Introduction

--dev-tools:

-- annotation_tools

This project is written by C# and can be opened up by VS2012.

-- database_tools

HRSC2016 dataset can also be saved in database. People can annotate images by cooperation online. However, you need to develop a web-based annotation tool.

-- dataset_load_tools

--C++

--Matlab

--Python

-- evaluate_tools

Tools for evaluation ship recognition experiments.

--HRSC2016:

--SOA_Results:

We welcome all the people to add their experimental results here.

--"srbbs_data":

Detection results of method in "Ship Rotated Bounding Box Space for Ship Extraction From High-Resolution Optical Satellite Images With Complex Backgrounds"

--"SRBBS-Fast-RCNN(BL1)":

Recognition results of method of BL1 in "A High Resolution Optical Satellite Image Dataset for Ship Recognition and Some New Baselines" which has been accepted by 6th International Conference on Pattern Recognition Application and Methods(ICPRAM 2017).

--"SRBBS-Fast-RCNN-R(BL2)":

Recognition results of method of BL2 in "A High Resolution Optical Satellite Image Dataset for Ship Recognition and Some New Baselines" which has been accepted by 6th International Conference on Pattern Recognition Application and Methods(ICPRAM 2017).

--State-Of-The-Art-Codes:

We welcome all the people to add their source codes here.

---"SplitSeaLand_SOA":

The code are written in C++. The project can be opened up by VS2012. These source codes are the implementation of base line methods for sea-land separation including OTSU, You's method, Liu's method, Tang's method in the paper of "A High Resolution Optical Satellite Image Dataset for Ship Recognition and Some New Baselines" which has been accepted by 6th International Conference on Pattern Recognition Application and Methods(ICPRAM 2017).

1. HRSC2016

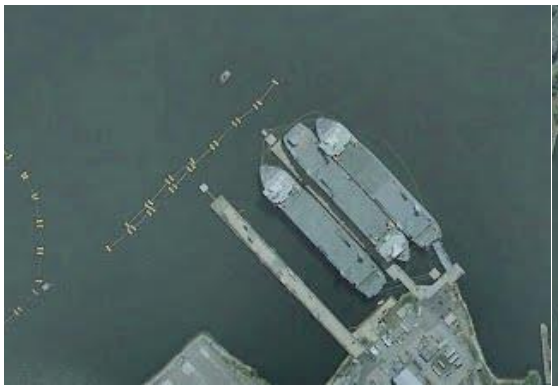
High resolution ship collections 2016 (HRSC2016) is a data set used for scientific research. Currently, all of the images in HRSC2016 were collected from Google Earth. Now you can download our dataset here. But all the pictures here can only be used for scientific research.

a) Introduction

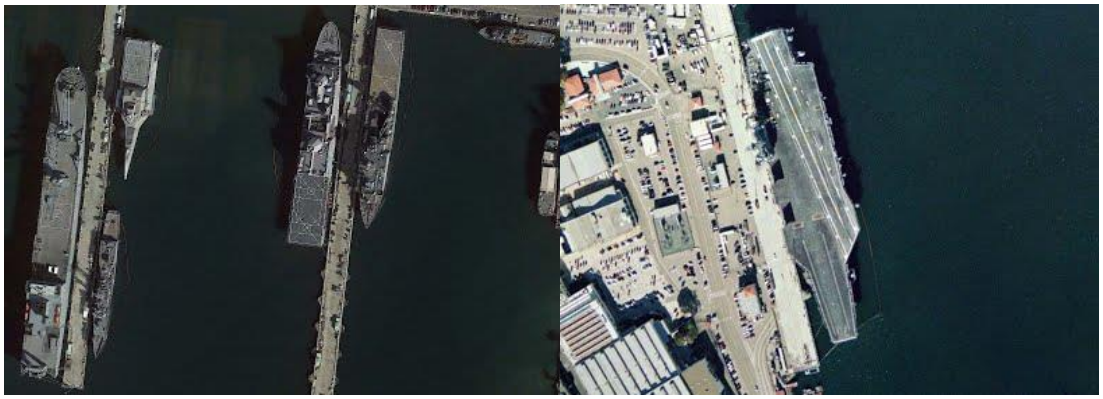
We call our dataset “High Resolution Ship Collection 2016”(HRSC2016). The HRSC2016 dataset contains images from two scenarios including ships on sea and ships close inshore. All the images are collected from six famous harbors. We not only collected the default images shown by Google Earth, but also downloaded the history images in the same place. The image resolutions are between 2-m and 0.4-m. The image sizes range from 300*300 to 1500*900 and most of them are larger than 1000*600.

