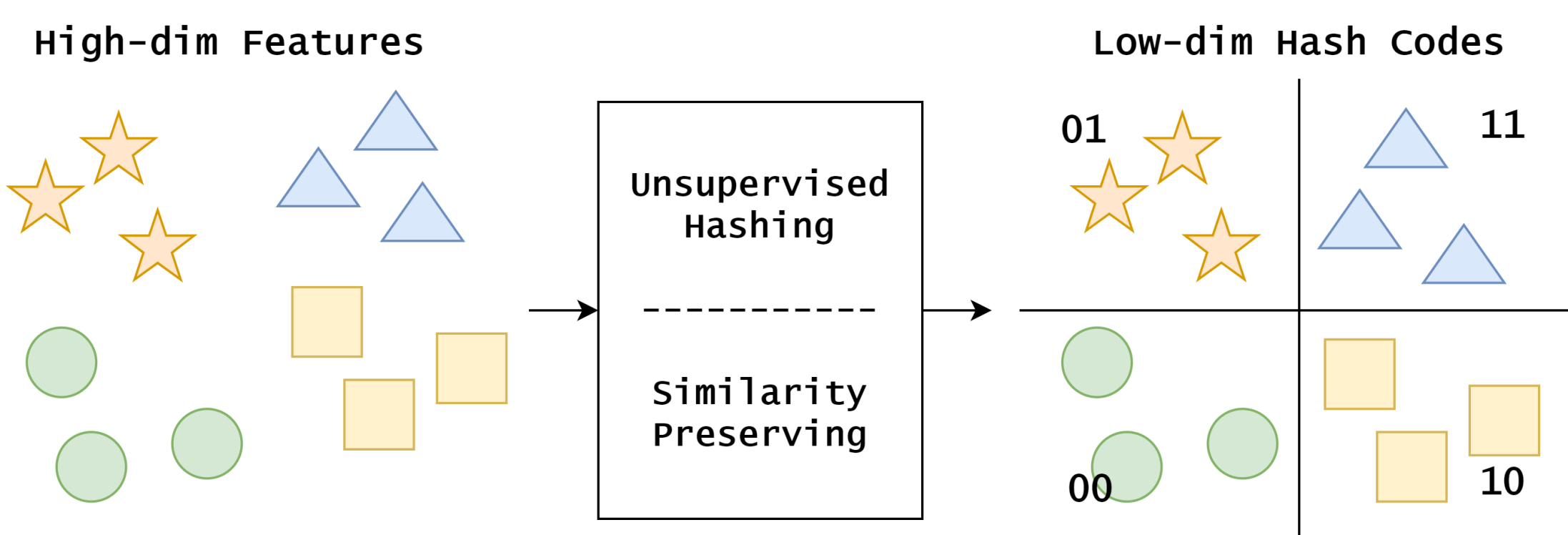
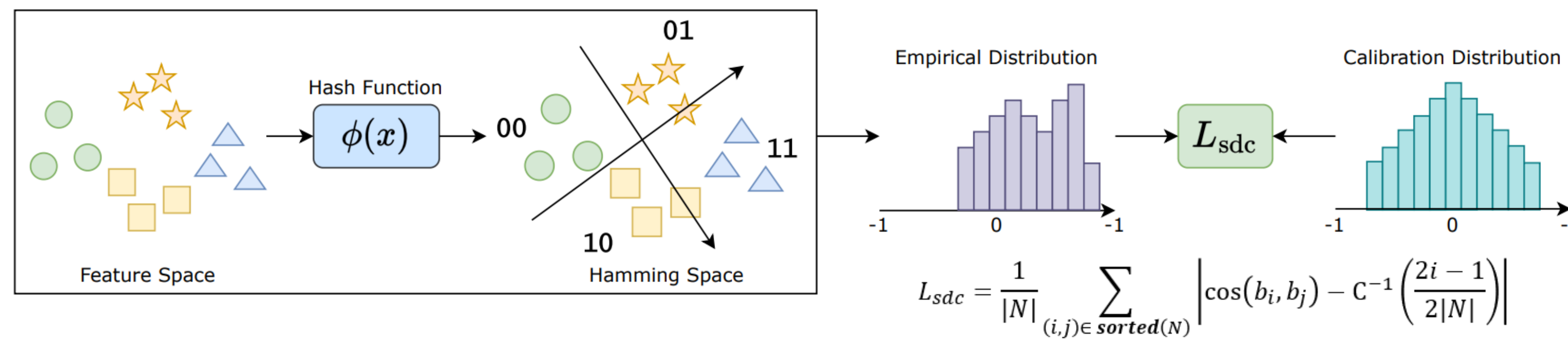




