Image-based Table Cell Detection: a Novel Table Structure Decomposition Method with New Dataset

> Dafeng Wei, Hongtao Lu, Yi Zhou, Kai Chen Shanghai Jiao Tong University Email: {weidafeng, htlu, zy 21th, kchen}@sjtu.edu.cn

## Two main tasks and our contributions

- 1. How to annotate table cell efficiently or even automatically?
  TableCell dataset:
- 2. How to improve table cell and structure decomposition?
  - Table Projection Module

### Table-wise to Cell-wise annotations

#### ATTACHMENT ONE: EVALUATION CRITERIA

Mandatory Requirements. The first table lists the mandatory requirement for Supplement Two of this RFP. If the offeror's Proposal meets the mandatory requirement of a Supplement, the offeror's Proposal may be included in the next part of the technical evaluation phase for those Supplements as described in the next table.

Mandatory Requirements -Salesforce Projects		Accep t
Supplement Two: The Offeror or Subcontractor has performed and successfully, completed at least two (2) Salesforce full lifecycle development projects (e.g., design, development and production deployment) within the last four years. Each project must have been for any Fortune500/Global500 entity or Governmental institution, including, but not limited to Federal, State, Higher Education or Local/Municipal.		
Supplement Two: The Offeror or Subcontractor must be listed as a Registered or higher partner on the Salesforce AppExchange at the time of proposal submission as listed on https://appexchange.salesforce.com/consulting		

Scored Criteria. In the technical evaluation phase, the State will rate the technical merits of the Proposals based on the following requirements and the weight assigned to each requirement:

Supplement Two Salesforce Projects In addition to the Mandatory Requirements Scored Criteria pertaining to Supplement Two						
Scored Criteria	Weight	Does Not Meet	Partially Meets	Meets	Exceeds	
Offeror or subcontractor must demonstrate capabilities as a Firm in performing Salesforce Based Application Development Projects (Supplement Two, Section 2.1)	25	0	2	5	7	
Offeror or subcontractor must demonstrate capabilities to Provide Qualified Personnel and Teams to performing Salesforce Based Application Development Projects (Supplement Two, Section 2.2)	75	0	2	5	7	
Offeror or subcontractor development tools, accelerators, methodologies and capabilities designed to produce high-quality, on-time and cost-effective Applications based upon the Salesforce platform (Supplement Two, Section 2.3)	75	0	2	5	7	
Offeror or subcontractor must demonstrate Enterprise Integration capabilities, experience, expertise, tools, methods and accelerators associated with the integration of Salesforce, Cloud, Commercial Packages and Custom Applications using ESB (SOA and File- based) integration capabilities. (Supplement Two, Section 2.4)	25	0	2	5	7	
Offeror or subcontractor must demonstrate capabilities (Firm, Personnel, Tools, Methods) in developing high value, high quality Salesforce Applications for other Governmental or Commercial clients based on the Salesforce platform, ApoExchance and 3 <sup>rd</sup> Party	100	0	2	5	7	

Page 16 of 63

REP: Salesforce Managed Service and Projects

Raw image

### Table-wise to Cell-wise annotations

#### ATTACHMENT ONE: EVALUATION CRITERIA

Mandatory Requirements. The first table lists the mandatory requirement for Supplement Two of this RFP. If the offeror's Proposal meets the mandatory requirement of a Supplement, the offeror's Proposal may be included in the next part of the technical evaluation phase for those Supplements as described in the next table.

Mandatory Requirements -Salesforce Projects	Reject	Accep t
Supplement Two: The Offeror or Subcontractor has performed and successfully completed at least two (2) Salesforce full lifecycle development projects (e.g., design, development and production deployment) within the last four years. Each project must have been for any Fortune500/Global500 entity or Governmental institution, including, but not limited to Federal, State, Higher Education or Local/Municipal.		
Supplement Two: The Offeror or Subcontractor must be listed as a Registered or higher partner on the Salesforce AppExchange at the time of proposal submission as listed on https://appexchange.salesforce.com/consulting		

Scored Criteria. In the technical evaluation phase, the State will rate the technical merits of the Proposals based on the following requirements and the weight assigned to each requirement:

