

PIX-TAB: Efficient PIXEL-Precise TABLE Structure Recognition Approach with Speculative Decoding and Region-Based Image Segmentation

Supplementary Material

8. Model Optimization and On-Device Solution

The number of OTSL tokens scales with $N \times M$, where N is the number of columns and M is the number of rows. With the proposed approach, we add only $N + M$ additional tokens to OTSL, achieving a speed improvement on regular tables. These additional tokens provide positional information that enables direct bounding box estimation from the tokens themselves, thereby eliminating the need for the bounding box decoder. This increase in the number of tokens does not change the asymptotic time or space complexity, because $N \times M + N + M = O(N \times M)$.

To optimize ONNX models for mobile devices, we have employed several techniques. First, we pruned layers from the ResNet encoder. Second, we converted the ONNX model into a framework that is optimized for the target device, such as TFLite or TensorRT. This conversion requires model modifications, as some PyTorch operations need to be rewritten to generate ONNX operations compatible with the target frameworks, supporting dynamic input/output sizes. Additionally, we substituted network segments containing incompatible operations with alternative inputs.

Fig. 5 illustrates this process with two execution graphs: the left graph contains incompatible operations that generate an intermediate value (a binary mask in this case), while the right graph takes this value as an additional input generated on the CPU side, thereby avoiding the problematic operation. Third, we removed unnecessary operations, such as unused type casts or network components used solely for training.

9. Experiments with different hyper-parameters

In addition, we investigated various architectural choices and their effect on inference time based on a test set with real tables (some examples are presented in Sec. 10). As shown in Tab. 6, decreasing the input resolution leads to faster inference but results in substantially lower performance. An alternative optimization strategy is to reduce the number of channels in the backbone and decoder modules. We selected $n_{channels} = 16$ and $d_{model} = 128$ as the optimal values for inference on the device.

Usually, auto-regressive decoder models decode one token at a time. However, the speculative decoding technique allows several tokens to be predicted at once. This is achieved by feeding the model not only currently predicted

Table 6. PIX-TAB evaluation results with different hyper-parameters

Resolution	Stride	$n_{channels}$	d_{model}	TEDS
240	4	32	256	88.37
		64	512	89.01
240	8	64	512	88.54
360	8	64	512	87.44
		8	64	83.05
480	8	16	128	89.8
			256	90.7
		32	128	90.14
			256	90.6
		64	256	91.87
			512	92.58

output, but also several expected tokens. After model inference we can check outputs. If they coincide with expected tokens, they become confirmed and thus are predicted in a single model run. In our implementation, we use a simple logic to predict next tokens: try to find a previous reference row for the current row and use tokens from it. If no such row exists, we complete the row with `<td></td>` tokens to the end of the row. Additionally, the last row is repeated several times.

10. Testing on a test set with real cases

Following is a demonstration of our method for several representative samples. The method is effective for loosely-connected tables as Fig. 6, as well as for tables where some row/column borders are explicit and others are implicit, as in Fig. 7. The method is language-agnostic, as demonstrated in Fig. 9, but it heavily depends on the OCR module, as will be described below. The method is effective for larger tables, as shown in Fig. 10 and also described in more detail below.

Tables with embedded images are a common yet challenging scenario in document analysis. While existing approaches have made significant progress in OCR and TSR, the presence of images and icons within tables poses unique difficulties.

While colorful images with a wide range of pixel intensities is simple to detect, the main challenge for both analytically and ML methods, such as YOLO, is represented by monotonic images such as on Fig. 6. Models trained on such images often misclassify text as images. We found it

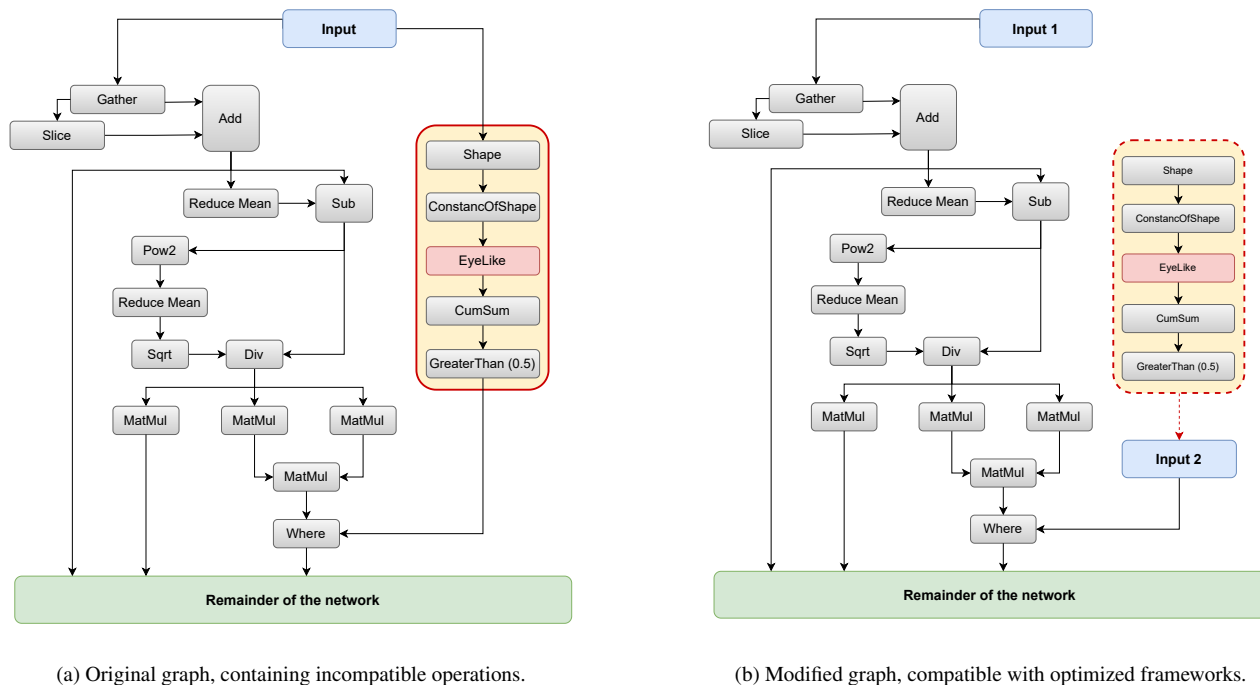


Figure 5. Simplified representation of the model inference graph.

effective to constrain image boxes so that they do not intersect text boxes.

