



Table Extraction

Table Extraction & Few-shot Document Classification

Report date: 2025-03-28

■ Table Information Extraction

- Lookback
 - Introduction
 - Evaluation Metrics & Benchmark Datasets
 - Related Works
- CascadeTSRDet - Table Structure Recognition
 - Run Samples by Pre-trained model
 - Evaluation by Pre-trained model
 - Yooz English Dataset

- Evaluation by Pre-trained model
 - Yooz English Dataset

#	Task	Status	%	2.2025				3.2025				4.2025			
				1	2	3	4	1	2	3	4	1	2	3	4
1	Literature Review/Survey														
2	Evaluation SOTA														
2.1	+ TATR - Table Detection & Table Structure Recognition											F			
2.2	+ CascadeTSRDet - Table Structure Recognition														F
2.2.1	- Install	Done	100%					F							
2.2.2	- Run Samples by Pre-trained model	Done	100%						F						
2.2.3	- Evaluation by Pre-trained model	Done	100%									D	F		
	+ Yooz English Dataset														
	- Pre-processing														
	- Code														
	- Analysis														
2.3	+ TFLOP - Table Structure Recognition														
2.3.1	- Install											D			
2.3.2	- Train														
	+ PubTabNet Dataset														
	+ FinTabNet Dataset (need change code)														
2.3.3	- Evaluation on Yooz English Dataset														
3	Propose new method														
3.1	+ Ideas														
3.1.1	- Table Detection														
	+ How to use text and layout information more effectively?														
	- Network architecture														
	- Post-processing														
3.1.2	- Table Structure Recognition														
	+ How to use layout information more effectively?														
	- Post-processing														
3.1.3	- Semantic Analysis														
3.2	+ Implementation														



Table Information Extraction

Introduction



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Step 1 - Detection

DATE	TRANS #	PO #	DESCRIPTION	INV AMOUNT	OPEN AMOUNT
10/20/23	EB35947272		September First Call EB	-7.64	-7.64
11/02/23	3839272598	F03UAEKEMB	ELECTRONIC ORDER	15.99	15.99
11/06/23	3839273413	F09RKJEDRY	ELECTRONIC ORDER	163.52	163.52
11/10/23	3839274343	04985	Matt	4.01	4.01
11/13/23	3839274807	F084QXOZSX	ELECTRONIC ORDER	94.49	94.49
11/17/23	3839275665	F0K8LLCYI3	ELECTRONIC ORDER	8.99	8.99
11/17/23	3839275712	19474009	RETURNS	-197.66	-197.66
11/17/23	3839275858	F00PN6JFEP	ELECTRONIC ORDER	7.02	7.02
11/21/23	EB18599891		October First Call EB	-11.89	-11.89
11/27/23	3839277374	F05TBAQ7WG	ELECTRONIC ORDER	107.52	107.52
11/28/23	3839277793	1947358	return	-40.91	-40.91
11/29/23	3839277861	1947316	return	-39.62	-39.62

Continued on reverse side.

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20231228 002936877 25 00107672 002153 00105519 01 00 0

Step 2 - Table Structure Recognition

DATE	TRANS #	PO #	DESCRIPTION	INV AMOUNT	OPEN AMOUNT
10/20/23	EB35947272		September First Call EB	-7.64	-7.64
11/02/23	3839272598	F03UAEKEMB	ELECTRONIC ORDER	15.99	15.99
11/06/23	3839273413	F09RKJEDRY	ELECTRONIC ORDER	163.52	163.52
11/10/23	3839274343	04985	Matt	4.01	4.01
11/13/23	3839274807	F084QXOZSX	ELECTRONIC ORDER	94.49	94.49
11/17/23	3839275665	F0K8LLCYI3	ELECTRONIC ORDER	8.99	8.99
11/17/23	3839275712	19474009	RETURNS	-197.66	-197.66
11/17/23	3839275858	F00PN6JFEP	ELECTRONIC ORDER	7.02	7.02
11/21/23	EB18599891		October First Call EB	-11.89	-11.89
11/27/23	3839277374	F05TBAQ7WG	ELECTRONIC ORDER	107.52	107.52
11/28/23	3839277793	1947358	return	-40.91	-40.91
11/29/23	3839277861	1947316	return	-39.62	-39.62

[Data cell Column header cell Projected row header cell]

JSON ↓ **Step 3 – Semantic Analysis**

```
[ {
    "DATE": "10/20/23",
    "TRANS": "EB35947272",
    "PO": "-",
    "DESCRIPTION": "September First Call EB",
    "INV_AMOUNT": -7.64,
    "OPEN_AMOUNT": -7.64
},
...,
...,
...,
...,
... ]
```

returns header fields and line items as structured data.

Semantic Analysis: Problem

Facture

Numéro de document	32949658	ALSO France - 10 Avenue des Louvresses - 92 230 Gennevilliers
Date	15.04.2019	
No client	10813679	
TVA client	FR3380224	
Modalités de paiement	Traite Non acc	
Délai de paiement	60 jours nets	
Echéance	14.06.2019	
Page	2/3	

+ Combined Information
+ Multi Lines
+ Dynamic Format

Art.N°	Désignation	Quantité/Unité	Prix H.T.	Total
Sap N° 2005337 Pos N° 900	EAN Code 8714574605517 Art. No. de client 79384946	Pays d'origine DE	dont prix HT 21.79 dont DEEE 0.02	65.37 0.06
T6N04AE#UUS	HP 303XL High Yield Black Ink Cartridge	5	23.79 23.76	118.95 118.90
C8772EE#UUS	HP 363 cartouche dencre magenta	2	11.82 11.81	23.64 23.62
910-002731	LOGITECH M187 Souris Sans Fil USB Noire	1	12.70 12.65	12.70 12.65
HLL2350DWRF1	BROTHER HLL2350DWRF1 Monochrome printer	2	85.51 84.91	171.02 169.82
CC654AE#UUS	HP 901XL CARTOUCHE NOIRE OFFICE	2	25.90 25.89	51.80 51.78
C13T664340	EPSON T6643 magenta ink (RDK)(EK)BLISTER	1	6.45 6.45	6.45 6.45
			Prix Total H.T. TVA 20,0 % Montant Total EUR	809.48 161.90 971.38

