

Magic Layouts: Structural Prior for Component Detection in User Interface Designs - Supplementary Materials

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1. Magic Layouts Tool

We have included a demo video for Magic Layouts showing how UXs are parsed and rapidly converted to digital prototypes demonstrating its practical use. Please watch the demo video.

2. Impact of Nr

We conduct experiments to evaluate the impact of number of proposal sampled from each image (N_r) during training. Table 1 and Table 2 show the performance of the proposed Magic Layout with FPN architecture for various $N_r = \{64, 128, 256, 512\}$ on RICO and DrawnUI dataset respectively. Both mean Average Precision (AP) and Average Recall (AR) slightly decreases (1-2%) while using lower N_r value *e.g.* 64, 128. Overall for both RICO and DrawnUI datasets, $N_r=256$ is sufficient for obtaining good precision and recall metrics.

3. Additional Results

Fig. 1 & 2 and Fig. 3 & 4 provide additional examples of UX parsed by the proposed Magic Layout for RICO [1] and DrawnUI [2] respectively.

References

- [1] Biplab Deka, Zifeng Huang, Chad Franzen, Joshua Hibschman, Daniel Afergan, Yang Li, Jeffrey Nichols, and Ranjitha Kumar. Rico: A mobile app dataset for building data-driven design applications. In *Proceedings of the 30th Annual Symposium on User Interface Software and Technology*, UIST '17, 2017.
- [2] Dimitri Fichou, Raul Berari, Paul Brie, Mihai Dogariu, Liviu Daniel Ștefan, Mihai Gabriel Constantin, and Bogdan Ionescu. Overview of ImageCLEFdrawnUI 2020: The detection and recognition of hand drawn website uis task. In *CLEF2020 Working Notes*, CEUR Workshop Proceedings, Thessaloniki, Greece, September 22-25 2020. CEUR-WS.org <<http://ceur-ws.org>>.

Table 1. Performance of proposed method (FPN+Magic) on RICO dataset [1] different N_r values

Method	AP	AP50	AP75	APs	APm	API	AR	AR	AR	ARs	ARm	ARI
@IoU	0.5:95	0.5	0.75	0.5:95	0.5:95	0.5:95	0.5:95	0.5:95	0.5:95	0.5:95	0.5:95	0.5:95
maxDets	100	100	100	100	100	100	1	10	100	100	100	100
FPN+Magic $N_r=64$	48.5	58.5	51.4	7.0	31.4	48.5	42.2	61.8	63.9	12.8	45.0	63.4
FPN+Magic $N_r=128$	49.5	59.4	52.3	8.1	33.8	49.5	42.8	62.6	64.7	13.2	46.4	64.1
FPN+Magic $N_r=256$	50.3	60.1	53.4	8.4	34.7	50.2	43.0	63.0	65.0	13.2	46.4	64.5
FPN+Magic $N_r=512$	50.8	60.5	53.7	9.1	36.6	50.7	42.5	62.4	64.4	14.2	48.3	63.7

Table 2. Performance of proposed method (FPN+Magic) on DrawnUI dataset [2] different N_r values

Method	AP	AP50	AP75	APs	APm	API	AR	AR	AR	ARs	ARm	ARI
@IoU	0.5:95	0.5	0.75	0.5:95	0.5:95	0.5:95	0.5:95	0.5:95	0.5:95	0.5:95	0.5:95	0.5:95
maxDets	100	100	100	100	100	100	1	10	100	100	100	100
FPN+Magic $N_r=64$	61.8	87.8	71.5	34.2	58.8	63.2	28.9	65.2	69.4	38.9	66.3	69.6
FPN+Magic $N_r=128$	63.3	89.0	73.8	32.6	59.0	65.1	30.5	66.8	71.2	37.6	66.4	71.5
FPN+Magic $N_r=256$	64.3	89.5	74.4	32.2	54.4	66.5	30.3	66.7	71.0	37.1	64.0	71.7
FPN+Magic $N_r=512$	64.1	89.7	75.3	32.8	59.9	65.9	30.2	67.0	71.2	37.4	65.7	71.7