Another challenge is recognition of texts that have to remain as a part of the image, as on Fig. 8. Texts “G+”, “G-”, “M ou OUVERT” have to remain in their original positions, otherwise the image loses meaning. Our method in its current form partially solves this problem in case when RBIS method is selected: if the total area of images in a table cell is larger than all the text in the cell, the whole cell is returned as an image. This is done because the RBIS is more accurate for detecting cell borders, as shown in Fig. 14.

For some cases, as in Fig. 11, where an image inside a table cell is surrounded by text, and the text does not have tabular structure (a list in this case) – the method relies on post-processing stages to organize its output.

Tight cooperation with OCR module also introduces drawbacks. As demonstrated in Fig. 12 and Fig. 13, if OCR performance is low on a particular image, table recognition quality will drop as well, including appearance of cell texts as images.

Detecting icons is another challenge, because some of them tend to be recognized as text by OCR module, and image detector networks, trained to detect icons also tend to misinterpret small bits of text as icons. Our method does not currently solve this problem.

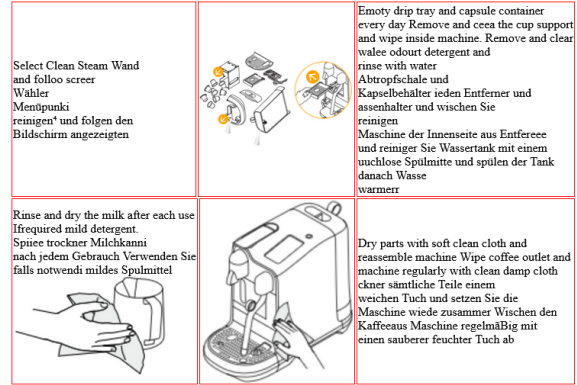
Tables with large number of rows and/or columns are yet another challenge. Since the encoder-decoder network re-

quires the image to be resized to a constant size, these tables usually lose details required for accurate recognition. In this case, under condition that the table cells have visible borders, RBIS shows better result. Example of cells detected with this method is shown in Fig. 15. Fig. 16 also demonstrates performance of the method for a text-heavy table with irregular structure and mixed (bordered/borderless) cells. Fig. 17 shows more examples of large text-heavy tables that we have used to test our method.

The method is not currently intended for use with photos of tables, e.g. skewed lines, blurred text etc. Including these cases is planned for future work, by preprocessing and specific augmentations. Example of performance of the method for such cases is shown on fig. 18



(a) Original table.



(b) Recognized table.

Figure 6. Recognition of loosely connected table. The method is effective for cases that imply some connectivity between texts and images, but don't have strict positioning or borders.

Durezza dell'acqua / Dureté de l'eau		Decalcifica dopo / Détartre après			
App.	fH	dH	CaCO ₃	(40 ml)	
	Level 0	<5	<3	< 50 mg/l	2 200
	Level 1	>7	>4	> 70 mg/l	1 600
	Level 2	>13	>7	> 130 mg/l	1 100
	Level 3	>25	>14	> 250 mg/l	800
	Level 4	>38	>21	> 380 mg/l	600

(a) Original table.

Durezza dell'acqua/ Dureté de l'eau		Decalcifica dopo/ Détartre après			
App	fH	dH	CaCO ₃	(40 ml)	
Leve	0	<5	<3	< 50 mg/l	2200
Leve	1	>7	>4	> 70 mg/l	11 600
Leve	2	> 13	>7	>130 mg/l	1 100
Level	3	>25	> 14	> 250 mg/l	800
Leve	4	>38	>21	> 380 mg/l	600

(b) Recognized table.

Figure 7. Recognition result of table without horizontal borders and with graphics. This example demonstrates our method for lightly stylized tables – containing colored texts, occasional graphics and missing some borders between rows and columns.

Prise pour casque d'écoute de l'amplificateur	Fiche et forme du casque d'écoute
<p>5 Mini-prise pour casque d'écoute à 3 pôles (connexion symétrique, 3,5 mm de diamètre) x2</p>	<p>G+ G- M ou OUVERT</p> <p>Côté G</p> <p>Côté D</p> <p>D+ D- M ou OUVERT</p>
<p>6 Prise pour casque d'écoute standard symétrique (4,4 mm de diamètre)</p>	<p>G+ D+ OUVERT</p> <p>G- D-</p>
<p>7 Prise pour casque d'écoute standard (6,3 mm de diamètre)</p>	<p>G D M (COMMUN)</p>
<p>8 Mini-prise pour casque d'écoute stéréo (3,5 mm de diamètre)</p>	<p>G D M (COMMUN)</p>
<p>9 Prise pour casque d'écoute XLR4 (symétrique 4 broches)</p>	<p>G+ D-</p> <p>G- D+</p>

(a) Original table.