Nous vous remercions de bien vouloir nous faire parvenir vos règlements sur le compte bancaire mentionné ci-dessous (BNP Paribas).
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07/26/2024	PO# 2254283	Received \$0.00	Total \$650.96	Balance \$650.96
Invoice #16387 A056674 12/16				
2019 BMW X5, White		VIN: 5UXCR6C56KLL40069	Stock/Ro: T-4785	
10/30/2024	PO# 2257401	Received \$0.00	Total \$585.75	Balance \$585.75
Invoice #17263				
2024 BMW X7, Black		VIN: 5UX23EM01R9U35155	Stock/Ro: T 3984	
11/14/2024	PO# 2257907	Received \$0.00	Total \$1,943.91	Balance \$1,943.91
Invoice #17453				
2022 BMW M4, Green		VIN: WBS33BA09NCK01666	Stock/Ro: T 4417	
11/15/2024	PO# 2257953	Received \$0.00	Total \$1,500.24	Balance \$1,500.24
Invoice #17464				
2020 BMW M4, Blue		VIN: WBS4Y9C00LFJ74798	Stock/Ro: T 6720	
11/20/2024	PO# 2258118	Received \$0.00	Total \$498.64	Balance \$498.64
Invoice #17506 A056427 12/11				
2022 BMW 3 Series, Black		VIN: 3MW5R1J06N8C30247	Stock/Ro: T 5492	

Semantic Analysis: By LLM

Art.N°	Désignation	Quantité/Unité	Prix H.T. Unitaire	Total
Sap N° 2005337 Pos N° 900	EAN Code 8714574605517 Art. No. de client 79384964	Pays d'origine DE	dont prix HT 21,70 dont DEEE 0,02	65,27 0,06
T6N04AE#UUS Sap N° 2876028 Pos N° 1000	HP 303XL High Yield Black Ink Cartridge EAN Code 190780571101	Pays d'origine US	5 dont prix HT 23,79 dont DEEE 0,01	118,95 23,78 0,05
C8772EE#UUS Sap N° 2509383 Pos N° 1100	HP 363 cartouche dencre magenta EAN Code 889894729071	Pays d'origine IE	2 dont prix HT 11,82 dont DEEE 0,01	23,64 11,82 0,02
910-002731 Sap N° 1747426 Pos N° 1200	LOGITECH M187 Souris Sans Fil USB Noire EAN Code 5099206032187	Pays d'origine NL	1 dont prix HT 12,70 dont DEEE 0,01	12,70 23,62 0,02
HLL2350DWRF1 Sap N° 2953837 Pos N° 1300	ART. NO. 79367074 BROTHER HLL2350DWRF1 Monochrome printer EAN Code 4977766782524	Pays d'origine CN	2 dont prix HT 85,51 dont DEEE 0,60	171,02 84,91 169,82 1,20
Numéro de série E78252M8N803214, E78252M8N803222 CC654AE#UUS Sap N° 1553575 Pos N° 1400	ART. NO. 79149105 HP 901XL CARTOUCHE NOIRE OFFICE EAN Code 884962780428	Pays d'origine NL	2 dont prix HT 25,90 dont DEEE 0,01	51,80 25,89 51,78 0,02
C13T664340 Sap N° 2305004 Pos N° 1500	ART. NO. 79149105 EPSON T6643 magenta ink (RDK)(EK)BLISTER EAN Code 8715946540993	Pays d'origine CN	1 dont prix HT 6,45	6,45 6,45 6,45

Column Header

Column Value

Désignation

HP 303XL High Yield Black Ink Cartridge
EAN Code 190780571101 Pays d'origine US

Extract only the **product name** from the text in a table,
without any additional information.

LLM



JSON

```
[{
  ...
  "product_name": "HP 303XL High Yield Black Ink Cartridge",
  ...
},
{...}, {...}, {...}, {...}, {...}, {...}, {...}]
```

Evaluation Metrics & Benchmark Datasets

- Precision, Recall, and F1-Score

- **Precision** = $\frac{TP}{TP+FP}$

Measures how many of the detected tables are correct.

- **Recall** = $\frac{TP}{TP+FN}$

Measures how many of the actual tables were detected.

- **F1-Score** = $\frac{2 \times \text{Precision} \times \text{Recall}}{\text{Precision} + \text{Recall}}$

A harmonic mean of precision and recall, balancing both.

- Intersection over Union (IoU)

$$IoU = \frac{\text{Area of Overlap}}{\text{Area of Union}}$$

- Mean Average Precision (mAP)

- The average precision over multiple IoU thresholds (e.g., 0.5, 0.75).

Evaluation Metrics: Table Structure Recognition

■ TEDS: Tree-Edit-Distance-based Similarity [1]

- Convert Tables to Tree Representation
- Compute Tree Edit Distance
- Calculate Similarity Score

■ Advantages of TEDS

- Structure-aware – Evaluates row/column hierarchy instead of treating tables as simple grids.
- Handles merged cells – Accounts for complex structures like rowspan and colspan.
- Text-sensitive – Checks if text is assigned to the correct cell.
- Robust metric – Works well for both simple and complex tables.

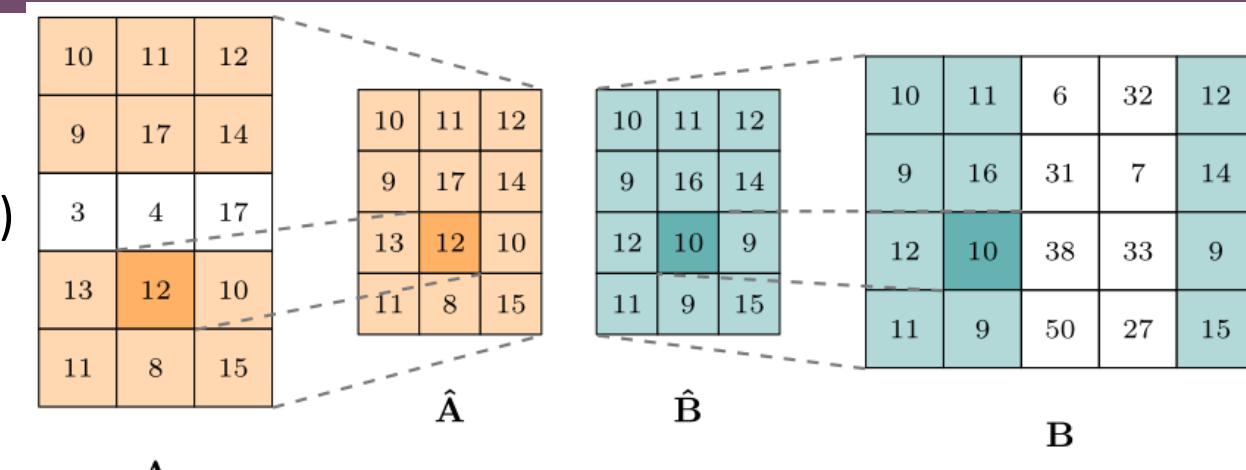
$$TEDS = 1 - \frac{\text{Edit Distance}}{\max(\text{Tree Size of Ground Truth}, \text{Tree Size of Prediction})}$$

- **TEDS = 1** → Perfect match
- **TEDS = 0** → Completely incorrect structure
- Scores between 0 and 1 indicate partial correctness.