Supplement Two Salesforce Projects In addition to the Mandatory Requirements Scored Criteria pertaining to Supplement Two						
Scored Criteria	Weight	Does Not Meet	Partially Meets	Meets	Exceeds	
Offeror or subcontractor must demonstrate capabilities as a Firm in performing Salesforce Based Application Development Projects (Supplement Two, Section 2.1)	25	0	2	5	7	
Offeror or subcontractor must demonstrate capabilities to Provide Qualified Personnel and Teams to performing Salesforce Based Application Development Projects (Supplement Two, Section 2.2)	75	0	2	5	7	
Offeror or subcontractor development tools, accelerators, methodologies and capabilities designed to produce high-quality, on-time and cost-effective Applications based upon the Salesforce platform (Supplement Two, Section 2.3)	75	0	2	5	7	
Offeror or subcontractor must demonstrate Enterprise Integration capabilities, experience, expertise, tools, methods and accelerators associated with the Integration of Salesforce, Cloud, Commercial Packages and Custom Applications using ESB (SOA and File- based) integration capabilities. (Supplement Two, Section 2.4)	25	0	2	5	7	
Offeror or subcontractor must demonstrate capabilities (Firm, Personnel, Tools, Methods) in developing high value, high quality Salesforce Applications for other Governmental or Commercial clients based on the Salesforce platform, AppExchange and 3rd Party	100	0	2	5	7	

#### ATTACHMENT ONE: EVALUATION CRITERIA

Mandatory Requirements. The first table lists the mandatory requirement for Supplement Two of this RFP. If the offeror's Proposal meets the mandatory requirement of a Supplement, the offeror's Proposal may be included in the next part of the technical evaluation phases for those Supplements as described in the next table.

Mandatory Requirements -Salesforce Projects	Reject	Accep t
Supplement Two: The Offeror or Subcontractor has performed and successfully completed at least two (2) Salesforce full lifecycle development projects (e.g., design, development and production deployment) within the last four years. Each project must have been for any Fortune500/Global500 entity or Governmental institution, including, but not limited to Federal, State, Higher Education or Local/Municipal.		
Supplement Two: The Offeror or Subcontractor must be listed as a Registered or higher partner on the Salesforce AppExchange at the time of proposal submission as listed on https://appexchange.salesforce.com/consulting		

Scored Criteria. In the technical evaluation phase, the State will rate the technical merits of the Proposals based on the following requirements and the weight assigned to each requirement:

Supplement Two Salesforce Projects In addition to the Mandatory Requirements Scored Criteria pertaining to Supplement Two						
Scored Criteria	Weight	Does Not Meet	Partially Meets	Meets	Exceeds	
Offeror or subcontractor must demonstrate capabilities as a Firm in performing Salesforce Based Application Development Projects (Supplement Two, Section 2.1)	25	0	2	5	7	
Offeror or subcontractor must demonstrate capabilities to Provide Qualified Personnel and Teams to performing Salesforce Based Application Development Projects (Supplement Two, Section 2.2)	75	0	2	5	7	
Differor or subcontractor development tools, accelerators, methodologies and capabilities designed to produce high-quality, on-time and cost-effective Applications based upon the Salesforce platform (Supplement Two, Section 2.3)	75	o	2	5	7	
Offeror or subcontractor must demonstrate Enterprise integration capabilities, experience, expertise, tools, methods and accelerators associated with the integration of Salesforce, Cloud, Commercial Packages and Custom Applications using ESB (SOA and File- based) integration capabilities. (Supplement Two, Section 2.4)	25	0	2	5	7	
Offeror or subcontractor must demonstrate capabilities (Firm, Personnel, Tools, Methods) in developing high value, high quality Salesforce Applications for other Governmenta or Commercial clients based on the Salesforce platform, AppExchange and 3 <sup>rd</sup> Party	100	0	2	5	7	

Page 16 of 63 RFP: Salesforce Managed Service and Projects Page 16 of 63 RFP: Salesforce Managed Service and Projects

Raw image

### Table-wise annotations TableBank<sup>[1]</sup>

[1] M. Li, etc, "Tablebank: Table benchmark for image-based table detection and recognition"

### Table-wise to Cell-wise annotations

#### ATTACHMENT ONE: EVALUATION CRITERIA

Mandatory Requirements. The first table lists the mandatory requirement for Supplement Two of this RFP. If the offeror's Proposal meets the mandatory requirement of a Supplement, the offeror's Proposal may be included in the next part of the technical evaluation phase for those Supplements as described in the next table.