Prise pour casque d'écoute de l'amplificateur	Fiche et forme du casque d'écoute
<p>5 Mini-prise pour casque d'écoute à 3 pôles (connexion symétrique, 3,5 mm de diamètre) x2</p>	<p>G+ G- MouOUVERT</p> <p>Côté Côté D+ D- MouOUVERT</p>
<p>6 Prise pour casque d'écoute standard symétrique (4,4 mm de diamètre)</p>	<p>G+ D+ OUVERT</p>
<p>7 Prise pour casque d'écoute standard (6,3 mm de diamètre)</p>	<p>G D M (COMMUN)</p>
<p>8 Mini-prise pour casque d'écousteréo (3,5 mm de diamètre)</p>	<p>M (COMMUN)</p>
<p>9 Prise pour casque d'écoute XLR4 (symétrique 4broches)</p>	<p>G+ D-</p> <p>G- D+</p>

(b) Recognized table.

Figure 8. Recognition result of table without vertical borders and with graphics. The method is effective when table cells contain images, but if the images contain text, the method may be confused whether the text belong to image or to actual cell. This example demonstrates a case when some text was not detected as part of image and ends up being detached from it.

設備名稱: 耳機擴大機, 型號 (型式): TA-ZHIES						
單元	限用物質及其化學符號					
	鉛 (Pb)	汞 (Hg)	鎘 (Cd)	六價鉻 (Cr ⁶⁺)	多溴聯苯 (PBB)	多溴二苯醚 (PBDE)
電路板	-	○	○	○	○	○
外殼	-	○	○	○	○	○
顯示器	-	○	○	○	○	○
配件 (遙控器等)	-	○	○	○	○	○

備考1. "超出0.1 wt %"及 "超出0.01 wt %" 係指限用物質之百分比含量超出百分比含量基準值。
備考2. "○" 係指該項限用物質之百分比含量未超出百分比含量基準值。
備考3. "-" 係指該項限用物質為排除項目。

(a) Original table.

設備名稱: 耳機擴大機, 型號 (型式): TA-ZHIES						
單元	限用物質及其化學符號					
	(Pb)	(Hg)	(Cd)	六價鉻 (Cr ⁶⁺)	多溴聯苯 (PBB)	多溴二苯醚 (PBDE)
電路板	-	○	○	○	○	○
外殼	-	○	○	○	○	○
顯示器	-	○	○	○	○	○
配件 (遙控 器等)	-	○	○	○	○	○

備考1. "超出0.1 wt %"及 "超出0.01 wt %" 係指限用物質之百分比含量超出百分比含量基準值。
備考2. "○" 係指該項限用物質之百分比含量未超出百分比含量基準值。
備考3. "-" 係指該項限用物質為排除項目。

(b) Recognized table.

Figure 9. Small table with merged cells. The method does not depend on the table language and symbols used. As long as the OCR module provided to the table recognition system supports the language and symbols – the table will be recognized correctly.

DWG. Figure 7-1		BLVS018		BLVS025		BLVS050	
		I		I		II	
Capacity		1/8 Ton (120kg)		1/4 Ton (240kg)		1/2 Ton (480kg)	
Lift		All models available in standard 10 or 20 ft. lifts. Custom lengths up to 100 ft. some models ¹					
Load Chain diameter x pitch	in.	Ø .157 x .47					
	mm	Ø 4.0 x 12					
Number of falls		1		1		2	
Lifting speeds	Low speed	0-10.5 ft/min (0-3.2 m/min)		0-10.5 ft/min (0-3.2 m/min)		0-5.25 ft/min (0-1.6 m/min)	
	High speed	41 ft/min (12.5 m/min)		41 ft/min (12.5 m/min)		20.67 ft/min (6.3 m/min)	
Pendant controls		Wireless controller ²					
Net weight	10 ft. Lift	36.4 lb (16.5kg)		42.8 lb (19.4kg)		42.8 lb (19.4kg)	
	20 ft. Lift	38.6 lb (17.5kg)		47.4 lb (21.5kg)		47.4 lb (21.5kg)	
Shipping weight	10 ft. Lift	43.0 lb (19.5kg)		49.4 lb (22.4kg)		49.4 lb (22.4kg)	
	20 ft. Lift	45.4 lb (20.6kg)		54.0 lb (24.5kg)		54.0 lb (24.5kg)	
Duty Cycle	Time Rating	15 min					
	Intermittent Duty %	30%					
	Max. starts per hour	180					
Motor	Horsepower	0.4 HP (300 W)		0.8 HP (600 W)		0.8 HP (600 W)	
	Pole	8P		8P		8P	
	Cycle	60Hz					
	Phase	single					
	Voltage	120 V					
Current Draw (amperage)	6.0A		10.0 A		10.0 A		
Noise level ³	81 dB						
Gearbox capacity	0.5L						
Enclosure ratings	Hoist	IP54					
	Pushbutton control	IP65					

(a) Original table.

DWG. Figure 7-1		BLVS018		BLVS025		BLVS050	
		I		I		II	
Capacity		1/8 Ton (120kg)		1/4 Ton (240kg)		1/2 Ton (480kg)	
Lift		All models available standard 10 or 20 ft. lifts. Custom lengths up to 100 some models					
Load Chain diameter pitch	in.	Ø .157x.47					
	mm	Ø4.0x12					
Number of falls		1		1		2	
Lifting speeds	Low speed	0-10.5 ft/min (0-3.2 m/min)		0-10.5 ft/min (0-3.2 m/min)		0-5.25 ft/min (0-1.6 m/min)	
	High speed	41 ft/min (12.5 m/min)		41 ft/min (12.5 m/min)		20.67 ft/min (6.3 m/min)	
Pendant controls		Wireless controller ²					
Net weight	10ft.Lift	36.4lb (16.5kg)		42.8lb (19.4kg)		42.8lb (19.4kg)	
	20ft.Lift	38.6lb (17.5kg)		47.4lb (21.5kg)		47.4lb (21.5kg)	
Shipping weight	10ft.Lift	43.0lb (19.5kg)		49.4lb (22.4kg)		49.4lb (22.4kg)	
	20ft.Lift	45.4lb (20.6kg)		54.0lb (24.5kg)		54.0lb (24.5kg)	
Duty Cycle	Time Rating	15 min					
	Intermittent Duty	30%					
	Max. starts per hour	180					
Motor	Horsepower	0.4HP (300 W)		0.8HP (600 W)		0.8HP (600 W)	
	Pole	8P		8P		8P	
	Cycle	60Hz					
	Phase	single					
	Voltage	120V					
Current Draw (amperage)	6.0A		10.0A		10.0A		
Noise level ³	81 dB						
Gearbox capacity	0.5L						
Enclosure ratings	Hoist	IP54					
	Pushbutton control	IP65					