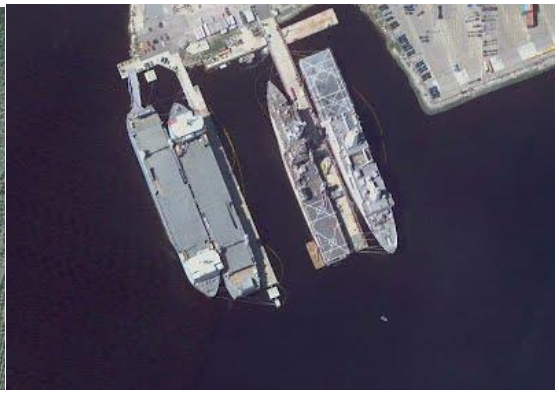
The detail introduction can be seen in the paper "A High Resolution Optical Satellite Image Dataset for Ship Recognition and Some New Baselines" which has been accepted by 6th International Conference on Pattern Recognition Application and Methods(ICPRAM 2017).

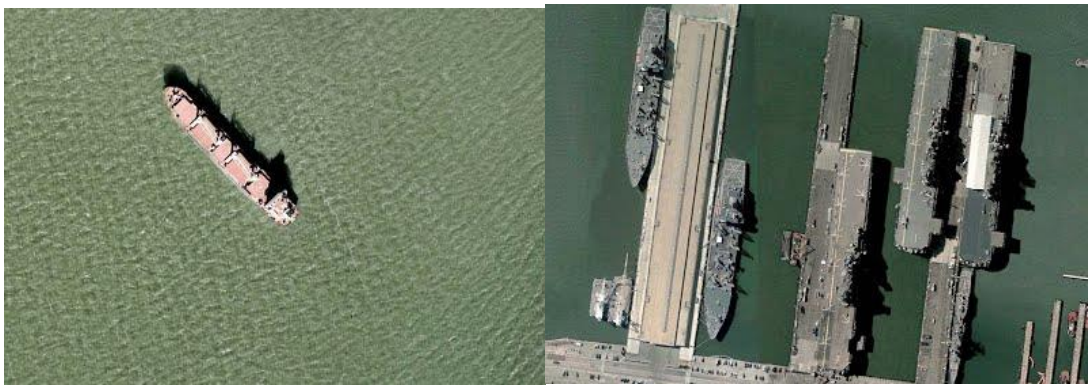
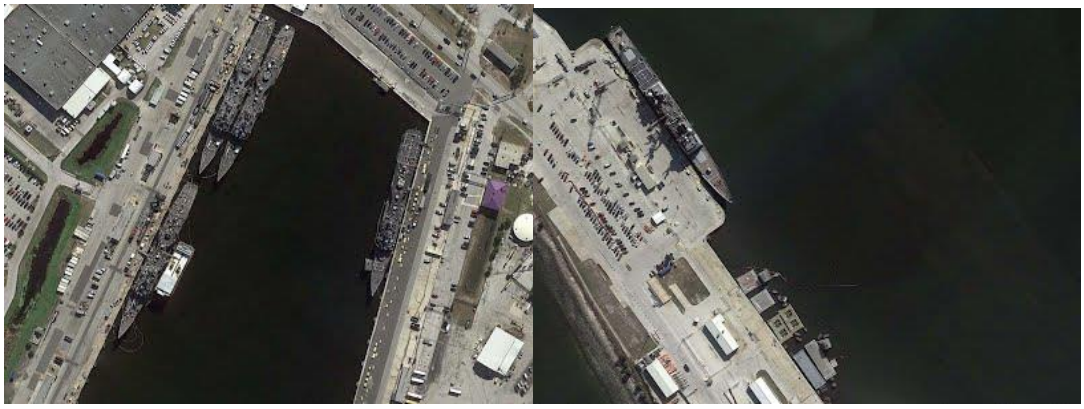
b) Samples of “train-val” set.