Evaluation Metrics: Table Structure Recognition

■ GriTS: Grid table similarity [1]

- Represent Tables as Grids
- Compute Cell-Level IoU (Intersection over Union)
- Match Cells and Compute Similarity Score
- Final GriTS Score Calculation



■ Key Features of GriTS

- Grid-based approach – Evaluates tables as structured 2D grids, aligning well with how tables are processed.
- Handles merged cells – Accounts for rowspan and colspan, making it robust for complex tables.
- IoU-based matching – Provides a soft similarity score instead of strict binary correctness.
- Fine-grained evaluation – Measures both structure and text correctness at the cell level.

$$GriTS = \frac{1}{N} \sum_{i=1}^N \frac{\text{IoU of Cell } i}{\max(\text{Rowspan}, \text{Colspan})}$$

[1] B. Smock et al., "GriTS: Grid table similarity metric for table structure recognition", ICDAR 2023.

Evaluation Metrics: Table Structure Recognition

■ Comparison: GriTS vs. TEDS

Metric	GriTS (Grid Table Similarity)	TEDS (Tree Edit Distance Similarity)
Approach	2D grid-based (rows, columns, cells)	Tree-based (hierarchical structure)
Structure Handling	Handles merged cells (rowspan/colspan) well	Good for nested structures but sensitive to minor errors
Matching	IoU-based soft matching	Edit distance (insertion, deletion, substitution)
Use Case	Better for detecting table layout and grid structure	Better for logical structure and hierarchy
Computational Cost	Lower (faster)	Higher (slower)

Benchmark Datasets

- Table Detection and Table Structure Recognition

#	Dataset	Domain	#Images	#Tables	Detection	Recognition
1	PubTables-1M	Scientific articles	460k	1M	Yes	Yes
2	FinTabNet	Financial reports	48k	113k	Yes	Yes
3	ICDAR-2013	Small expert-labeled dataset		256	Yes	Yes
4	PubTabNet	HTML annotations of tables extracted from scientific articles.	520k		?	Yes
5	PubLayNet	Public Domain	335k		Yes	No
6	Yooz-English-Train	Finance Domain	1700	-	Yes	Yes
7	Yooz-English	Finance Domain	200	-	Yes	Yes

Related Works

- Table Detection and Table Structure Recognition

Method	Table Structure Recognition					Table Detection			Information	
	TEDS-struc.(%)			GriTSCon		mAP				
	FinTabNet	PubTables1M	PubTabNet	PubTables1M	ICDAR-2013	FinTabNet	PubTables1M	ICDAR-2013		
TFLOP [1]	99.56		98.38						V + L + T	
CascadeTSRDet [2]	99.08	99.19	96.99						V	
SEMv3 [3]			97.5						V	
TDeLTA [4]						76.08	98.02		V + L + T	
UniTable [5]	98.89		97.89						V	
UniTabNet [6]			97.5						V+L+T	
TATR [7,8]				98.5	98.11		97	88	V	

- On a large public dataset, the accuracy of both TD and TSR is very high.
- However, on the ICDAR-2013 dataset, Table Detection performs poorly.
- Recently, there has been a trend of using Visual, Layout, and Text for TSR.

[1] M. Khang et al., "TFLOP: Table Structure Recognition Framework with Layout Pointer Mechanism" , IJCAI 2024.

[2] B. Xiao et al., "CascadeTSRDet: Rethinking Detection Based Table Structure Recognition for Visually Rich Document Images" , Expert Systems With Applications 2025.

[3] C. Qin et al., "SEMv3: A Fast and Robust Approach to Table Separation Line Detection", JCAI-24.

[4] Y. Fan et al., "TDeLTA: A Light-weight and Robust Table Detection Method based on Learning", AAAI 2024.

[5] S. Peng et al., "UniTable: Towards a Unified Framework for Table Recognition via Self-Supervised Pretraining", Table Representation Learning Workshop at NeurIPS 2024.

[6] Z. Zhang et al., "UniTabNet: Bridging Vision and Language Models for Enhanced Table Structure Recognition", EMNLP 2024.

[7] B. Smock et al., "PubTables-1M: Towards Comprehensive Table Extraction From Unstructured Documents ", CVPR 2022. -> **TATR (Microsoft)**

[8] B. Smock et al., "Aligning benchmark datasets for table structure recognition", ICDAR 2023. -> **TATR (Microsoft)**



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Yooz English Dataset

Yooz English Dataset for Table Structure Recognition

■ Yooz English: 199 Images

- Normal: Full table, our annotated table bounding box.
 - Small: Smallest Y of bounding box containing the information to be extracted. Reduce Y closer to the Y of the last extracted row.

Yooz English Small

DATE	DOCUMENT / TRANSACTION	PURCHASES	PAYMENTS & CREDITS	BALANCE
		PREVIOUS BALANCE		
04JAN24	712621	109.14		

VENDOR			BALANCE	# DAYS	P.O. NUMBER/COMMENTS
DATE	REFERENCE	AMOUNT			
KAYSER FORD INC					
101223	00000752626	68.94	68.94	80	243089BOY
121233	0000186361P	13.84	13.84	40	503578
120723	0000186358P	26.46	26.46	24	503578
121523	0000187485P	319.31	319.31	16	15671
122623	0000187747P	188.87	188.87	5	15724
122923	0000188053P	24.05	24.05	2	15788

Reduce Y

Table Structure Recognition

- Evaluate CascadeTSRDet
 - Yooz English Dataset

Table Structure Recognition

recognize header fields and line items of table.

Input

DATE	TRANS #	PO #	DESCRIPTION	INV AMOUNT	OPEN AMOUNT
10/20/23	EB35947272		September First Call EB	-7.64	-7.64
11/02/23	3839272598	F03UAKEKBM	ELECTRONIC ORDER	15.99	15.99
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Output

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11/28/23	3839277793	1947358	return	-40.91	-40.91
11/29/23	3839277861	1947316	return	-39.62	-39.62

 Data cell
  Column header cell
  Projected row header cell

Evaluation Metrics: Table Structure Recognition

■ TEDS: Tree-Edit-Distance-based Similarity [1]

- Convert Tables to Tree Representation
- Compute Tree Edit Distance
- Calculate Similarity Score

■ Advantages of TEDS

- Structure-aware – Evaluates row/column hierarchy instead of treating tables as simple grids.
- Handles merged cells – Accounts for complex structures like rowspan and colspan.
- Text-sensitive – Checks if text is assigned to the correct cell.
- Robust metric – Works well for both simple and complex tables.

$$TEDS = 1 - \frac{\text{Edit Distance}}{\max(\text{Tree Size of Ground Truth}, \text{Tree Size of Prediction})}$$

- **TEDS = 1** → Perfect match
- **TEDS = 0** → Completely incorrect structure
- Scores between 0 and 1 indicate partial correctness.