(b) Recognized table.

Figure 10. The method remains effective for large table with merged cells. Here multiple split cells are present, and column widths do not match (e.g. width of cells with "Lifting speeds", "Duty Cycle", "Motor" are different) – but the method still manages to decode the table correctly.

90 DAY	1 YEAR	2 YEAR	3 YEAR	5 YEAR	LIFE
Lathe Accessories Machine Accessories Mobile Bases Safety Equipment Specialty Items View Accessories	Air Tools Contractor Air Tools-Industrial Air Tools-Light Industrial Lubrication	Body Repair Kits Saws Cable Pullers Cold Saws Hacksaws Pallet Trucks Rigging Tools Service Jacks Slotters Surface Grinders Tapping Trolley Air Equipment Trolley-Electric MM Lathes MM Precision Vises	Beam Clamps Chain Hoist- Manual Lever Hoists Pulley-CPH Models Scissor Lift Tables Screw Jacks Wrenches-Geared Trolleys-Plain Wrenches-Manual WW Air Filtration WW Bandaws WW Buffers WW Sanders WW Tablesaws	WW Drill Presses WW Dust Collectors WW Dust Filters WW Dust P-Flings WW Saws WW Lathes WW Planers WW Shapers WW Tablesaws	Fastening Tools Mechanics Hand Tools Sinking Tools Vises (no precision) Clamps

Warranty reverts to 1 Year Warranty if woodworking (WWS) products listed above are used for industrial or educational purposes.

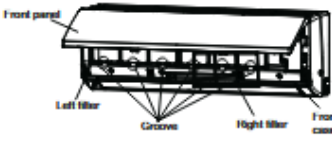
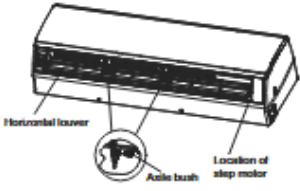
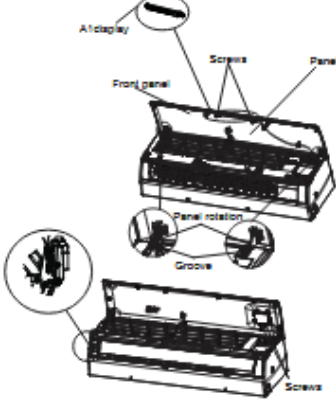
(a) Original table.

90 DAY	1 YEAR	2 YEAR	3 YEAR	5 YEAR	LIFE MOUNTY
Lathe Accessories Machine Accessories Mobile Bases Safety Equipment Specialty Items View Accessories	Air Tools Contractor Air Tools-Industrial Air Tools-Light Industrial Lubrication	Body Repair Kits Saws Cable Pullers Cold Saws Hacksaws Pallet Trucks Rigging Tools Service Jacks Slotters Surface Grinders Tapping Trolley Air Equipment Trolley-Electric MM Lathes MM Precision Vises	Beam Clamps Chain Hoist- Manual Lever Hoists Pulley-CPH Models Scissor Lift Tables Screw Jacks Wrenches-Geared Trolleys-Plain Wrenches-Manual WW Air Filtration WW Bandaws WW Buffers WW Sanders WW Tablesaws	WW Drill Presses WW Dust Collectors WW Dust Filters WW Dust P-Flings WW Saws WW Lathes WW Planers WW Shapers WW Tablesaws	Fastening Tools Mechanics Hand Tools Sinking Tools Vises (no precision) Clamps



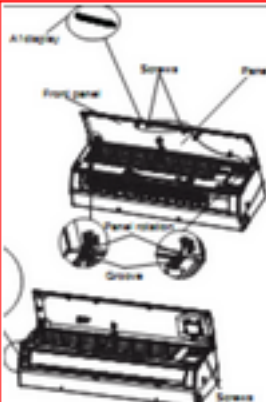
Warranty reverts to 1 Year Warranty if woodworking (WWS) products listed above are used for industrial or educational purposes.

(b) Recognized table.

Figure 11. Table with images and merged cells. The method is effective when a table cell contains images, but style information (e.g. the image position in relation to text) is lost. In this example all cells borders are present, so the information about that the text inside the cells was further split into columns (as in table column 3 and 5) is also lost.