Mandatory Requirements -Salesforce Projects	Reject	Accep t
Supplement Two: The Offeror or Subcontractor has performed and successfully completed at least two (2) Salesforce full lifecycle development projects (e.g., design, development and production deployment) within the last four years. Each project must have been for any Fortune500/Global500 entity or Governmental institution, including, but not limited to Federal, State, Higher Education or Local/Municipal.		
Supplement Two: The Offeror or Subcontractor must be listed as a Registered or higher partner on the Salesforce AppExchange at the time of proposal submission as listed on https://appexchange.salesforce.com/consulting		

Scored Criteria. In the technical evaluation phase, the State will rate the technical merits of the Proposals based on the following requirements and the weight assigned to each requirement:

Supplement Two Salesforce Projects In addition to the Mandatory Requirements Scored Criteria pertaining to Supplement Two						
Scored Criteria	Weight	Does Not Meet	Partially Meets	Meets	Exceeds	
Offeror or subcontractor must demonstrate capabilities as a Firm in performing Salesforce Based Application Development Projects (Supplement Two, Section 2.1)	25	0	2	5	7	
Offeror or subcontractor must demonstrate capabilities to Provide Qualified Personnel and Teams to performing Salesforce Based Application Development Projects (Supplement Two, Section 2.2)	75	0	2	5	7	
Offeror or subcontractor development tools, accelerators, methodologies and capabilities designed to produce high-quality, on-time and cost-effective Applications based upon the Salesforce platform (Supplement Two, Section 2.3)	75	0	2	5	7	
Offeror or subcontractor must demonstrate Enterprise Integration capabilities, experience, expertise, tools, methods and accelerators associated with the Integration of Salesforce, Cloud, Commercial Packages and Custom Applications using ESB (SOA and File- based) integration capabilities. (Supplement Two, Section 2.4)	25	0	2	5	7	
Offeror or subcontractor must demonstrate capabilities (Firm, Personnel, Tools, Methods) in developing high value, high quality Salesforce Applications for other Governmental or Commercial clients based on the Salesforce platform, AppExchange and 3rd Party	100	0	2	5	7	

#### ATTACHMENT ONE: EVALUATION CRITERIA

Mandatory Requirements. The first table lists the mandatory requirement for Supplement Two of this RFP. If the offeror's Proposal meets the mandatory requirement of a Supplement, the offeror's Proposal may be included in the next part of the technical evaluation phase for those Supplements as described in the next table.

Mandatory Requirements -Salesforce Projects	Reject	Accep
Supplement Two: The Offeror or Subcontractor has performed and successfully completed at least two (2) Salesforce full lifecycle development projects (e.g., design, development and production deployment) within the last four years. Each project must have been for any Fortune500/Global500 entity or Governmental institution, including, but not limited to Federal, State, Higher Education or Local/Municipal.		
Supplement Two: The Offeror or Subcontractor must be listed as a Registered or higher partner on the Salesforce AppExchange at the time of proposal submission as listed on https://appexchange.salesforce.com/consulting		

Scored Criteria. In the technical evaluation phase, the State will rate the technical merits of the Proposals based on the following requirements and the weight assigned to each requirement:

Scored Criteria	Weight	Does Not Meet	Partially Meets	Meets	Exceeds
Offeror or subcontractor must demonstrate capabilities as a Firm in performing Salesforce Based Application Development Projects (Supplement Two, Section 2.1)	25	0	2	5	7
Offeror or subcontractor must demonstrate capabilities to Provide Qualified Personnel and Teams to performing Salesforce Based Application Development Projects (Supplement Two, Section 2.2)	75	0	2	5	7
Differor or subcontractor development tools, accelerators, methodologies and capabilities designed to produce high-quality, on-time and cost-effective Applications based upon the Salesforce platform (Supplement Two, Section 2.3)	75	o	2	5	7
Offeror or subcontractor must demonstrate Enterprise Integration capabilities, experience, expertise, tools, methods and accelerators associated with the Integration of Salesforce, Cloud, Commercial Packages and Custom Applications using ESB (SOA and File- based) integration capabilities. (Supplement Two, Section 2.4)	25	o	2	5	7
Differor or subcontractor must demonstrate capabilities (Firm, Personnel, Tools, Methods) in developing high value, high quality Salesforce Applications for other Governmental or Commercial clients based on the Salesforce platform, AppExchange and 3 <sup>rd</sup> Party	100	0	2	5	7

#### ATTACHMENT ONE: EVALUATION CRITERIA

Mandatory Requirements. The first table lists the mandatory requirement for Supplement Two of this RFP. If the offeror's Proposal meets the mandatory requirement of a Supplement, the offeror's Proposal may be included in the next part of the technical evaluation phase for those Supplements as described in the next table.