A. RICO Screenshots

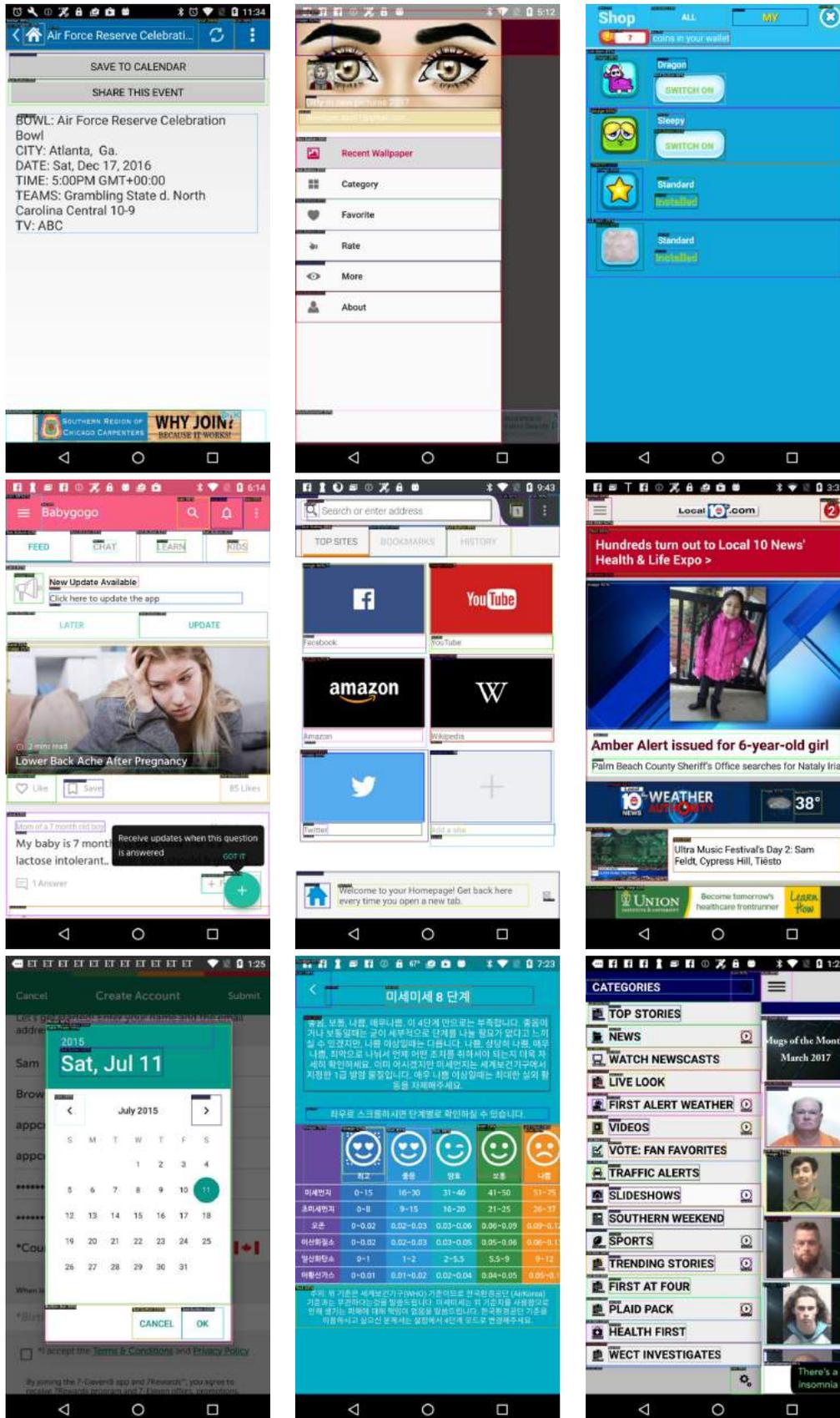


Figure 1. RICO screenshots parsed by Magic Layouts - 1.