Table Structure Recognition: CascadeTSRDet [1]

- It is better on Small than on Normal
 - We need remove empty space of table detection result
 - before execute table structure recognition

Method	Table Structure Recognition								Information	
	TEDS-text.(%)		TEDS-struc.(%)							
	Yooz-English-Small	Yooz-English	Yooz-English-Small	Yooz-English	FinTabNet	PubTables1M	PubTabNet			
TFLOP [1]	Not yet	Not yet	Not yet	Not yet	99.56		98.38		V + L + T	
CascadeTSRDet [2]	71.86%	49.12%	77.13%	59.95%	99.08	99.19	96.99		V	
TATR [7,8]	Not yet	Not yet	Not yet	Not yet					V	

[1] M. Khang et al., "TFLOP: Table Structure Recognition Framework with Layout Pointer Mechanism" , IJCAI 2024.

[2] B. Xiao et al., "CascadeTSRDet: Rethinking Detection Based Table Structure Recognition for Visually Rich Document Images" , Expert Systems With Applications 2025.

[7] B. Smock et al., "PubTables-1M: Towards Comprehensive Table Extraction From Unstructured Documents " , CVPR 2022. -> **TATR (Microsoft)**

[8] B. Smock et al., "Aligning benchmark datasets for table structure recognition", ICDAR 2023. -> **TATR (Microsoft)**

Table Structure Recognition: CascadeTSRDet [1]

■ on Small

- Structure Only
 - Score Group 50-100: **87.38%, 173/198 samples**
 - Score Group 75-100: 54.55%
 - Score Group 50-100: 32.83%
- Structure vs Structure + Text:
 - Score Group 50-100: **-8.08% (87.38% vs 79.29%)**
 - Score Group 75-100: 54.55% vs 49.49%
 - Score Group 50-100: 33.83% vs 29.80%

Chart by TEDS Score (Small)

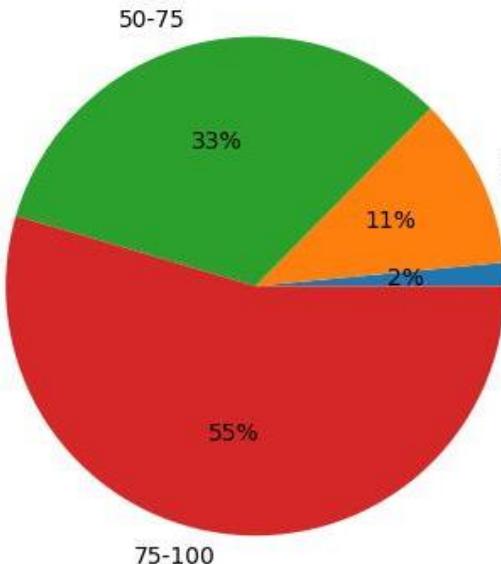
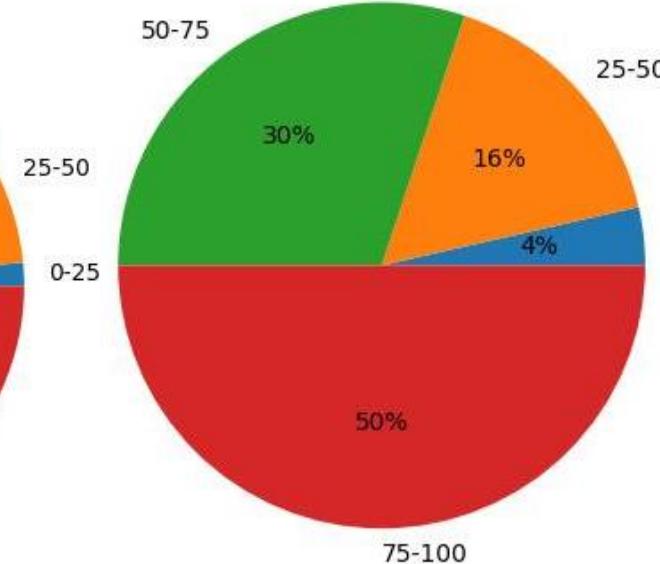


Chart by TEDS-text Score (Small)



Score Group	Small Dataset				Normal Dataset			
	Struct Only		Struct+Text		Struct Only		Struct+Text	
	SUM	%	SUM	%	SUM	%	SUM	%
0-25	3	1.52%	7	3.54%	18	9.09%	38	19.19%
25-50	22	11.11%	32	16.16%	53	26.77%	68	34.34%
50-75	65	32.83%	59	29.80%	72	36.36%	46	23.23%
75-100	108	54.55%	98	49.49%	54	27.27%	43	21.72%

Chart by TEDS Score (Normal)

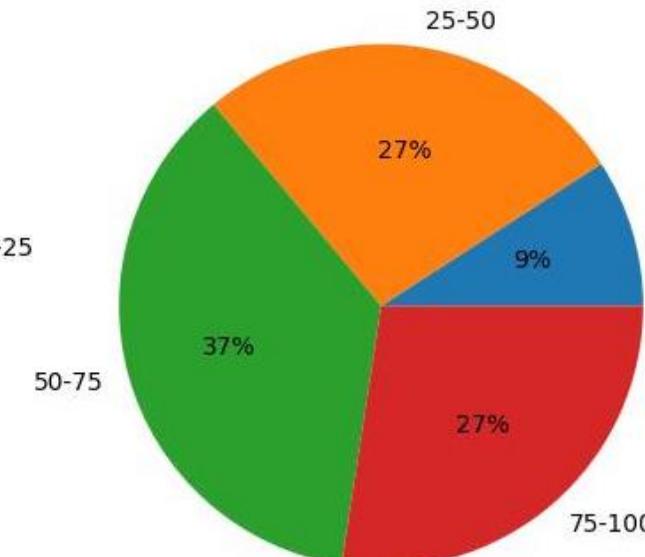


Chart by TEDS-text Score (Normal)

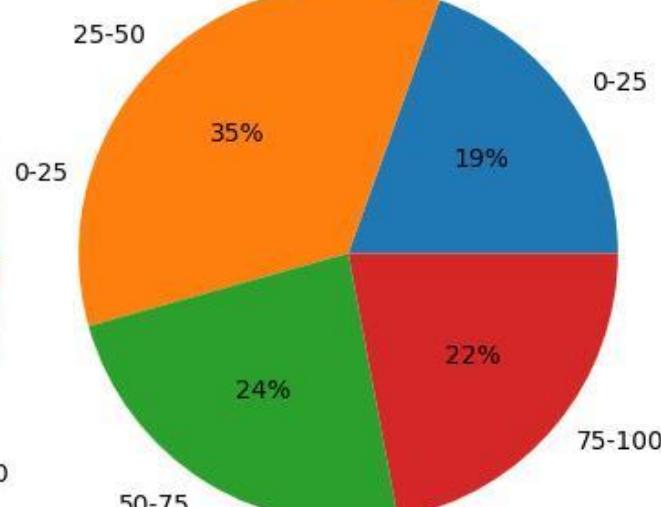


Table Structure Recognition: CascadeTSRDet [1]