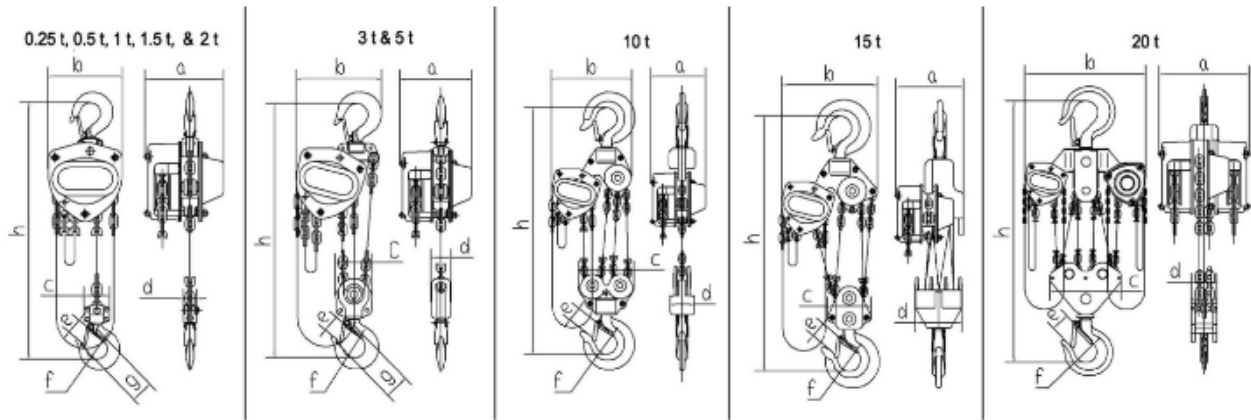
Step	Procedure
1.Remove filter easy	
<p>Open the front panel. Push the left and right filters to make them break away from the groove on the front case. Then remove the left and right filters one by one.</p>	
2.Remove horizontal louver	
<p>Push out the axle bush on horizontal louver. Bend the horizontal louver with hand and then separate the horizontal louver from the crank shaft of step motor to remove it.</p>	
3.Remove panel and display	
<p>Separate the panel rotation shaft from the groove facing the front panel and then remove the front panel.</p> <p>Screw off the 2 screws that are locking the display board.</p>	

(a) Original table.

Step	Procedure
	
2Remove	
	

(b) Recognized table.

Figure 12. Example of failed case 1. The method heavily depends on OCR performance – namely, detected text boxes. These boxes contribute both to image table structure recognition and image detection, so if the OCR module fails to recognize text, e.g. due to low image resolution – table recognition quality will drop significantly.



Stock Number	Model	Rated Capacity (ton)	No. of Falls	Load Chain (mm)	Hand Chain (mm)	Pounds of pull to lift capacity	Req'd Hand Chain (ft.) to lift load 1 foot	Net Weight (lbs)	Dimensions							Headroom h (in)
									a (in)	b (in)	c (in)	d (in)	e (in)	f (in)	g (in)	
100210	L100-25-*	1/4	1	4 x 12	3 x 15	41.8	18	9	3-3/4	4-5/16	1-3/16	13/16	1-1/16	1-1/4	1-3/8	9-13/16
106210	L100-50-*	1/2	1	5 x 15	4.8 x 22	51.3	25	10	5-1/8	5-1/2	1-11/16	1	1-1/16	1-1/4	1-3/8	11-1/4
101210	L100-100-*	1	1	6.3 x 19	5 x 25	63.9	43	12	6-3/8	6-5/16	2	1-3/16	1-5/16	1-9/16	1-3/4	11-5/8
101610	L100-150-*	1-1/2	1	7.1 x 21	5 x 25	77	57	15	6-11/16	7-3/16	2-1/2	1-5/16	1-5/16	1-5/8	1-7/8	13-3/4
102210	L100-200-*	2	1	8 x 24	5 x 25	79.4	70	20	7-1/4	8	2-1/2	1-5/16	1-7/16	1-13/16	2-1/16	14-3/4
103210	L100-300-*	3	2	7.1 x 21	5 x 25	79.4	114	24	8-11/16	9-1/4	4-3/16	2-1/16	1-11/16	2-1/16	2-7/16	20-1/16
105510	L100-500-*	5	2	9 x 27	5 x 25	74.9	198	41	7-9/16	11-1/8	5-1/4	2-1/2	2	2-3/8	3-1/8	23-5/8
101010	L100-1000-*	10	4	9 x 27	5 x 25	79.4	396	83	7-9/16	14-3/16	10-3/8	3-3/4	2-1/2	3-3/8	-	29-15/16
101110	L100-1500-*	15	6	9 x 27	5 x 25	81.6	594	287	7-7/8	19-3/8	4-5/16	6-1/8	3-1/8	3-15/16	-	33-7/8
102010	L100-2000-*	20	8	9 x 27	5 x 25	79.4 x 2	396 x 2	381	9-1/16	25-13/16	11-1/4	4-13/16	3-1/4	4-5/16	-	34-1/4

(a) Original table.

Stock Number	Rated Capacity (ton)	No. of Falls	Load Chain (mm)	Hand Chain (mm)	4-511	0-611 -116	11-118 S	a (in)	b (in)	c (in)	d (in)	e (in)	f (in)	g (in)	Headroom h (in)
10t				Hand (nd)											

(b) Recognized table.

Figure 13. Example of failed case 2. Another failing case due to low image resolution and low OCR performance.

Step	Procedure
<p>1.Remove filter Assy</p> <p>Open the front panel. Push the left and right filters to make them break away from the groove on the front case. Then remove the left and right filters one by one.</p>	
<p>2.Remove horizontal louver</p> <p>Push out the axle bush on horizontal louver. Bend the horizontal louver with hand and then separate the horizontal louver from the crank shaft of step motor to remove it.</p>	
<p>3.Remove panel and display</p> <p>Separate the panel rotation shaft from the groove using the front panel and then remove the front panel.</p> <p>Screw off the 2 screws that are locking the display board.</p>	

(a) Original table.