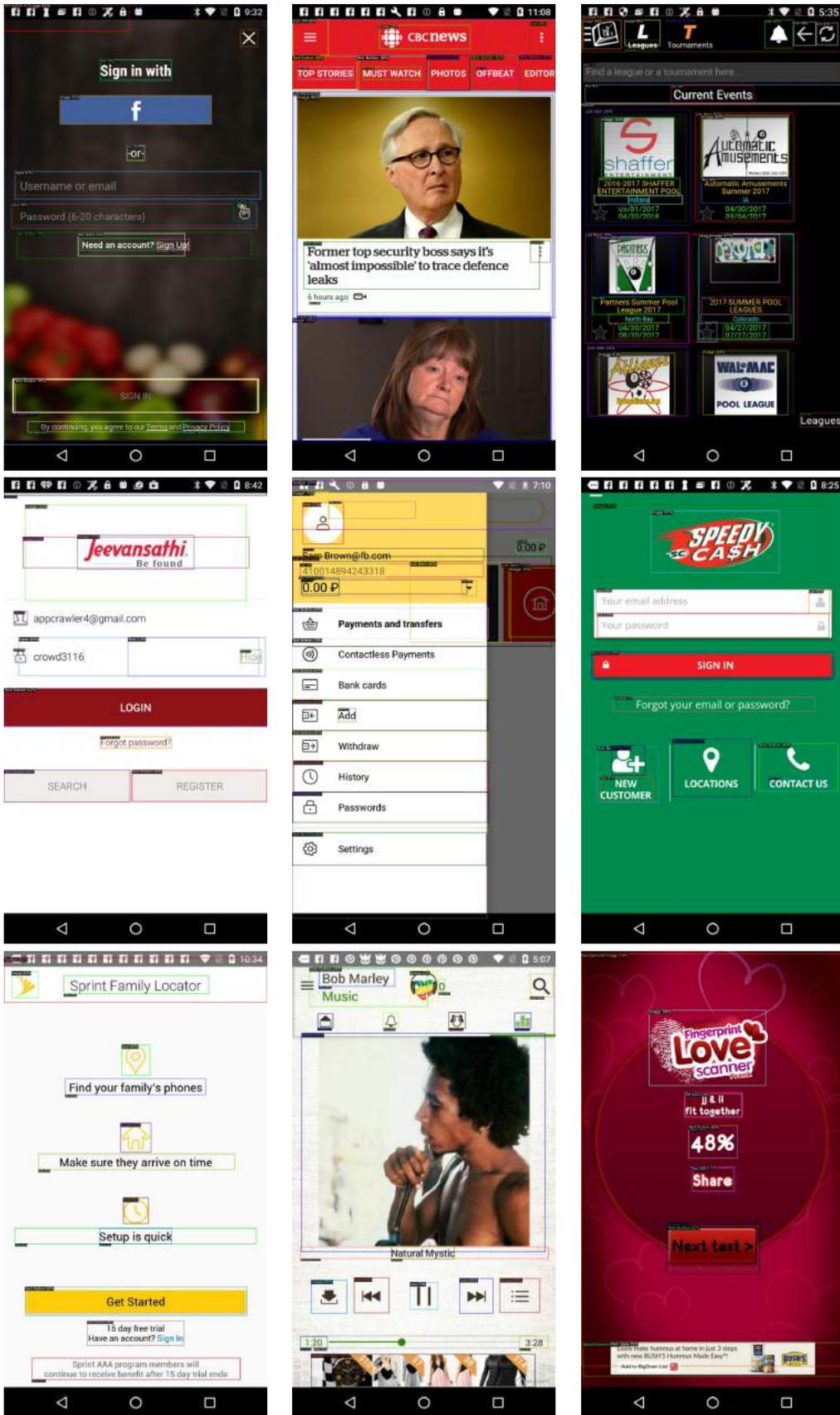


Figure 2. RICO screenshots parsed by Magic Layouts - 2.

B. DrawnUI hand-sketched UXs



Figure 3. DrawnUI UX parsed by Magic Layouts - 1.