- on Small
 - Structure Only
 - Score Group 90-100: **34.85%, 69/198 samples**
 - Structure vs Structure + Text:
 - Score Group 90-100: **-4.55% (34.85% vs 30.30%)**

Score Group	Small Dataset				Normal Dataset			
	Struct Only		Struct+Text		Struct Only		Struct+Text	
	SUM	%	SUM	%	SUM	%	SUM	%
0-10	0	0.00%	1	0.51%	4	2.02%	13	6.57%
10-20	2	1.01%	4	2.02%	9	4.55%	16	8.08%
20-30	5	2.53%	6	3.03%	14	7.07%	21	10.61%
30-40	6	3.03%	5	2.53%	24	12.12%	35	17.68%
40-50	12	6.06%	23	11.62%	20	10.10%	21	10.61%
50-60	18	9.09%	21	10.61%	22	11.11%	21	10.61%
60-70	31	15.66%	27	13.64%	33	16.67%	23	11.62%
70-80	29	14.65%	25	12.63%	28	14.14%	10	5.05%
80-90	26	13.13%	24	12.12%	13	6.57%	14	7.07%
90-100	69	34.85%	60	30.30%	30	15.15%	21	10.61%

Table Structure Recognition: CascadeTSRDet [1]

Chart by TEDS Score (Normal)

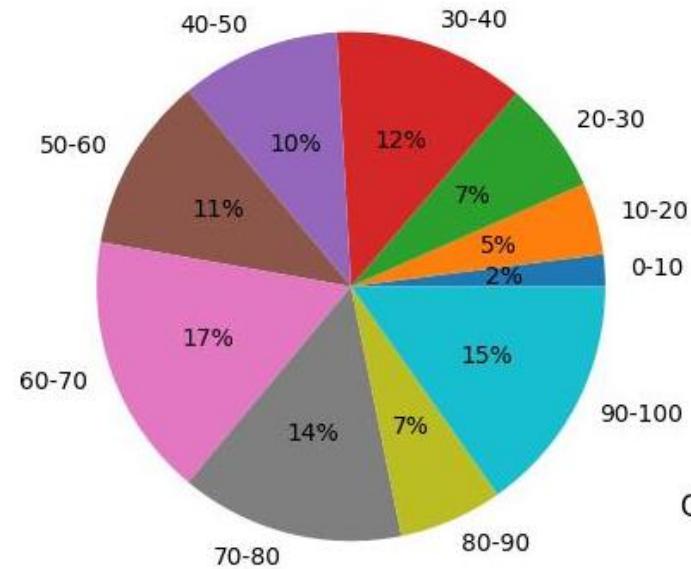


Chart by TEDS-text Score (Normal)

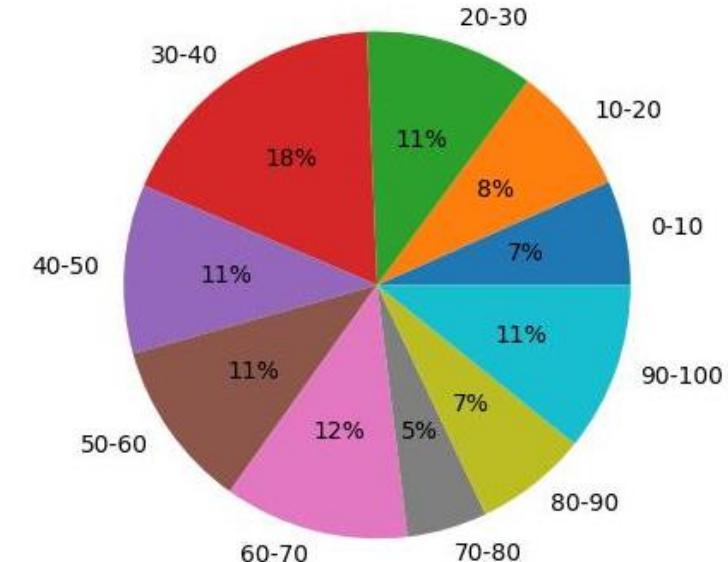


Chart by TEDS-text Score (Small)

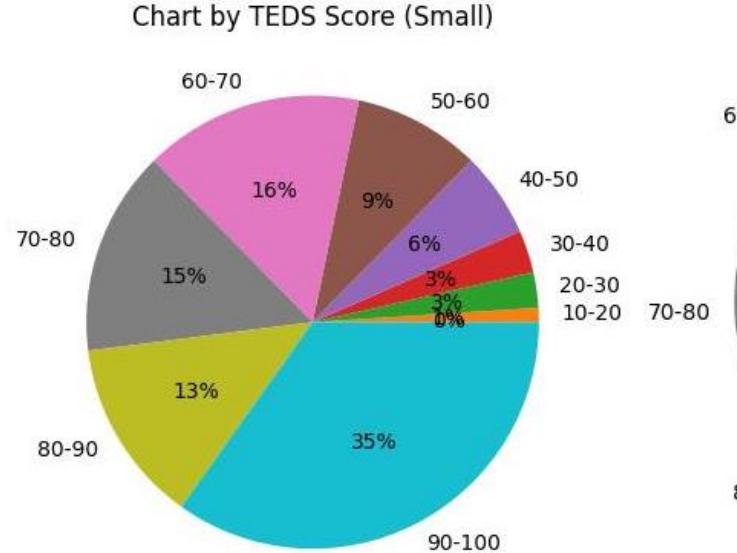


Table Structure Recognition

- Errors Analysis – Low Score Samples

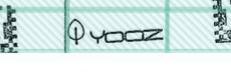
Table Structure Recognition: CascadeTSRDet [1]

- Analysis Errors on Small
 - Structure Only
 - Groups:
 - **10-20 (all 2 samples)**
 - **20-30 (all 5 samples)**
 - **70-80 (some samples)**

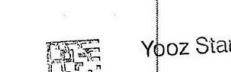
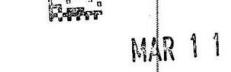
Score Group	Small Dataset				Normal Dataset			
	Struct Only		Struct+Text		Struct Only		Struct+Text	
	SUM	%	SUM	%	SUM	%	SUM	%
0-10	0	0.00%	1	0.51%	4	2.02%	13	6.57%
10-20	2	1.01%	4	2.02%	9	4.55%	16	8.08%
20-30	5	2.53%	6	3.03%	14	7.07%	21	10.61%
30-40	6	3.03%	5	2.53%	24	12.12%	35	17.68%
40-50	12	6.06%	23	11.62%	20	10.10%	21	10.61%
50-60	18	9.09%	21	10.61%	22	11.11%	21	10.61%
60-70	31	15.66%	27	13.64%	33	16.67%	23	11.62%
70-80	29	14.65%	25	12.63%	28	14.14%	10	5.05%
80-90	26	13.13%	24	12.12%	13	6.57%	14	7.07%
90-100	69	34.85%	60	30.30%	30	15.15%	21	10.61%