Step	Procedure
<p>1.Remove filter Assy</p> <p>Open the front panel. Push the left and right filters to make them break away from the groove on the front case. Then remove the left and right filters one by one.</p>	<p>1.Remove filter Assy</p> <p>Open the front panel. Push the left and right filters to make them break away from the groove on the front case. Then remove the left and right filters one by one.</p>
<p>2.Remove horizontal louver</p> <p>Push out the axle bush on horizontal louver. Bend the horizontal louver with hand and then separate the horizontal louver from the crank shaft of step motor to remove it.</p>	<p>2.Remove horizontal louver</p> <p>Push out the axle bush on horizontal louver. Bend the horizontal louver with hand and then separate the horizontal louver from the crank shaft of step motor to remove it.</p>
<p>3.Remove panel and display</p> <p>Separate the panel rotation shaft from the groove using the front panel and then remove the front panel.</p> <p>Screw off the 2 screws that are locking the display board.</p>	<p>3.Remove panel and display</p> <p>Separate the panel rotation shaft from the groove using the front panel and then remove the front panel.</p> <p>Screw off the 2 screws that are locking the display board.</p>

(b) Filled images.

Step	Procedure
<p>1.Remove filter Assy</p> <p>Open the front panel. Push the left and right filters to make them break away from the groove on the front case. Then remove the left and right filters one by one.</p>	
<p>2.Remove horizontal louver</p> <p>Push out the axle bush on horizontal louver. Bend the horizontal louver with hand and then separate the horizontal louver from the crank shaft of step motor to remove it.</p>	
<p>3.Remove panel and display</p> <p>Separate the panel rotation shaft from the groove using the front panel and then remove the front panel.</p> <p>Screw off the 2 screws that are locking the display board.</p>	

(c) Detected cells.

Figure 14. Example of region-based image segmentation. Example with large cells and images.

		BLVS018	BLVS025	BLVS050
DWG. Figure 7-1		I	I	II
Capacity		1/8 Ton (120kg)	1/4 Ton (240kg)	1/2 Ton (480kg)
Lift		All models available in standard 10 or 20 ft. lifts. Custom lengths up to 100 ft. some models ¹		
Load Chain diameter x pitch	in.	Ø .157 x .47		
	mm	Ø 4.0 x 12		
Number of falls		1	1	2
Lifting speeds	Low speed	0-10.5 ft/min (0-3.2 m/min)	0-10.5 ft/min (0-3.2 m/min)	0-5.25 ft/min (0-1.6 m/min)
	High speed	41 ft/min (12.5 m/min)	41 ft/min (12.5 m/min)	20.67 ft/min (6.3 m/min)
Pendant controls		Wireless controller ²		
Net weight	10 ft. Lift	36.4 lb (16.5kg)		42.8 lb (19.4kg)
	20 ft. Lift	38.6 lb (17.5kg)		47.4 lb (21.5kg)
	10 ft. Lift	43.0 lb (19.5kg)		49.4 lb (22.4kg)
Shipping weight	20 ft. Lift	45.4 lb (20.6kg)		54.0 lb (24.5kg)
	Time Rating	15 min.		
Duty Cycle	Intermittent Duty %	30%		
	Max. starts per hour	180		
Motor	Horsepower	0.4 HP (300 W)	0.8 HP (600 W)	0.8 HP (600 W)
	Pole	8P		
	Cycle	60Hz		
	Phase	single		
	Voltage	120 V		
Current Draw (amperage)		6.0A	10.0 A	10.0 A
Noise level ³		81 dB		
Gearbox capacity		0.5L		
Enclosure ratings		IP54		
Pushbutton control		IP65		

(a) Original table.

		T S050-230	T S100-230	T S200-230	T S300-230	T S500-230
Capacity		1/2 ton (500 kg)	1 ton (1000 kg)	2 ton (2000 kg)	3 ton (3000 kg)	5 ton (5000 kg)
Lift		All models available in standard 10, 15 or 20 ft. lifts. Custom lengths available up to 100 ft. for most models ¹				
Load Chain (diameter x pitch)	in.	Ø 248 x 752	Ø 280 x 785	Ø 394 x 1189	Ø 394 x 1189	Ø 441 x 1339
	mm	Ø 6.3 x 19.1	Ø 7.1 x 20.2	Ø 10 x 30.2	Ø 10 x 30.2	Ø 11.2 x 34
Number of falls		1	1	2	2	2
Lifting speeds (ft/min)	High spd	33	26	32	21	13
	Low spd	8	7	8	5	3
Pendant controls		Dependent upon lift and trolley use; see sect. 18.0.				
Duty Cycle	Time Rating	30 min.				
	Duty Rating %	H4 (40/20)				
	Max. starts per hour	240				
Motor	Horsepower	1.5	2	5	5	5
	Pole	0.4	0.5	1.2	1.2	1.2
	Cycle	60Hz				
	Phase	3				
	Voltage	220 V				
Current Draw (amperage)	High spd.	8.9	11	16.8	16.8	16.8
	Low spd.	4	5.6	8.4	8.4	8.4
Noise level ²		75 db				
Gearbox capacity		1.2 L	1.4L	4L	4L	4L
Dimensions (Figure 7-1)						
A	22-7/16" (570mm)	24-7/16" (620mm)	28-1/8" (715mm)	28-1/8" (715mm)	28-1/8" (715mm)	
B	10-5/8" (270mm)	11-13/16" (300mm)	13-3/8" (340mm)	13-3/8" (340mm)	13-3/8" (340mm)	
C	12-3/16" (310mm)	12-5/8" (320mm)	14-3/4" (375mm)	14-3/4" (375mm)	14-3/4" (375mm)	
D	6-1/2" (165mm)	7-1/16" (180mm)	8-11/16" (220mm)	8-11/16" (220mm)	8-11/16" (220mm)	
E	14-3/4" (375mm)	16-1/8" (410mm)	20-7/8" (530mm)	20-7/8" (530mm)	20-7/8" (530mm)	
F	7-1/2" (190mm)	7-11/16" (195mm)	10-5/8" (270mm)	10-5/8" (270mm)	10-5/8" (270mm)	
G	7-5/16" (185mm)	8-11/16" (220mm)	10-1/4" (260mm)	10-1/4" (260mm)	10-1/4" (260mm)	
H1	19-11/16" (500mm)	21-5/8" (550mm)	40-3/16" (1020mm)	---	---	
H2	---	---	---	41-5/16" (1050mm)	43-5/16" (1100mm)	

(b) Filled images.

