Group-wise Co-Salient Object Detection via Multi-view Self-Labeling Novel Class Discovery

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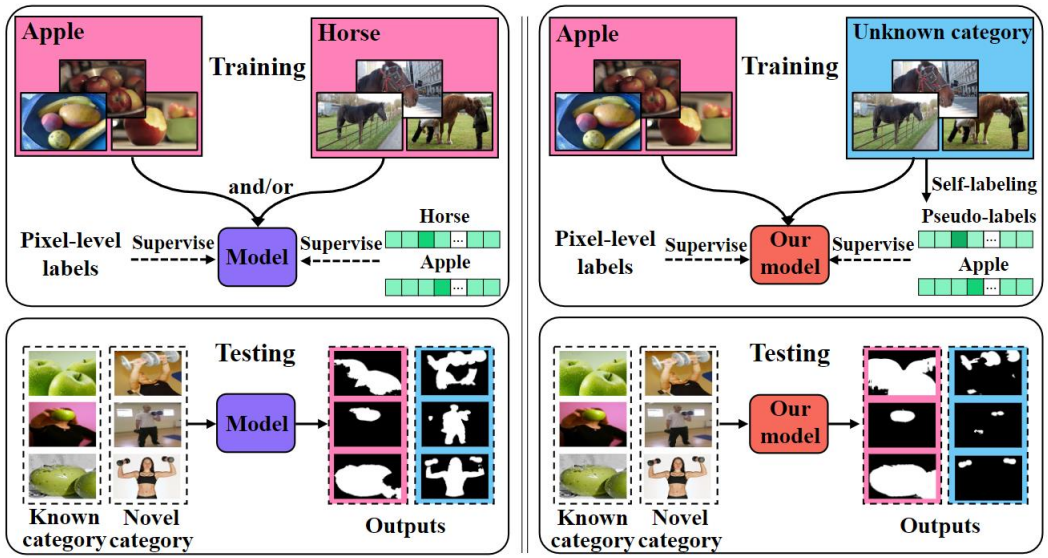
Problems & Ideas

- Problems of conventional stereo matching approaches: The dominant framework inputs one or two groups of images manually annotated with pixel-level and category labels, and then uses these supervisory signals to train a model in a supervised-learning manner. The trained model is over-fitting to the known categories that cannot generalize well on the novel categories.
- Ideas: A self-labeling NCD framework which can effectively transfer the semantic knowledge from the known category to improve clustering of the unknown category, which can generalize well to the novel category.



Main Contributions

- Contributions:
  - To the best of our knowledge, this is the first work that formulates CoSOD under the NCD framework;
  - We design an effective DRFM to learn more compact features within a group as well as design a novel GIM that swaps each group's dynamic filters to maximize inter-group separability;
  - Extensive experiments on Cosal2015, CoSOD3k, CoCA have demonstrated that our method has achieved superior performance compared to the state-of-the-arts in terms of all evaluation metrics.

Table 1: Performance comparisons of our model with other state-of-the-arts. **Bold** indicates the best and underlined indicates the second-best performance. - indicates data missing.

Methods	CoSal2015				CoSOD3k				CoCA			
	$MAE \downarrow$	$S_\alpha \uparrow$	$E_\phi^{max} \uparrow$	$F_\beta^{max} \uparrow$	$MAE \downarrow$	$S_\alpha \uparrow$	$E_\phi^{max} \uparrow$	$F_\beta^{max} \uparrow$	$MAE \downarrow$	$S_\alpha \uparrow$	$E_\phi^{max} \uparrow$	$F_\beta^{max} \uparrow$
CoEGNet(TPAMI2021)	0.077	0.836	0.882	0.832	0.092	0.762	0.825	0.736	0.106	0.612	0.717	0.493
GCoNet(CVPR2021)	0.069	0.845	0.887	0.847	0.071	0.802	0.860	0.750	0.105	0.673	0.760	0.524
CADC(ICCV2021)	0.064	**0.866**	0.906	0.862	0.096	0.801	0.840	0.759	0.132	0.681	0.744	0.548
HrSSMN(TMM2022)	0.062	0.845	0.895	0.841	0.087	0.788	0.842	0.753	0.106	0.671	0.739	0.532
DCFM(CVPR2022)	0.067	0.838	0.892	0.856	0.067	0.810	0.874	0.805	**0.085**	0.710	0.783	0.598
OURS	**0.057**	0.862	**0.912**	**0.865**	**0.063**	**0.825**	**0.883**	**0.809**	0.097	**0.719**	**0.795**	**0.605**