Errors of Score Group 10-20 (Structure only) 1/2

Predicted

Date	VIN	Vehicle		Invoice	Subtotal	Taxes	Balance
2/27/2024	PW692242	'23 Jeep Wrangler Black	- Reason: Accident, Driver: Curtis Vetrone / #12x Dodge 4500 Century 411 Wrecker - From: Main & S Lake, Neenah, WI 54956, USA, To: 101 N LAKE ST, NEENAH, WI 54956	64623	\$885.00	\$28.00	\$913.00
		Impounds/Storage: Daily	4 @ \$75.00	\$300.00			
		Impound Rate					
		Accident Tow - Primary	1 @ \$250.00	\$250.00			
		Clean Up Scene/Equipment	1 @ \$100.00	\$100.00			
		Environmental Fee	1 @ \$10.00	\$10.00			
		Fuel Surcharge	1 @ \$25.00	\$25.00			
		Admin Fee	1 @ \$75.00	\$75.00			
		Release Fee	1 @ \$50.00	\$50.00			
		Accident Tow - Secondary	1 @ \$75.00	\$75.00			
		Invoice: https://app.towbook.com/PublicAccess/Invoice2.aspx?id=184308274&sc=f4db0cac64					
2/28/2024	H6247735	'17 Chevrolet Equinox	- Reason: Accident, Driver: Jonathon ludvigsen / #18FL Kenworth 20k NRC 21ft - From: 223 N Park Ave, Neenah, WI 54956, USA (223 North Park Avenue), To: 151 North Green Bay Rd., Neenah WI 54956 (Bergstrom Body Shop-Neenah)	64650	\$400.00	\$0.00	\$400.00
		Accident Tow - Primary	1 @ \$175.00	\$175.00			
		Clean Up Scene/Equipment	1 @ \$100.00	\$100.00			
		Admin Fee	1 @ \$75.00	\$75.00			
		Release Fee	1 @ \$50.00	\$50.00			
		Invoice: https://app.towbook.com/PublicAccess/Invoice2.aspx?id=184431490&sc=20568fc1a3					
3/6/2024	LG399083	'20 Kia Optima	- Reason: Accident, Driver: Curtis Vetrone / #12x Dodge 4500 Century 411 Wrecker - From: 700 S Green Bay Rd, Neenah, 54956, WI, To: 151 North Green Bay Rd., Neenah WI 54956	64779	\$546.50	\$26.08	\$572.58
		Impounds/Storage: Daily	0 @ \$0.00	\$0.00			
		Impound Rate					
		Fuel Surcharge	1 @ \$0.00	\$0.00			
		Loaded/Hooked Mileage	7.3 @ \$5.00	\$36.50			
		Accident Tow - Primary	1 @ \$250.00	\$250.00			
		Admin Fee	1 @ \$75.00	\$75.00			
		Clean Up Scene/Equipment	1 @ \$100.00	\$100.00			
		Environmental Fee	1 @ \$10.00	\$10.00			
		Fuel Surcharge	1 @ \$25.00	\$25.00			
		Release Fee	1 @ \$50.00	\$50.00			
		Invoice: https://app.towbook.com/PublicAccess/Invoice2.aspx?id=185092517&sc=601b757846					

Ground Truth

Date	VIN	Vehicle		Invoice	Subtotal	Taxes	Balance
2/27/2024	PW692242	'23 Jeep Wrangler Black	- Reason: Accident, Driver: Curtis Vetrone / #12x Dodge 4500 Century 411 Wrecker - From: Main & S Lake, Neenah, WI 54956, USA, To: 101 N LAKE ST, NEENAH, WI 54956	64623	\$885.00	\$28.00	\$913.00
2/28/2024	H6247735	'17 Chevrolet Equinox	- Reason: Accident, Driver: Jonathon ludvigsen / #18FL Kenworth 20k NRC 21ft - From: 223 N Park Ave, Neenah, WI 54956, USA (223 North Park Avenue), To: 151 North Green Bay Rd., Neenah WI 54956 (Bergstrom Body Shop-Neenah)	64650	\$400.00	\$0.00	\$400.00
3/6/2024	LG399083	'20 Kia Optima	- Reason: Accident, Driver: Curtis Vetrone / #12x Dodge 4500 Century 411 Wrecker - From: 700 S Green Bay Rd, Neenah, 54956, WI, To: 151 North Green Bay Rd., Neenah WI 54956	64779	\$546.50	\$26.08	\$572.58
		Impounds/Storage: Daily	0 @ \$0.00	\$0.00			
		Impound Rate					
		Fuel Surcharge	1 @ \$0.00	\$0.00			
		Loaded/Hooked Mileage	7.3 @ \$5.00	\$36.50			
		Accident Tow - Primary	1 @ \$250.00	\$250.00			
		Admin Fee	1 @ \$75.00	\$75.00			
		Clean Up Scene/Equipment	1 @ \$100.00	\$100.00			
		Environmental Fee	1 @ \$10.00	\$10.00			
		Fuel Surcharge	1 @ \$25.00	\$25.00			
		Release Fee	1 @ \$50.00	\$50.00			
		Invoice: https://app.towbook.com/PublicAccess/Invoice2.aspx?id=185092517&sc=601b757846					

Errors of Score Group 10-20 (Structure only) 1/2

Proposed ROI

Date	VIN	Vehicle	Invoice	Subtotal	Taxes	Balance
2/27/2024	PW692242	'23 Jeep Wrangler Black - Reason: Accident, Driver: Curtis Vetrone / #12x Dodge 4500 Century 411 Wrecker - From: Main & S Lake, Neenah, WI 54956, USA, To: 101 N LAKE ST, NEENAH, WI 54956 Impounds/Storage: Daily 4 @ \$75.00 \$300.00 Impound Rate Accident Tow - Primary 1 @ \$250.00 \$250.00 Clean Up Scene/Equipment 1 @ \$100.00 \$100.00 Environmental Fee 1 @ \$10.00 \$10.00 Fuel Surcharge 1 @ \$25.00 \$25.00 Admin Fee 1 @ \$75.00 \$75.00 Release Fee 1 @ \$50.00 \$50.00 Accident Tow - Secondary 1 @ \$75.00 \$75.00 Invoice: https://app.towbook.com/PublicAccess/Invoice2.aspx?id=184308274&sc=f4db0cac64	64623	\$885.00	\$28.00	\$913.00
2/28/2024	H6247735	'17 Chevrolet Equinox - Reason: Accident, Driver: Jonathon ludvigsen / #18FL Kenworth 20k NRC 21ft - From: 223 N Park Ave, Neenah, WI 54956, USA (223 North Park Avenue), To: 151 North Green Bay Rd., Neenah WI 54956 (Bergstrom Body Shop-Neenah) Accident Tow - Primary 1 @ \$175.00 \$175.00 Clean Up Scene/Equipment 1 @ \$100.00 \$100.00 Admin Fee 1 @ \$75.00 \$75.00 Release Fee 1 @ \$50.00 \$50.00 Invoice: https://app.towbook.com/PublicAccess/Invoice2.aspx?id=184431490&sc=20568fc1a3	64650	\$400.00	\$0.00	\$400.00
3/6/2024	LG399083	'20 Kia Optima - Reason: Accident, Driver: Curtis Vetrone / #12x Dodge 4500 Century 411 Wrecker - From: 700 S Green Bay Rd, Neenah, 54956, WI, To: 151 North Green Bay Rd., Neenah WI 54956 Impounds/Storage: Daily 0 @ \$0.00 \$0.00 Impound Rate Fuel Surcharge 1 @ \$0.00 \$0.00 Loaded/Hooked Mileage 7.3 @ \$5.00 \$36.50 Accident Tow - Primary 1 @ \$250.00 \$250.00 Admin Fee 1 @ \$75.00 \$75.00 Clean Up Scene/Equipment 1 @ \$100.00 \$100.00 Environmental Fee 1 @ \$10.00 \$10.00 Fuel Surcharge 1 @ \$25.00 \$25.00 Release Fee 1 @ \$50.00 \$50.00 Invoice: https://app.towbook.com/PublicAccess/Invoice2.aspx?id=185092517&sc=601b757846	64779	\$546.50	\$26.08	\$572.58

