

Domain Adaptation for Emotion Detection from Face Expressions (Western to Pakistani Dramas & Talk Shows)

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Problem Statement

Humans have seven distinct facial emotions. Facial expression recognition algorithms have applications in healthcare, entertainment, criminal justice and more. Deep learning algorithms are efficient for facial expression classification but these algorithms demand high amount of data. Domain Adaptation can be used to address the lack of sufficient data. Right Now we don't have much data from Pakistani facial expressions. In this Project, We created dataset of Pakistani facial expressions and used domain adaptation to develop efficient facial expression classifier of Pakistani faces.

Dataset

The datasets used in this projects are CK, FER2013 are Pakistan Drama and Talk Shows(PDTS). PDTS(G2G) is collected by group G2G. CK, FER2013, PDTS contains respectively 593, 35887, 4242 images.

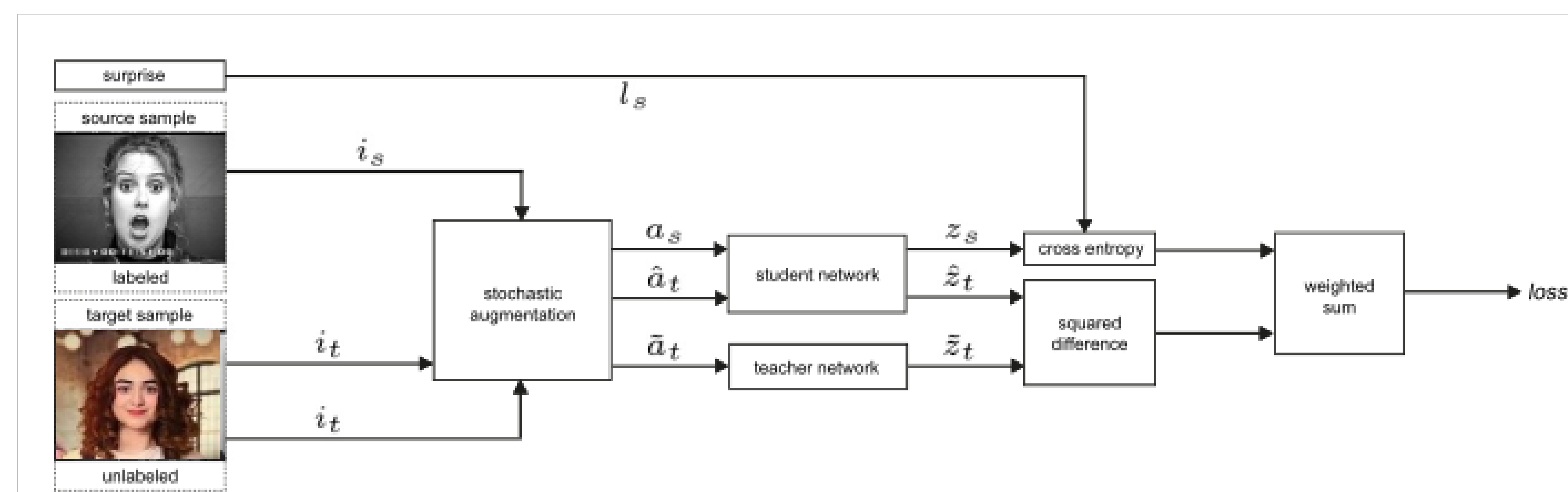


Figure 1:Self Ensembling

Dataset

Dataset	Angry	Fear	Happy	Neutral	Sad	Surprise
CK+	135	75	207	10	84	249
FER2013	4593	5121	8989	6198	6077	4002
PDTS(G2G)	90	122	950	1300	309	339
PDTS(G3G)	129	85	276	271	332	106

Figure 2:Dataset Used for Facial Expression Recognition

Results



Figure 3:4x optical microscope images of sample[1] (left), and sample[2] (right).



Figure 4:CK Dataset



Figure 5:Drama Dataset

Experiments and Results

Source Dataset	Target Dataset	Loss	Error	Accuracy
FER2013	-	1.0844	-	23%
Fer2013	PDTS(G3G)	1.095	71.3%	28%
FER2013	PDTS(G2G)	1.407	55%	40%
CK	PDTS(G2G)	1.38	75.3%	18%
FER2013	-	0.80687	-	31%
FER2013	PDTS(G3G)	0.9832	45%	53.21%
FER2013	PDTS(G2G)	-	-	43%
FER2013	-	0.8687	-	32%
FER2013	PDTS(G2G)	0.844	46%	51%
FER2013	PDTS(G3G)	1.092	62%	41.12%
FER2013	PDTS(G2G)	0.7068	42%	58.12%

Figure 6:Results

References

- [1] Geoffrey French, Michal Mackiewicz, and Mark Fisher. Self-ensembling for visual domain adaptation. *arXiv preprint arXiv:1706.05208*, 2017.
- [2] Antti Tarvainen and Harri Valpola. Mean teachers are better role models: Weight-averaged consistency targets improve semi-supervised deep learning results. In *Advances in neural information processing systems*, pages 1195–1204, 2017.
- [3] Christopher Pramerdorfer and Martin Kampel. Facial expression recognition using convolutional neural networks: state of the art. *arXiv preprint arXiv:1612.02903*, 2016.