objects inter-operation. The objects in reference image may be smaller or bigger or the objects of reference image may be oriented with different angles are extracted with interest points using Enhanced Speeded-Up Robust Features. This Enhanced Speeded-Up Robust Features helps in identifying the interest points between a reference image and a target image. Further, the representation of image helps in searching the matching points between reference and target image. This process is repeated for all frames of a video using iterative operations as such the iterative operations takes place between a reference image consisting of objects and the sequence of frames of a video. Thus, it helps in identifying the feature points in videos.

Keywords – Enhanced SURF, Feature Descriptor, Feature points, Orientation, Scaling of Objects

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I. INTRODUCTION

The importance of this research article can be visualized with the help of various features descriptors. Among all these feature descriptions, the specialized features descriptor plays a vital role in detecting any of the objects. If the features descriptions are not robust, the objects cannot be determined or detected. We are addressing the problem of identifying the features of an image or videos based on the information extracted using the feature descriptions.

The features obtained from the feature descriptors helps in detecting the objects of an image or videos. Further, the objects are identified using either Feature Descriptors or Feature Discriminators. The feature discriminators are used for differentiating the features of original image with the target image, where the object is to be detected. The Objects in target image may seem different, when the objects are merged in water, the size of object in real-time may vary when an object is immersed in water. Thus we need to address the problem of scaling. Further, when an object is dropped into water the object may be seem like different angles. Thus, we require a mechanism which addresses the problem of scaling of objects and different angles of orientation. We require a mechanism to identify the objects of underwater.

The underwater objects can be detected by addressing various challenges like scaling, orientation. The scaling of objects takes place immediately when an object is dropped into a water, that is, when an object is dropped into a water the size of an object changes, so we have employed a mechanism of proposed featured descriptors called Enhanced Speeded-Up Robust Features, which takes the challenge of identifying the objects even when the size of an object in target video is smaller or bigger than the original objects. While dropping an object into water, the object changes its orientation from original image considered as a reference image. Thus, we are addressing the two challenges of object identification like scaling and orientation.

II. RELATED WORK

The research article [6] focuses on finding objects of an image from target image based on the principle of SURF. Further, the research article [10] introduces a feature descriptor like SIFT, which does the task of identifying an object in an image.

The research article [13] as introduced a new methodology of feature discriminators, which does the task of discriminating an objects of an image from a reference image and target frames of a videos. The author of the research article [12] also presented how the details of feature

information set can be extracted based on the information content of the target image.

The research article [15] has discussed the importance of identifying underwater objects, as it is most essential in real time applications involving identification of objects, when an object is fallen into water. The objects must be identified. This helps in detecting an object in real time scenarios. The research article [17] has presented the approaches of describing an object when an object is scaled with different orientations. Further the article has focused on detecting an object, when in target image or video has an object of the type of reference image.

III. PROPOSED METHOD

The features represented by the feature descriptors helps in detecting the objects of an image or videos. The objects are identified using either Feature Descriptors or Feature Discriminators. The feature descriptor has yielded good results over other feature discriminators. As we are interested to determine an objects in target image based on the information gathered from a reference image. Further the proposed enhanced Speeded-Up Robust Features has described 300 feature points over an image of a dataset. The dataset may contain some information of objects in different scaling and orientations. However, the objects are identified

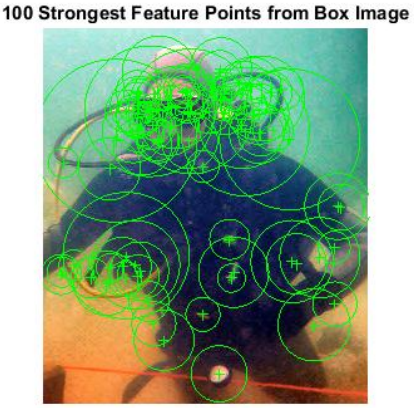

Fig.1. The proposed method over a dataset in reference image with 100 features set extracted. with some interest points identified from a reference image.

The information gathered from a reference image is searched against the target sequence of video frames, which helps in identifying objects in videos of underwater.

The underwater objects can be detected by addressing various challenges like scaling, orientation. The scaling of objects takes place immediately when an object is dropped into a water, that is, when an object is dropped into a water the size of an object changes, so we have employed a mechanism of proposed featured descriptors called Enhanced Speeded-Up Robust Features, which takes the challenge of identifying the objects even when the size of an object in target video is smaller or bigger than the original objects. While dropping an object into water, the object changes its orientation from original image considered as a reference image. Thus, we are addressing the two challenges of object identification like scaling and orientation.

Fig.2. The proposed method assessed with 300 strongest feature points extracted from a target sequence of frames of a video.

IV. FEATURE MATCHING

The feature matching is done by searching feature information of reference image with reference to the sequence of frames of videos, which is a target video. The search operation is carried out with the help of nearest neighbor of an object. The object means, the intended object to be searched in the target sequence of video frames. The sequence of frames of a video may contain objects of interest or not, such frames must be addressed with finding the distance of the objects in reference image with the objects of the sequence of frames of a video.

V. RESULTS AND ANALYSIS

The results of the proposed method have been assessed to measure the accuracy of the proposed method on a real time videos and the robustness in detecting an objects of a video. If the proposed method has shown its significant information of identifying an object of other related objects present in a video.

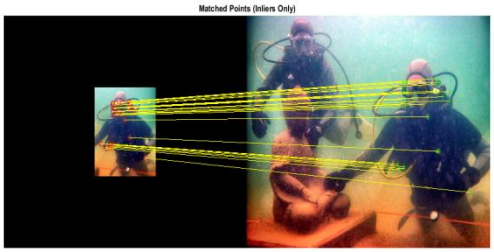

Fig.3. Matched feature points between a reference image and a target sequence of frame of a video.

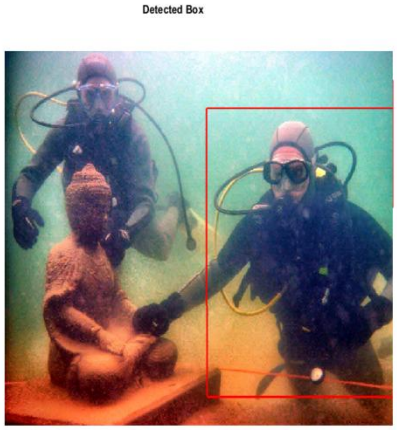

Fig.4. Matched feature points assessment in detecting underwater objects of a video.

Fig.5. The detected objects and its reference image in a single frame.

VI. CONCLUSION

The contribution of this research article is to detect objects of underwater; the objects of underwater may be visible on some situations and may not be visible on some situations due to some discrepancies like low intensity in captured images. Thus, we have defined an objective to identify the objects of underwater.

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