This is a difficult case.

We can improve by using text and layout information

Or we can reject

Ground Truth

Date	VIN	Vehicle	Invoice	Subtotal	Taxes	Balance
2/27/2024	PW692242	'23 Jeep Wrangler Black - Reason: Accident, Driver: Curtis Vetrone / #12x Dodge 4500 Century 411 Wrecker - From: Main & S Lake, Neenah, WI 54956, USA, To: 101 N LAKE ST, NEENAH, WI 54956 Impounds/Storage: Daily 4 @ \$75.00 \$300.00 Impound Rate Accident Tow - Primary 1 @ \$250.00 \$250.00 Clean Up Scene/Equipment 1 @ \$100.00 \$100.00 Environmental Fee 1 @ \$10.00 \$10.00 Fuel Surcharge 1 @ \$25.00 \$25.00 Admin Fee 1 @ \$75.00 \$75.00 Release Fee 1 @ \$50.00 \$50.00 Accident Tow - Secondary 1 @ \$75.00 \$75.00 Invoice: https://app.towbook.com/PublicAccess/Invoice2.aspx?id=184308274&sc=f4db0cac64	64623	\$885.00	\$28.00	\$913.00
2/28/2024	H6247735	'17 Chevrolet Equinox - Reason: Accident, Driver: Jonathon ludvigsen / #18FL Kenworth 20k NRC 21ft - From: 223 N Park Ave, Neenah, WI 54956, USA (223 North Park Avenue), To: 151 North Green Bay Rd., Neenah WI 54956 (Bergstrom Body Shop-Neenah) Accident Tow - Primary 1 @ \$175.00 \$175.00 Clean Up Scene/Equipment 1 @ \$100.00 \$100.00 Admin Fee 1 @ \$75.00 \$75.00 Release Fee 1 @ \$50.00 \$50.00 Invoice: https://app.towbook.com/PublicAccess/Invoice2.aspx?id=184431490&sc=20568fc1a3	64650	\$400.00	\$0.00	\$400.00
3/6/2024	LG399083	'20 Kia Optima - Reason: Accident, Driver: Curtis Vetrone / #12x Dodge 4500 Century 411 Wrecker - From: 700 S Green Bay Rd, Neenah, 54956, WI, To: 151 North Green Bay Rd., Neenah WI 54956 Impounds/Storage: Daily 0 @ \$0.00 \$0.00 Impound Rate Fuel Surcharge 1 @ \$0.00 \$0.00 Loaded/Hooked Mileage 7.3 @ \$5.00 \$36.50 Accident Tow - Primary 1 @ \$250.00 \$250.00 Admin Fee 1 @ \$75.00 \$75.00 Clean Up Scene/Equipment 1 @ \$100.00 \$100.00 Environmental Fee 1 @ \$10.00 \$10.00 Fuel Surcharge 1 @ \$25.00 \$25.00 Release Fee 1 @ \$50.00 \$50.00 Invoice: https://app.towbook.com/PublicAccess/Invoice2.aspx?id=185092517&sc=601b757846	64779	\$546.50	\$26.08	\$572.58

Cell (even row) Cell (odd row) Column header cell

Errors of Score Group 10-20 (Structure only) 2/2

Ground Truth

Date	T	Invoice	Delivery Note	Customer P.O. No.	Inv./Credit Amt.	Payment Amt.	Balance
M	D	V					
01/31/2024	D	177172			14.46		14.46
Cell (even row)		Cell (odd row)		Column header cell			

Predicted Table

Date	T	Invoice	Delivery Note	Customer P.O. No.	Inv./Credit Amt.	Payment Amt.	Balance
M	D	V					
01/31/2024	D	177172			14.46		14.46
Data cell		Column header cell		Projected row header cell			

Proposed ROI

Date	T	Invoice	Delivery Note	Customer P.O. No.	Inv./Credit Amt.	Payment Amt.	Balance
M	D	V					
01/31/2024	D	177172			14.46		14.46

We can improve by semantic analysis

Errors of Score Group 20-30 (Structure only) 1/5

Ground Truth

DATE	INVOICE	DESCRIPTION	RECIPIENT/ORDERED BY	AMOUNT	SERVICE/DELIVERY	TAX	TOTAL
01/09	03247013	BP. ORCHID 6"	JOHNSON, JODI JODI	165.00	35.00	10.00	210.00

Cell (even row) Cell (odd row) Column header cell

Predicted Table

DATE	INVOICE	DESCRIPTION	RECIPIENT/ORDERED BY	AMOUNT	SERVICE/DELIVERY	TAX	TOTAL
01/09	03247013	BP. ORCHID 6"	JOHNSON, JODI JODI	165.00	35.00	10.00	210.00

Data cell Column header cell Projected row header cell

Proposed ROI

DATE	INVOICE	DESCRIPTION	RECIPIENT/ORDERED BY	AMOUNT	SERVICE/DELIVERY	TAX	TOTAL
01/09	03247013	BP. ORCHID 6"	JOHNSON, JODI JODI	165.00	35.00	10.00	210.00

Errors of Score Group 20-30 (Structure only) 2/5

Ground Truth

<u>Invoice #</u>	<u>Date</u>	<u>Due Date</u>	<u>Description</u>	<u>Amount</u>	<u>Invoice Balance</u>
09052023AR	09/05/2023	10/20/2023	09052023AR	(218.72)	(218.72)