		T S050-230	T S100-230	T S200-230	T S300-230	T S500-230
Capacity		1/2 ton (500 kg)	1 ton (1000 kg)	2 ton (2000 kg)	3 ton (3000 kg)	5 ton (5000 kg)
Lift		All models available in standard 10, 15 or 20 ft. lifts. Custom lengths available up to 100 ft. for most models ¹				
Load Chain (diameter x pitch)	in.	Ø 248 x 752	Ø 280 x 785	Ø 394 x 1189	Ø 394 x 1189	Ø 441 x 1339
	mm	Ø 6.3 x 19.1	Ø 7.1 x 20.2	Ø 10 x 30.2	Ø 10 x 30.2	Ø 11.2 x 34
Number of falls		1	1	2	2	2
Lifting speeds (ft/min)	High spd	33	26	32	21	13
	Low spd	8	7	8	5	3
Pendant controls		Dependent upon lift and trolley use; see sect. 18.0.				
Duty Cycle	Time Rating	30 min.				
	Duty Rating %	H4 (40/20)				
	Max. starts per hour	240				
Motor	Horsepower	1.5	2	5	5	5
	Pole	0.4	0.5	1.2	1.2	1.2
	Cycle	60Hz				
	Phase	3				
	Voltage	220 V				
Current Draw (amperage)	High spd.	8.9	11	16.8	16.8	16.8
	Low spd.	4	5.6	8.4	8.4	8.4
Noise level ²		75 db				
Gearbox capacity		1.2 L	1.4L	4L	4L	4L
Dimensions (Figure 7-1)						
A	22-7/16" (570mm)	24-7/16" (620mm)	28-1/8" (715mm)	28-1/8" (715mm)	28-1/8" (715mm)	
B	10-5/8" (270mm)	11-13/16" (300mm)	13-3/8" (340mm)	13-3/8" (340mm)	13-3/8" (340mm)	
C	12-3/16" (310mm)	12-5/8" (320mm)	14-3/4" (375mm)	14-3/4" (375mm)	14-3/4" (375mm)	
D	6-1/2" (165mm)	7-1/16" (180mm)	8-11/16" (220mm)	8-11/16" (220mm)	8-11/16" (220mm)	
E	14-3/4" (375mm)	16-1/8" (410mm)	20-7/8" (530mm)	20-7/8" (530mm)	20-7/8" (530mm)	
F	7-1/2" (190mm)	7-11/16" (195mm)	10-5/8" (270mm)	10-5/8" (270mm)	10-5/8" (270mm)	
G	7-5/16" (185mm)	8-11/16" (220mm)	10-1/4" (260mm)	10-1/4" (260mm)	10-1/4" (260mm)	
H1	19-11/16" (500mm)	21-5/8" (550mm)	40-3/16" (1020mm)	---	---	
H2	---	---	---	41-5/16" (1050mm)	43-5/16" (1100mm)	

(c) Detected cells.

Figure 15. Example of region-based image segmentation. Example with table having large number of rows.

PARAMETER	TEST CONDITIONS	SE555			NA555 NE555 SA555			UNIT
		MIN	TYP	MAX	MIN	TYP	MAX	
THRES voltage level	V _{CC} = 15 V	9.4	10	10.6	8.8	10	11.2	V
	V _{CC} = 5 V	2.7	3.3	4	2.4	3.3	4.2	
THRES current ⁽¹⁾		30	250		30	250	nA	
TRIG voltage level	V _{CC} = 15 V	4.8	5	5.2	4.5	5	5.6	V
	V _{CC} = 5 V	1.45	1.67	1.9	1.1	1.67	2.2	
TRIG current	TRIG at 0 V	0.5	0.9		0.5	2	μA	
RESET voltage level	T _A = -55°C to 125°C			1.1			V	
RESET current	RESET at V _{CC}	0.1	0.4		0.1	0.4	mA	
	RESET at 0 V	-0.4	-1		-0.4	-1.5		
DISCH switch off-state current		20	100		20	100	nA	
DISCH switch on-state voltage	V _{CC} = 5 V, I _O = 8 mA			0.15	0.4		V	
CONT voltage (open circuit)	V _{CC} = 15 V	9.6	10	10.4	9	10	11	V
	V _{CC} = 5 V	2.9	3.3	3.8	2.6	3.3	4	
Low-level output voltage	V _{CC} = 15 V, I _{OL} = 10 mA	0.1	0.15		0.1	0.25	V	
	V _{CC} = 15 V, I _{OL} = 50 mA	0.4	0.5		0.4	0.75		
	V _{CC} = 15 V, I _{OL} = 100 mA	2	2.2		2	2.5		
	V _{CC} = 15 V, I _{OL} = 200 mA	2.5			2.5			
	V _{CC} = 5 V, I _{OL} = 3.5 mA	0.1	0.2		0.1	0.35		
	V _{CC} = 5 V, I _{OL} = 5 mA	0.1	0.2		0.1	0.35		
	V _{CC} = 5 V, I _{OL} = 8 mA	0.15	0.25		0.15	0.4		
	V _{CC} = 5 V, I _{OL} = 10 mA	0.15	0.25		0.15	0.4		
High-level output voltage	V _{CC} = 15 V, I _{OH} = -100 mA	13	13.3		12.75	13.3	V	
	V _{CC} = 15 V, I _{OH} = -200 mA	12			12.5			
	V _{CC} = 5 V, I _{OH} = -100 mA	3	3.3		2.75	3.3		
	V _{CC} = 5 V, I _{OH} = -200 mA	2			2			
Supply current	Output low, No load	10	12		10	15	mA	
	Output high, No load	3	5		3	6		

(a) Original table.