Mandatory Requirements -Salesforce Projects	Reject	Accep t
Supplement Two: The Offeror or Subcontractor has performed and successfully completed at least two (2) Salesforce full lifecycle development projects (e.g., design, development and production deployment) within the last four years. Each project must have been for any Fortune500/Global500 entity or Governmental institution, including, but not limited to Federal, State, Higher Education or Local/Municipal.		
Supplement Two: The Offeror or Subcontractor must be listed as a Registered or higher partner on the Salesforce AppExchange at the time of proposal submission as listed on https://appexchange.salesforce.com/consulting		

Scored Criteria. In the technical evaluation phase, the State will rate the technical merits of the Proposals based on the following requirements and the weight assigned to each requirement:

Scored Criteria	Weight	Does Not Meet	Partially Meets	Meets	Exceeds
Offeror or subcontractor must demonstrate capabilities as a Firm in performing Salesforce Based Application Development Projects (Supplement Two, Section 2.1)	25	0	2	5	7
Offeror or subcontractor must demonstrate capabilities to Provide Qualified Personnel and Teams to performing Salesforce Based Application Development Projects (Supplement Two, Section 2.2)	75	0	2	5	7
Dfferor or subcontractor development tools, accelerators, methodologies and capabilities designed io produce high-quality, on-time and cost-effective Applications based upon the Salesforce platform (Supplement Two, Section 2.3)	75	0	2	5	7
Differor or subcontractor must demonstrate Enterprise integration capabilities, experience, expertise, tools, nethods and accelerators associated with the entegration of Salesforce, Cloud, Commercial Packages and Custom Applications using ESB (SOA and File- based) integration capabilities. (Supplement Two, Section 2.4)	25	0	2	5	7
Differor or subcontractor must demonstrate capabilities (Firm, Personnel, Tools, Methods) in developing high value, high quality Salesforce Applications for other Governmental or Commercial clients based on the Salesforce platform, AppExchange and 3 <sup>rd</sup> Party	100	0	2	5	7

Page 16 of 63 RFP: Salesforce Managed Service and Projects

Cell-wise annotations TableCell(Ours)

Page 16 of 63 RFP: Salesforce Managed Service and Projects

: Salesforce Managed Service and Projects

#### Raw image

Table-wise annotations TableBank<sup>[1]</sup>

Page 16 of 63

RFP: Salestone Managed Service and Projects

[1] M. Li, etc, "Tablebank: Table benchmark for image-based table detection and recognition"

# Label manually?



Click & drag to move shape 'cell'

## Our methods



Pipeline of extracting columns and rows automatically using traditional morphological operations including erosion and dilation.

## Our methods



Pipeline of extracting columns and rows automatically using traditional morphological operations including erosion and dilation.

## Our methods



Pipeline of extracting columns and rows automatically using traditional morphological operations including erosion and dilation.

### How about tables with only partial lines?



The proportion and numbers of objects with different size in

dataset TableCell. {small, middle, large} objects correspond to the area  $\{< 32^2, 32^2 \sim 96^2, > 96^2\}$ , respectively.

Fig. 4.



ETTERIORAL TY

田静

月公司股东权益受动表

	# Total images	# Total cells	# Electronic images	# Electronic cells	# Scan images	# Scan cells
Train	3684	122354	3500	99632	184	22722
Val	1578	47652	1532	43935	46	3717
Total	5262	170006	5032	143567	230	26439

72.053.171.34 647.346.455.58 5.291.385.000.78

#### Criteria 2: Strong Leadership

The leaders of a charter school are stewards of the charter's mission and vision and carry out their duties in a professional, responsible and ethical manner. Charter school leaders use their influence and authority for the primary purpose of achieving student success. Criteria 2: Strong Leadership

The leaders of a charter school are stewards of the charter's mission and vision and carry out their duties in a professional, responsible and ethical manner. Charter school leaders use their influence and authority for the primary purpose of achieving student success.