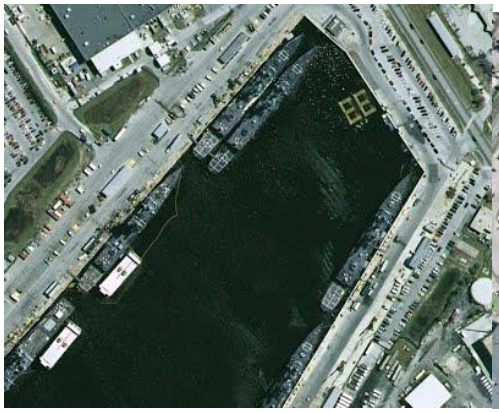
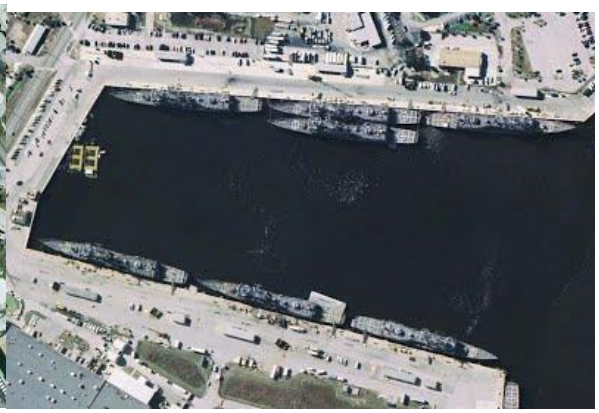


c) Samples of “test” set.