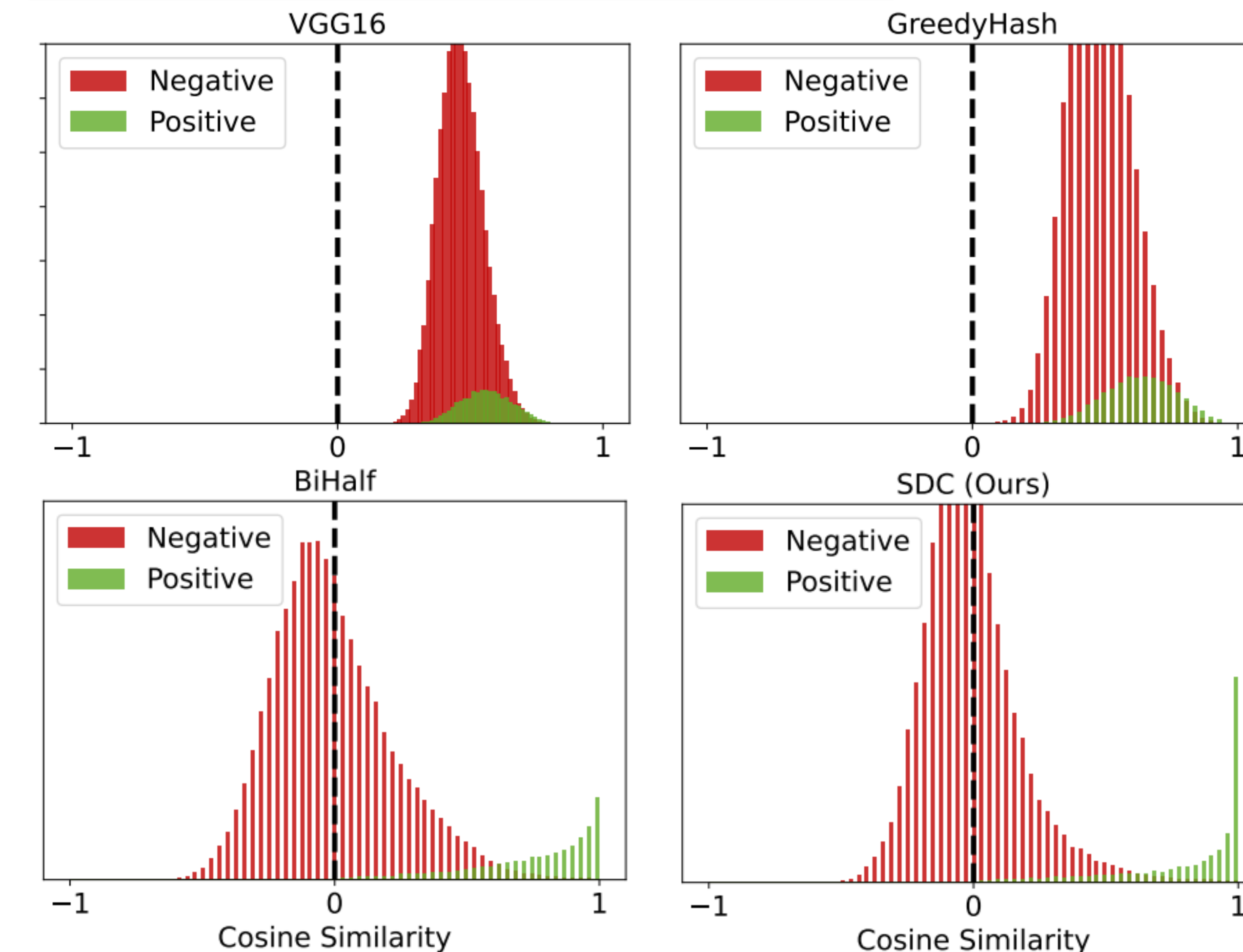
Background



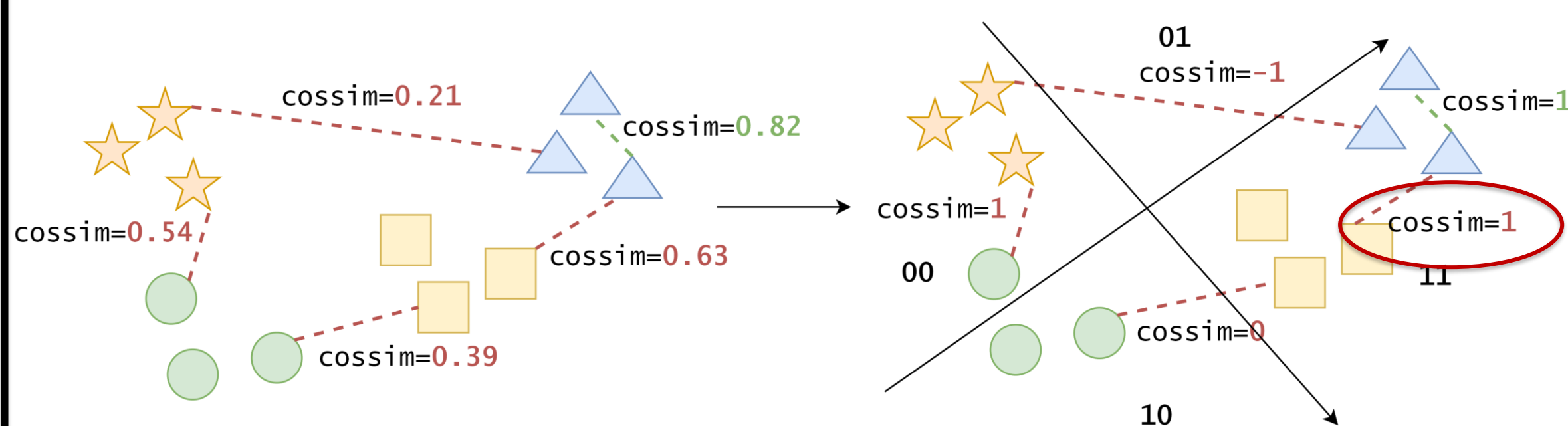
Similarity Distribution Calibration



Pairwise similarity distribution

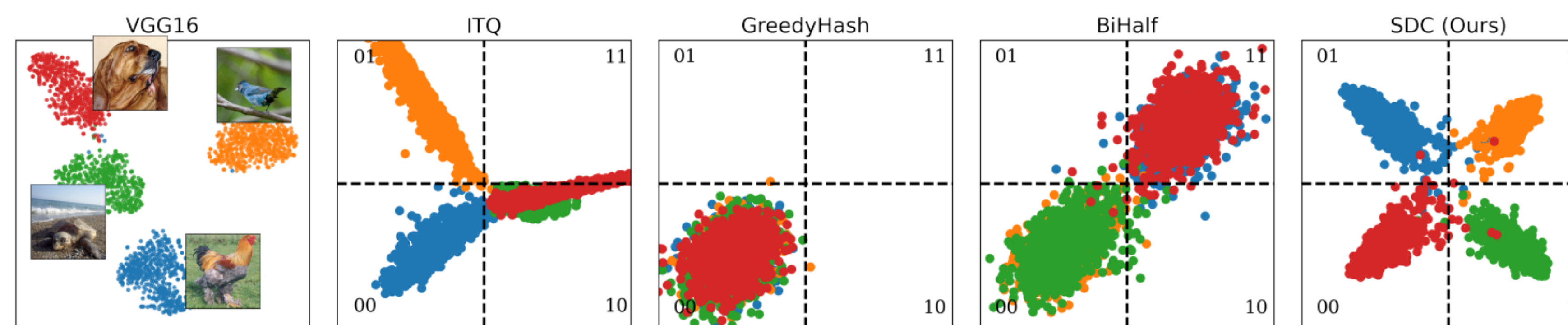


Similarity Collapsing Problem



- Similarity **collapsed** in hash codes space when we preserve the feature similarity naively.

Toy Example



Qualitative Results

Methods	Reference	CIFAR10			ImageNet100			NUSWIDE			MS-COCO		
		16	32	64	16	32	64	16	32	64	16	32	64
<i>VGG16</i>													
LsH [20]	STOC'98	23.9	29.6	37.6	14.7	29.7	48.7	51.0	59.3	67.1	45.2	51.6	59.8
SH [21]	NeurIPS'08	41.8	42.1	43.5	35.1	50.9	60.9	63.0	60.9	64.0	59.4	64.8	66.2
ITQ [22]	TPAMI'12	46.8	51.3	54.4	45.5	62.1	72.7	73.2	75.0	77.1	67.6	72.9	75.4
SSDH [23]	IJCAI'18	41.0	39.6	38.5	32.3	40.1	44.6	66.8	67.8	66.7	53.9	56.7	57.4
GreedyHash [24]	NeurIPS'18	44.9	51.9	55.7	54.4	68.7	74.7	70.0	76.2	79.3	66.8	73.2	77.4
TBH [25]	CVPR'20	48.2	50.2	50.7	42.9	44.5	48.3	75.8	77.8	78.5	68.8	72.6	74.8