	The criteria for judging the quality of Strong Leadership	Quality of element broadly equivalent to the following would be assessed at Level 5	Quality of element broadly equivalent to the following would be assessed at Level 2
2.1	Effectively communicates and engages statisticities in the estation and obten of the school	The back and school leadership clearly and effectively communicate the mission, goals, pedagogical approach and education model of the school with all effectent Stakholder groups. Stakholders are active supporters and communications of the mission and vision to the school community. The mission and subinor of the school is clearly articulared, well-known by school stakeholders, and implemented in daily protice.	Communication regarding the mission and vision with takeholders is sporadic and/or inconsistent. The school's mission and vision are known and understood by few of the school's stakeholders.
2.2	Generates and sustains a school culture conductes to staff professional growth	The school leadership provides professional development opportunities that advance the effectiveness of standing and learning and monitors that professional development for impact on school achievement. There is open and clear communication between students, staff, and administration; and teachers are empowered to demonstrate teacher leadership throughout the school, as well as establish goals for professional growth.	Staff development is restricted to individuals with title or no link to meeting overall solvholide peaks or to the performance of students. The types of professional development in which tranchers participate are limited and/or not relevant to individual and schoolwide needs. Staff does not set goals for professional growth.
2.3	Trease and individually with fairness, ingointy and respect.	School leaders ensure that school policies regarding equal opportunity and utiliarkel hansamme are effectively implemented. There is open communication among the staff and with the leadership team. School stakeholders report that they are treated with fairness, dignity, and respect and that school leadership is working effectively to create an optimal teaching and learning environment.	There are gaps in communication in the school. Policies regarding equal opportunity and unlawful harassment are nonexistent are/or ineffectively implemented. Stakeholders do not feel they have a voice in the school.

1000

-

-

1000

## Difficulty in Table structure decomposition



Or just blank?

#### Calendar of meetings:

The calendar of meetings is the following:

N°	Date	N°	Date	N	Date
1	08/04/2014	5	12/02/2015	9	12/11/2015
2	04/06/2014	6	16/04/2015	1	
3	04/09/2014	7	24/06/2015	8	
4	20/11/204	8	23/09/2015		

## Column and row projection



Given the input feature map I, row projection averages each row and simply replaces each value with the calculated mean value, i.e.

$$\hat{I}_{ij} = \frac{1}{W} \sum_{j=1}^{W} I_{ij}$$

### **TPM:** Table Projection Module







(b) Table Projection in Resnet

Fig. 7. We use TPM as an explicit row and column feature extraction module in the downsample shortcut path of ResNet backbone. The format of Conv block is {*input*, *output*, *kernel\_size*}.

(a) Resnet bottleneck.

### Results

TABLE IIIEVALUATION RESULTS ON TABLECELL DATASET WITH RESNET-50 AS THE BACKBONE NETWORKS. AP MEANS MAP AVERAGED OVER: $\{0.5:0.05:0.95\}$  IOU THRESHOLD,  $AP_{\{50,75\}}$  means map at  $\{0.50, 0.75\}$  IOU THRESHOLD and  $AP_{\{s,m,l\}}$  represents for<br/> $\{small, medium, large\}$  objects of area  $\{<32^2, 32^2 \sim 96^2, \ge 96^2\}$ .

			Compor	ients				Average I	Precision		
	TPM	0.25 ratio	OHEM	Focal Loss	Soft-NMS	AP	AP_50	AP_75	AP_s	AP_m	AP_l
Baseline						0.807	0.895	0.874	0.685	0.848	0.777
	$\checkmark$					0.818	0.895	0.874	0.712	0.858	0.783
0 11	$\checkmark$	$\checkmark$				0.833	0.915	0.894	0.685	0.884	0.789
Our models	$\checkmark$	$\checkmark$	$\checkmark$	$\checkmark$		0.844	0.918	0.907	0.719	0.889	0.797
	$\checkmark$	$\checkmark$	$\checkmark$	$\checkmark$	$\checkmark$	0.848	0.918	0.907	0.721	0.894	0.801

TABLE VResults on one-stage FCOS and two-stage MaskRCNN verify our plug-and-run module TPM can bring consistent improvements.