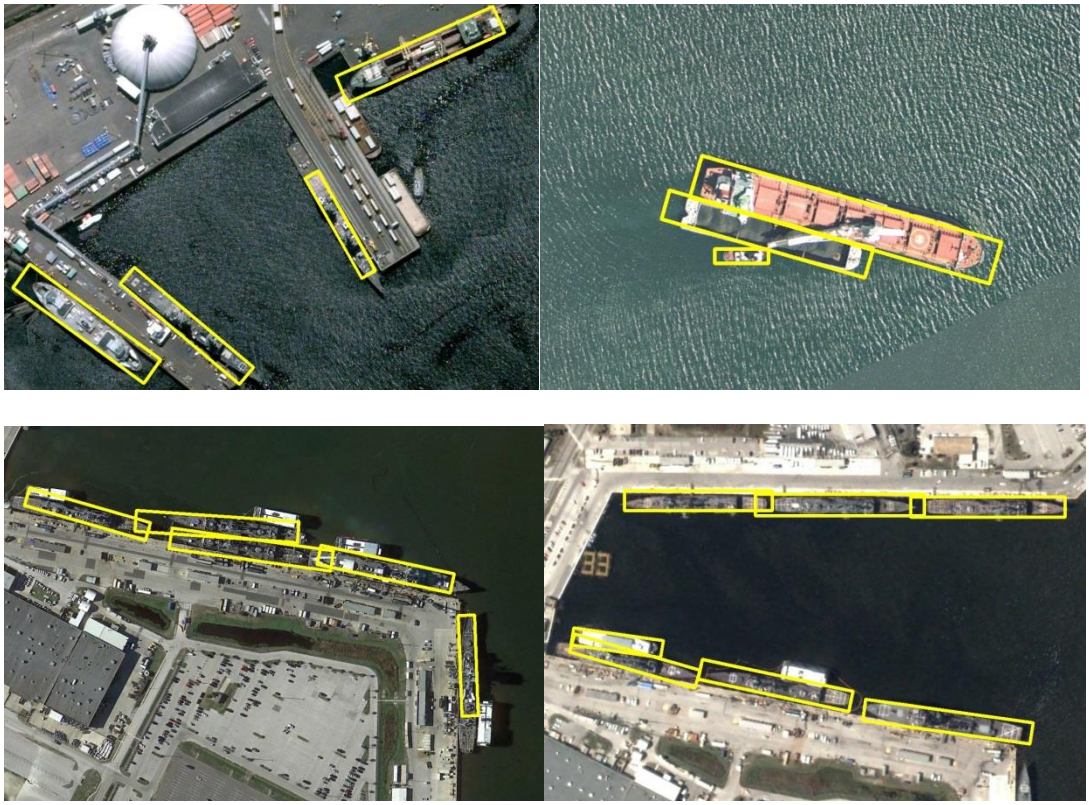



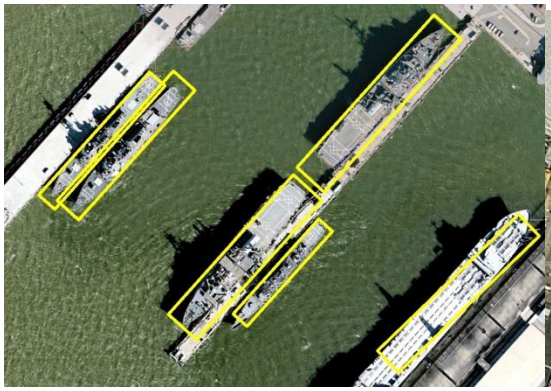
2. Results of SRBBS method

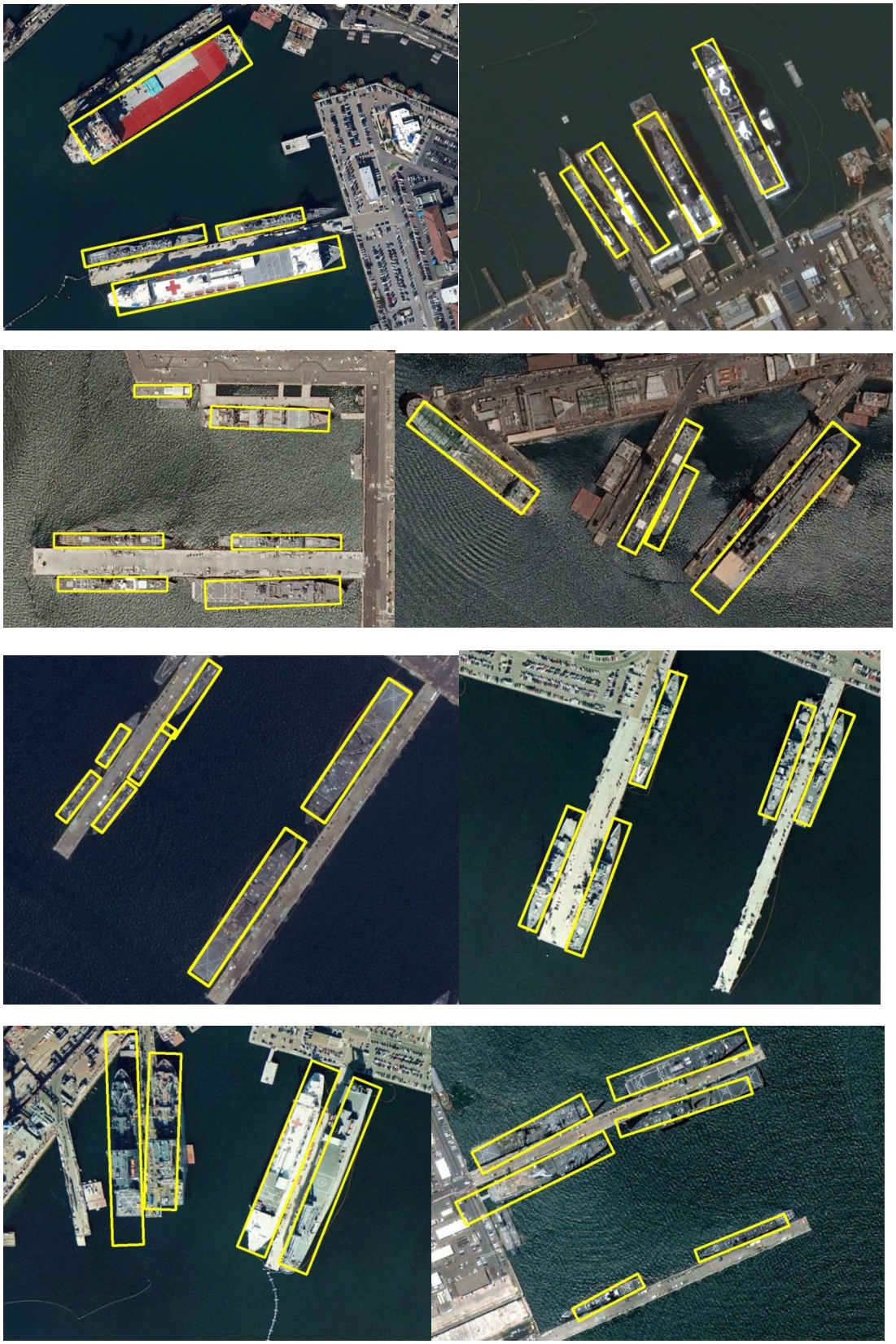
a) Samples of detection results.