PARAMETER	TEST CONDITIONS	SE555			NA555 NE555 SA555			UNIT
		MIN	TYP	MAX	MIN	TYP	MAX	
THRES voltage level	V _{CC} = 15 V	9.4	10	10.6	8.8	10	11.2	V
	V _{CC} = 5 V	2.7	3.3	4	2.4	3.3	4.2	
THRES current (1)		30	250		30	250	nA	
TRIG voltage level	V _{CC} = 15 V	4.8	5	5.2	4.5	5	5.6	V
	V _{CC} = 5 V	1.45	1.67	1.9	1.1	1.67	2.2	
TRIG current	TRIG at 0 V	0.5	0.9		0.5	2	μA	
2RESET voltage level	T _A = ±55°C to 125°C	0.3	0.7	1	0.3	0.7	1	V
2RESET current	RRESET at V _{CC}	0.1	0.4		0.1	0.4	mA	
	RRESET at 0V	±0.4	±1		±0.4	±1.5		
2DISCH switch off-state current		20	100		20	100	nA	
DISCH switch on-state voltage	V _{CC} = V, I _O = mA			0.15	0.4		V	
CONT voltage (open circuit)	V _{CC} = 15 V	9.6	10	10.4	9	10	11	V
	V _{CC} = 5 V	2.9	3.3	3.8	2.6	3.3	4	
Low-level output voltage	V _{CC} = 15 V, I _{OL} = 10 mA	0.1	0.15		0.1	0.25	V	
	V _{CC} = 15 V, I _{OL} = 50 mA	0.4	0.5		0.4	0.75		
	V _{CC} = 15 V, I _{OL} = 101 mA	2	2.2		2	2.5		
	V _{CC} = 15 V, I _{OL} = 1200 mA	2.5			2.5			
	V _{CC} = 5 V, I _{OL} = 3.5 mA	0.1	0.2		0.1	0.35		
	V _{CC} = 5 V, I _{OL} = 5 mA	0.1	0.2		0.1	0.35		
	V _{CC} = 5 V, I _{OL} = 8 mA	0.15	0.25		0.15	0.4		
	V _{CC} = 5 V, I _{OL} = 10 mA	0.15	0.25		0.15	0.4		
High-level output voltage	V _{CC} = 15 V, I _{OH} = ±1 mA	31	13.3		12.75	13.3	V	
	V _{CC} = 15 V, I _{OH} = ±200 mA	12			12.5			
	V _{CC} = 2 V, I _{OH} = ±100 mA	3	3.3		2.75	3.3		
Supply current	Output low, No load	10	12		10	15	mA	
	Output high, No load	3	5		3	6		

(b) Recognized table.

Figure 16. Example of text-heavy table recognition. Included few irregular cells (min, typ, max columns do not have separating border).

Location	Exhibit	Income from discontinued operations	Customer relationships	Other expenses	Retail	Due after ten years	Total deferred tax liabilities
In billions	Cash dividends declared per common share	Total		In thousands	Receivables	Inventory	Financing activities
Level 3				Years Ended	Balance at beginning of year	In-process research and development	
Pinnacle WestAPS	13995.808	87712.178	74386.448	97016.218	61898.178	47668.128	28661.968
Balance at December 31, 2015			19828.518				
Marketing	82261.348	96015.798		25899.968		83774.878	70525.458
As of December			63965.248	67498.98	70730.48		
Earnings	7910.38	14934.378	52108.808	43030.258	40057.58	24429.718	9554.398
Net operating loss carryforwards	43255.828	46963.818	83271.238	63767.118	43470.998	13829.668	14514.268
U.S. Plans	44130.438	70365.458	37729.208	15854.498	38859.148	60667.358	58776.128
China	91569.448				18925.808		
Less accumulated depreciation and amortization	321.598	59708.188		51081.598			95207.328
Exhibits and Financial Statement Schedules	53420.28	24931.858	26175.208	27265.318	88720.18	51961.348	22129.768
Decrease	88945.858	93653.428	21363.768	1273.608	35575.878	40755.578	41957.358
	70447.58	59974.338	78326.948		93475.718	69271.318	61089.158
Exhibit	15924.558	19412.688	37886.998	870.438	99540.688	74133.28	57113.238
Dollars in thousands	4016.668	6541.778	26489.468		39499.18	53079.948	81164.268
North America		65987.108	88980.738				39117.798
East	36384.608	70122.38					26218.438

Figure 17. Samples from MarketingStyle subset of SynthTabNet dataset

权利人	张鹏
共有情况	
坐落	北京市朝阳区... 房屋坐落
不动产单元号	
权利类型	国有建设用地使用权/房屋所有权
权利性质	出让
用途	城镇住宅用地/住宅
面积	分摊土地面积:19.00m ² /房屋建筑面积:72.91m ²
使用期限	国有建设用地使用权 2039年12月31日止
权利其他状况	

(a) Original table.

N. dt	
权利类型	出让/房屋所有权
权利性质	出让
用途	城镇住宅用地/住宅
面积	分摊土地面积:19.00m ² /房屋建筑面积:72.91m ²
使用期限	国有建设用地使用权 2039年12月31日止
权利其他状况	

(b) Recognized table.

Figure 18. Example of the algorithm performance for a table captured with a camera.