				Average Pre	ecision		
	TPM	AP	AP_0.50	AP_0.75	AP_s	AP_m	AP_1
FCOS	$\checkmark$	0.776 0.783	0.893 0.893	0.85 0.852	0.69 0.708	0.816 0.821	0.726 0.73
Mask RCNN	$\checkmark$	0.828	0.878 0.906	$0.867 \\ 0.886$	0.758 0.76	0.852 0.873	0.805 0.788

### Results

store sugar enables	2010.00		#Q. II		STATE MARKSWARD
H H	1018	CALCULATION OF	1410 (11928-W		CHIER DO N H MA
82245	1.1.0	100000000000	- B B C D C 100.00		LE RAREA
RAY BREAL	12163-14	CONTRACTOR IN INC.	THE PARTY OF LANSING MALE AND		All PARA
. Reads	Alling	COLUMN STATES	CALCOLOGY, MANUEL		AL REALST
Contra Contra	COLUMN TO D	Carlos Britished Ann	Contraction and all		WALKING
HWER .	01112+142	CONTRACTOR AND TO	the lot with the state		THE D BOY DOL
DARN	中北に十四日	APR. 877, 881, 74	14,28,382.39		DATED PROFILE
4855	neilli 108	patt0.00	SHELOD		10100000
NSRR	+12141	CHARLEN AND INC. OF	121110000,00.0		COLLID MILEN
AT1 8670		COLUMN 11 11 11 11	CALL NORY AND A		一一 一 一 一 一 一 一 一 一 一 一 一 一 一 一 一 一 一 一
WEAK.	10000	Concept 1 (1980) (194, 10	Coll Division of the		CALLED THE MERICA
b. Long	CONTRACTOR OF	WILL MEDTER ADD. AL	Cold Provide 3rd, 41		h until
REEL FRANK *** SERIE	- ALCONTINGS	CONTRACTOR AND	11100/.m.m		ALAYAR YARAH ST ALAMY
N中, 计数数上出标单数干量的电量和60	mailed 248	wittin auras, that he	4.101.000.011		四中, 对那是主命和由资产进行
但於於數葉是特殊處 (由本)(14-1月4年)	-100 SO		CHURD, UP		自然的普索加强曲 与原有技 "一"
化产业器和书 (新生活) 不广节者(新)	THE OTHER	cel23.00	Dell 1 00		有产业费利用: (在出出 *** 年後
四年代建立了新生产一个专家用1	PAGED 392	Call \$ 5151, 816, 72	Sold Block and Br		(二) 営業用語(空影品 *-** 管備用)
A CARDINA A	0.00100	10 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1		A POTT &
L NHOR (SHORN 1-7 THUS)	PACED DE	1 10 10 10 10 10	CALL INCOME. AND IN		IN-TERMENT CONTINUES
6. 1194254	0.000000	THE PROPERTY AND ADDRESS	COLUMN TWO IS NOT IN COLUMN		CHARLES PROVIDENT
· 2444 18983 1-19400	1	6,040,054.75	COLUMN TWO IS NOT		FRIENDLATER " THERE
1-1 Submonth	96.010+3	00.1313	te 21.00		T-1 Bergester (1.8)
1.0400.0400 (3-580) < 4.0.41	Perien BB	CHELSON PL 15	Course of Capity of Marchine		CONTRACTOR OF AND A
101-0-0-0-0-0-0-0-0-0-0-0-0-0-0-0-0-0-0		OF LINE	00.1019		The statement of the state of t
THE PARTICULAR PROPERTY AND A DESCRIPTION OF A DESCRIPTIO	College Coll	COLUMN AND ADD	Cr621.00		COLUMN TRAVELOW OF
LODGED CPREAT VAN	- PALED BR	and light on th	and the second second		LODNER IPPER
. aecontitel.es	-	or(00.00	- 10.010		PERSONAL PROPERTY AND INCOME.
1-2 1003-040-040-050-040-050-040-040-040-040-040	- Carlos - Carlos	or(10.241	14(1)0.3(8 -		
1.1945586820386948	CALLED, DR	00.41114	ee d'ann		2018年後期日本在展示的工作成开始
111 年期主要的公司自计划电话编		20.011.09	-		この知日を取り並往に当たい 対象法部
CITE SPECT SHITTER CONTRACT	-	and the second			111 5.80.7 + 875-0417,555
111 BAR THE BURGERS	and all the local	CHERT THE COL	CALIFORNIA CONTRACTOR		CONTRACTOR AND AND ADDRESS OF THE