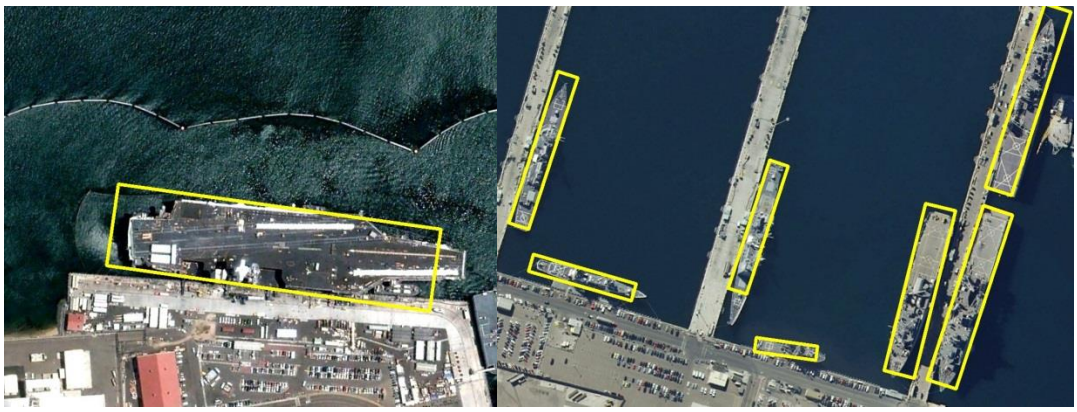
We list samples of experiment result of our work "Liu Z, Wang H, Weng L, et al. Ship Rotated Bounding Box Space for Ship Extraction From High-Resolution Optical Satellite Images With Complex Backgrounds[J]. GRSL, 2016."

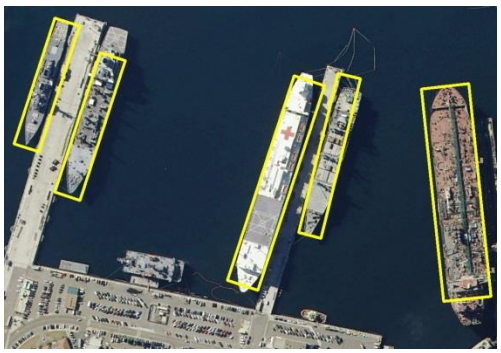
The best fitness in 5000 candidates was drawn in each image.











b) Comparision.

References:

[S1] Tang J, Deng C, Huang G B, et al. Compressed-domain ship detection on spaceborne optical image using deep neural network and extreme learning machine[J]. Geoscience and Remote Sensing, IEEE Transactions on, 2015, 53(3): 1174-1185.

[S2] You X, Li W. A sea-land segmentation scheme based on statistical model of sea[C]//Image and Signal Processing (CISP), 2011 4th International Congress on. IEEE, 2011, 3: 1155-1159.

[S3] Liu G, Zhang Y, Zheng X, et al. A new method on inshore ship detection in high-resolution satellite images using shape and context information[J]. Geoscience and Remote Sensing Letters, IEEE, 2014, 11(3): 617-621.