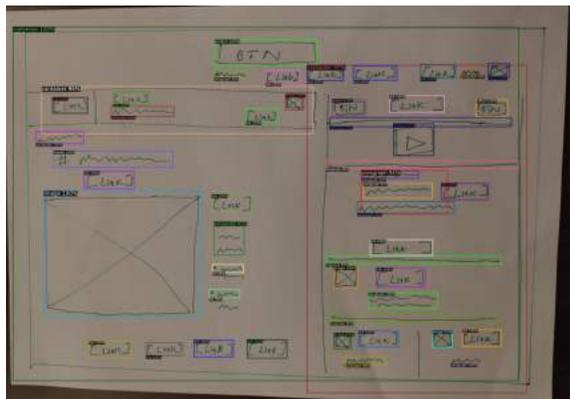
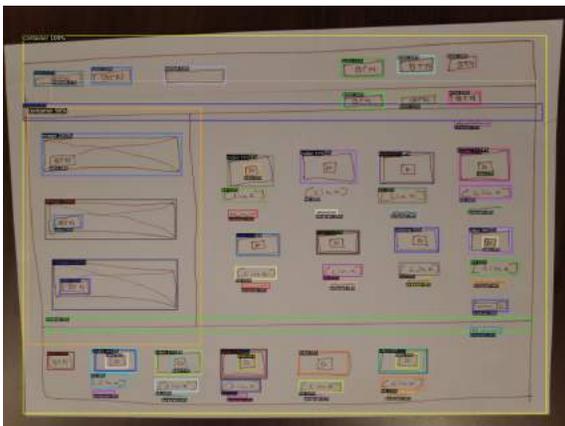
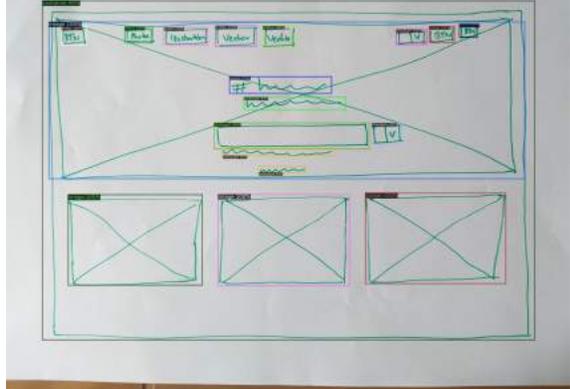
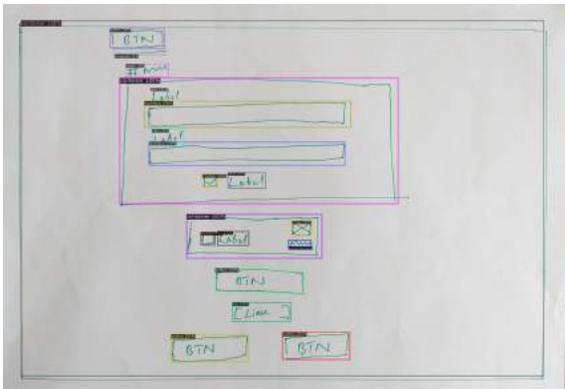
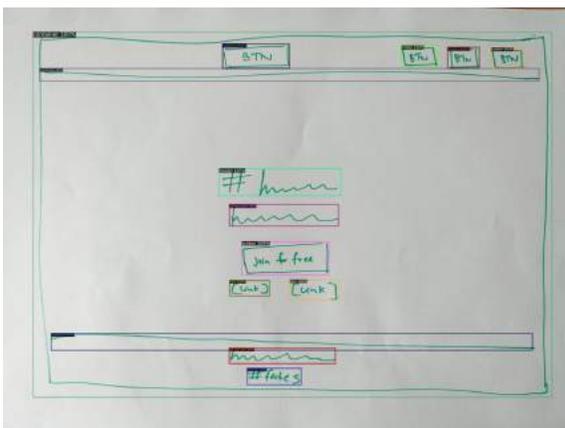
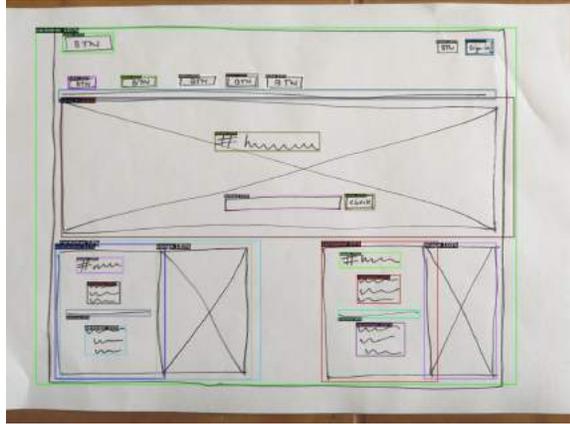
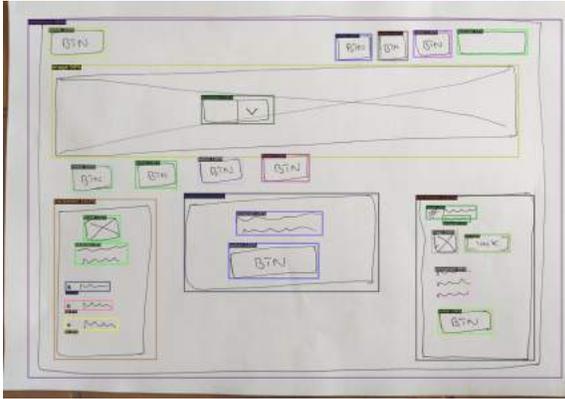


Figure 4. DrawnUI UX parsed by Magic Layouts - 2.