ARTEFACT DETECTION AND SEGMENTATION BASED ON A DEEP LEARNING SYSTEM

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ABSTRACT

This paper presents the results of detection and segmentation of artefact from endoscopic video frames for EAD2020 competition. In this competition, a deep learning based system is applied, which is built upon RetinaNet. Since RetinaNet employs a one-stage method that lacks facilitating masks of segmented objects, inspired by the work of real-time instance segmentation, this system accomplishes object segmentation through two parallel branches to generate a set of prototype masks and to predict per-object mask coefficients respectively. Overall, top 7 (out of 32 entries) position was achieved in this competition on the leaderboard.

1. METHODS

Figure 1 illustrates the network system applied in this competition [1, 2, 3, 4, 5, 6, 7, 8, 9] built upon RetinaNet. It accomplishes object segmentation through two parallel strands (Prototype and Prediction coefficient), which are to generate a set of prototype masks and to predict per-object mask coefficients respectively. The backbone model of Resnet101 is applied for all three tasks.

2. RESULTS

Table 1 presents the final results submitted from this work whereas Table 2 gives the mAP for segmentation when 95% the overall classification accuracy was 63%. Although the results remain on the top 7, it is felt more enhancement is needed to further improve this model to improve its robustness.

Model parameters	Score$_d$	Rank
Epoch = 412, Threshold = 0.17	0.2020 0.0768	18
Epoch = 226, Threshold = 0.13	0.2205 0.0843	7

Table 1. Leaderborad scores for the two submissions put in in the EAD2020 competition.

Region type	mAP at IoU thresholds			
	0.50	**0.70**	**0.95**	**All**
box	77.85	61.64	0.99	47.42
mask	76.91	61.51	0.87	46.17

Table 2. The mAP values for segmentation.

3. REFERENCES

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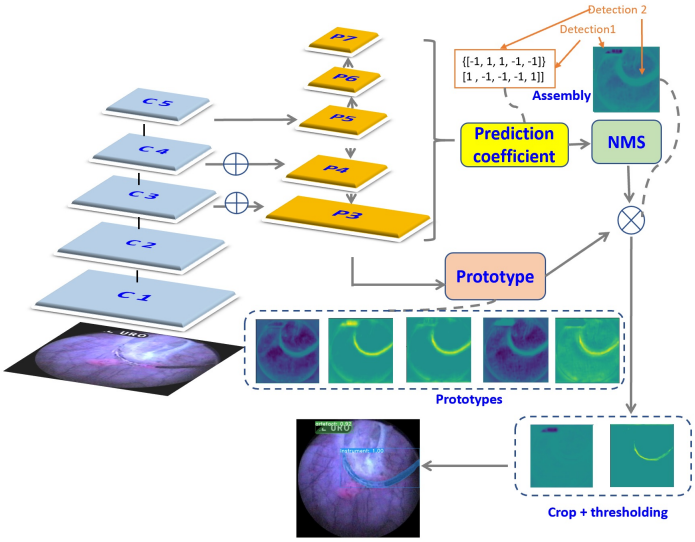

Fig. 1. The network applied in competition.

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