Tips: The codes of these methods are implemented by us as the authors described in the papers, but may be inconsistent with the original version. Currently, the parameters are set as the same as the ones in the papers.

We compare our method with two state-of-the-art ship detection approaches [S1],[S3] on our data set. Method in [S1](“Tang’s method”) included initial ship location, ship feature representation and classification. We only need to compare our method with initial ship location. Tang’s method was based on the method in [S2], but with improved modules. We also evaluate Tang’s method on “Sea set” which includes only sea images (28 images, 32 samples). Method in [S3]("Liu’s method") was designed for high resolution images and ship detection in harbors. It is an ideal method for comparison. However, Liu’s method extracted ships by “V” shape ship head detection. There are some ships without classical ship heads, such as: Tarawa-class amphibious assault ship, aircraft carrier and container ship etc. So we select images containing ships with “V” shape ship heads as "Head set" (247 images, 575 samples) to evaluate Liu’s method.

Experiment results are shown in the figure SRBBS_b_1.

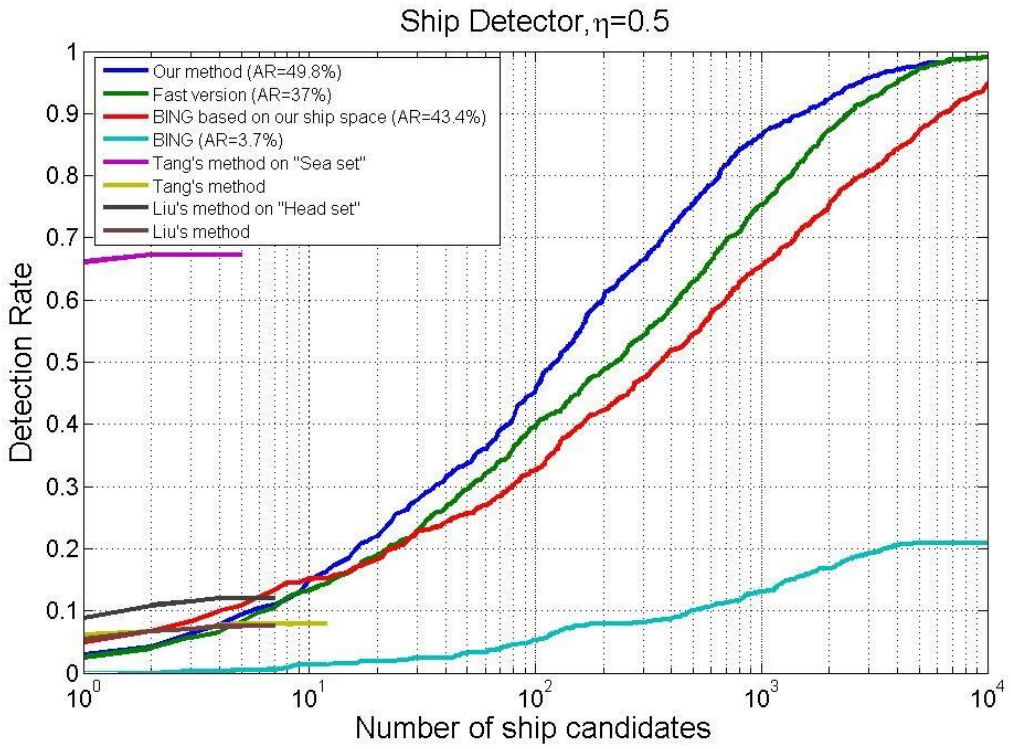


Fig. SRBBS_b_1: The comparative experimental results. Here we calculate AR using 5000 candidates.

It can be seen that both of Tang’s method and Liu’s method cannot robustly extract ships from complex background. Tang’s method achieves good detection rate (67.3%) with less than ten candidates on images with sea background. But they still cannot deal ships with complex background on sea. Examples are shown in figure SRBBS _b_2.

Fig. SRBBS_b_2.

Liu's method gets bad performance (12.1% detection rate) on "Head set" and lower detection rate on the testing set. Liu's method is hand-crafted in a step-by-step manner and has many parameters. It is difficult to balance so many parameters on our data set.

In summary, the comparative experimental results show that our method achieves best performance.