III TALBORS / LATCHER!	CELEV. No.		COLUMN AND		
10 单位影响影响自然主要方向并不能在都是个现在					一心理计解的正确能和任意计会人不停
INT NOOSESSMELEY AND	-			1	1411年1月1日日本日本日本日本日本日本日本日本日本日本日本日本日本日本日本日本日本日本
121 4-54(54(54))	-	CHOED DB	nellio.mp		111+00(522025
(二)私妻子小監督主的法规指令法从此拘留评制	COLUMN TWO	00,0113.00	Cell1.00.		1213187-0428-055-88910-0
CONTRACTOR AND ADDRESS	COLUMN I	COLUMN STREET	14 10 Doctors, 161 15.		LUID BOTTO DE L'ANDAR
1.1.9187200882008444		102.105.304 45	100,100,000 442		THE ROLF CHARLEND PR. CO.
. works		CALLOR IN CALLSON	-		COLUMN THE OWNER
1-1844000		1			1.6月17 萬年9月5月
(T) PROPERTY.	- PER				1.202.建筑加速度注
and the second se	SARA ISS.	Dit Office	an paper		SCREE, ST.
AND					1517-16
511-5-1	100	121	1917-0-1		100
and	印		四九		
(ALL)	· [10]		理土		
1973 1973	· [PP		四大		
(a	· m		(M.C.)		
(a	· <u>F</u>		四主		
(a	, 即 )		N.C.		
(a	)		[Ff:土]		
(a	) )	cellio.s	[理主] 9 <del>0</del>		cell[0.99
(a	) ) 99		PE ±	1	cell[0.99
(a	) ) 99 99	cellio.s	(新生) (日 (日) (日) (日) (日) (日) (日) (日) (日) (日)		cell[0.99
(a	) ) 99 99 99	cellio.s	19 19 19		celli0.99 cell(0.99 cell(0.99
(a	) ) 99 99 99 99	cellio.s	192 192 192 192		celli0.99 celli0.99 celli0.99 celli0.99
(a	) 99 99 99	cell[0.9	1912) 192 192 192		celli0.99 celli0.99 celli0.99 celli0.99
(a	) 99 99 99 99	cell[0.9 cell[0.9 cell[0.9	1912 19 19 19		cellio.99 cellio.99 cellio.99 cellio.99 cellio.99
(a	) ) 99 99 99 99 99 99 99 99 99	cellio.s cellio.s cellio.s	19 19 19		celli0.99 celli0.99 celli0.99 celli0.99 celli0.99 celli0.99
(a	) ) ) ) ) ) ) ) ) ) ) ) ) ) ) ) ) ) )	cell[0.5 cell[0.5 cell[0.5			celli0.99 celli0.99 celli0.99 celli0.99 celli0.99 celli0.99
(a	) 29 29 29 29 29 29 29 29 29 29 20	cellio.s cellio.s cellio.s cellio.s			cellio.99 cellio.99 cellio.99 cellio.99 cellio.99 cellio.99 cellio.99
(a	) 29 29 29 29 29 29 29 20 00	cell[0.5 cell[0.5 cell[0.5 cell[0.5	1912 19 19 19 19 19		celli0.99 celli0.99 celli0.99 celli0.99 celli0.99 celli0.99 celli0.99
(a celij0. celij0.99 celij1. celij0.99 celij1.j celij0.99 celij1.j	) 99 99 99 99 99 99 99 99 99	cell[0.5 cell[0.5 cell[0.5 cell[0.5			cell[0.99 cell[0.99 cell[0.99 cell[0.99 cell[0.99 cell[0.99 cell[0.99 cell[0.99
(a	) 99 99 99 99 99 99 99	celijo.s celijo.s celijo.s	1912) 19 19 19 19 19 19		celli0.99 celli0.99 celli0.99 celli0.99 celli0.99 celli0.99 celli0.99 celli0.99 celli0.99

(c)





Fig. 8. Qualitative examples. Faster RCNN does not detect most long-range slender rectangle in fig (a) and our TPM accurately detects almost all cells in fig (b) and (e). We also test skewed table from Marmot to verify the generalization in fig (f).

(d)

## Want to know more?

- Email: weidafeng@sjtu.edu.cn
- Source Code and dataset: <a href="http://github.com/weidafeng/TableCell">http://github.com/weidafeng/TableCell</a>