CIBHash† [26]	IJCAI'21	56.2	59.2	61.2	63.9	71.4	74.6	77.1	79.7	80.9	73.3	77.0	78.5
BiHalf [27]	AAAI'21	54.7	58.1	60.6	60.7	71.2	76.0	77.4	80.1	81.9	71.2	75.6	78.0
SDC†	Ours	59.8	64.0	66.3	72.8	78.5	80.6	80.7	82.3	83.4	76.9	79.8	81.2
<i>ResNet50</i>													
NSH† [28]	IJCAI'22	70.6*	73.3*	75.6*	-	-	-	75.8*	81.1*	82.4*	74.6*	77.4*	78.3*
SDC†	Ours	74.2	75.8	78.4	80.7	83.8	85.7	81.2	83.2	84.2	78.3	81.1	82.6
<i>ViT-B/16</i>													
WCH† [29]	ACCV'22	77.5	79.3	80.6	69.4	76.9	80.8	70.7	75.6	78.6	73.0	78.8	81.4
SDC†	Ours	87.4	88.4	89.0	76.4	82.6	84.9	81.8	83.3	84.0	79.2	83.3	84.5

Highlights

- We reveal the fundamental similarity collapse problem suffered by existing pairwise similarity preservation-based unsupervised hashing methods.
- We propose a Similarity Distribution Calibration (SDC) method by aligning the hash code similarity distribution towards a calibration distribution (e.g., beta distribution) with sufficient spread across the entire similarity range, thus alleviating similarity collapse problem.

Retrieval Example