-DIT

Cell (even row) Cell (odd row) Column header cell

Predicted Table

<u>Invoice #</u>	<u>Date</u>	<u>Due Date</u>	<u>Description</u>	<u>Amount</u>	<u>Invoice Balance</u>
09052023AR	09/05/2023	10/20/2023	09052023AR	(218.72)	(218.72)

-DIT

Data cell Column header cell Projected row header cell

Proposed ROI

<u>Invoice #</u>	<u>Date</u>	<u>Due Date</u>	<u>Description</u>	<u>Amount</u>	<u>Invoice Balance</u>
09052023AR	09/05/2023	10/20/2023	09052023AR	(218.72)	(218.72)

-DIT

We can improve by using text and layout information

Errors of Score Group 20-30 (Structure only) 3/5

Ground Truth

DATE	DOCUMENT / TRANSACTION	PURCHASES	PAYMENTS & CREDITS	BALANCE
		PREVIOUS BALANCE		
28DEC23	711603	264.81		
18JAN24	714840	14.88		

Cell (even row) Cell (odd row) Column header cell

Predicted Table

DATE	DOCUMENT / TRANSACTION	PURCHASES	PAYMENTS & CREDITS	BALANCE
		PREVIOUS BALANCE		
28DEC23	711603	264.81		
18JAN24	714840	14.88		

Data cell Column header cell Projected row header cell

Proposed ROI

DATE	DOCUMENT / TRANSACTION	PURCHASES	PAYMENTS & CREDITS	BALANCE
		PREVIOUS BALANCE		
28DEC23	711603	264.81		
18JAN24	714840	14.88		

We can improve by using text and layout information

Errors of Score Group 20-30 (Structure only) 4/5

Ground Truth

Program	Transaction Date	Customer Name	Contract #	VIN	Trans Type	Customer Charge	Dealer Cost
SMLP	10/27/2023	KUCHENBECKER, JUSTIN	914109728	* PL564622	New Registration	995.00	515.00

Cell (even row) Cell (odd row) Column header cell

Predicted Table

Program	Transaction Date	Customer Name	Contract #	VIN	Trans Type	Customer Charge	Dealer Cost
SMLP	10/27/2023	KUCHENBECKER, JUSTIN	914109728	* PL564622	New Registration	995.00	515.00

Data cell Column header cell Projected row header cell

Need to correct header
By post processing?

Proposed ROI

Program	Transaction Date	Customer Name	Contract #	VIN	Trans Type	Customer Charge	Dealer Cost
SMLP	10/27/2023	KUCHENBECKER, JUSTIN	914109728	* PL564622	New Registration	995.00	515.00

Errors of Score Group 20-30 (Structure only) 5/5

Predicted

DATE	DOCUMENT / TRANSACTION	PURCHASES	PAYMENTS & CREDITS	BALANCE
		PREVIOUS BALANCE		
09AUG23	1258932	238.83	238.83	
12SEP23	1258932		238.83	
13SEP23	CM1258932		238.83	
09JAN24	1258932	238.83		
12OCT23	CM1239675		66.51	
09JAN24	1239675	66.51		
06DEC23	1300928	128.72		
28DEC23	1300928		128.72	
13DEC23	1303400	386.28		
28DEC23	1303400		386.28	
14DEC23	1303737	146.86		
28DEC23	1303737		146.86	Yooz Stamp
21DEC23	1306374	640.58		
09JAN24	1306374		640.58	v1
26DEC23	1306892	175.60		
27DEC23	1307753	147.63		147.31.2024
17JAN24	1307753		147.63	
11JAN24	1312692	348.54		① YOOZ
15JAN24	CM1312692		348.54	
22JAN24	1315380	1,223.65		
25JAN24	1316660	507.34		

■ Data cell ■ Column header cell ■ Projected row header cell

Ground Truth

DATE	DOCUMENT / TRANSACTION	PURCHASES	PAYMENTS & CREDITS	BALANCE
		PREVIOUS BALANCE		
09AUG23	1258932	238.83	238.83	
12SEP23	1258932		238.83	
13SEP23	CM1258932		238.83	
09JAN24	1258932	238.83		
12OCT23	CM1239675		66.51	
09JAN24	1239675	66.51		
06DEC23	1300928		128.72	
28DEC23	1300928		128.72	
13DEC23	1303400	386.28		
28DEC23	1303400		386.28	
14DEC23	1303737	146.86		
28DEC23	1303737		146.86	Yooz Stamp
21DEC23	1306374		640.58	v1
09JAN24	1306374		640.58	
26DEC23	1306892	175.60		
27DEC23	1307753	147.63		147.31.2024
17JAN24	1307753		147.63	
11JAN24	1312692		348.54	① YOOZ
15JAN24	CM1312692		348.54	
22JAN24	1315380	1,223.65		
25JAN24	1316660	507.34		

■ Cell (even row) ■ Cell (odd row) ■ Column header cell

Errors of Score Group 20-30 (Structure only) 5/5

Proposed ROI

DATE	DOCUMENT / TRANSACTION	PURCHASES	PAYMENTS & CREDITS	BALANCE
		PREVIOUS BALANCE		
09AUG23	1258932	238.83	238.83	
12SEP23	1258932		238.83	
13SEP23	CM1258932		238.83	
09JAN24	1258932	238.83		
12OCT23	CM1239675		66.51	
09JAN24	1239675	66.51		
06DEC23	1300928	128.72		
28DEC23	1300928		128.72	
13DEC23	1303400	386.28		
28DEC23	1303400		386.28	
14DEC23	1303737	146.86		
28DEC23	1303737	146.86		Yooz Stamp
21DEC23	1306374	640.58		
09JAN24	1306374	640.58		
26DEC23	1306892	175.60		
27DEC23	1307753	147.63		147.63 2024
17JAN24	1307753	147.63		
11JAN24	1312692	348.54		
15JAN24	CM1312692		348.54	
22JAN24	1315380	1,223.65		
25JAN24	1316660	507.34		

Ground Truth

DATE	DOCUMENT / TRANSACTION	PURCHASES	PAYMENTS & CREDITS	BALANCE
		PREVIOUS BALANCE		
09AUG23	1258932	238.83	238.83	
12SEP23	1258932		238.83	
13SEP23	CM1258932		238.83	
09JAN24	1258932	238.83		
12OCT23	CM1239675		66.51	
09JAN24	1239675	66.51		
06DEC23	1300928		128.72	
28DEC23	1300928		128.72	
13DEC23	1303400	386.28		
28DEC23	1303400		386.28	
14DEC23	1303737	146.86		
28DEC23	1303737	146.86		146.86 Yooz Stamp
21DEC23	1306374		640.58	
09JAN24	1306374	640.58		
26DEC23	1306892	175.60		
27DEC23	1307753	147.63		147.63 2024
17JAN24	1307753		147.63	
11JAN24	1312692	348.54		
15JAN24	CM1312692		348.54	
22JAN24	1315380	1,223.65		
25JAN24	1316660	507.34		

Cell (even row) Cell (odd row) Column header cell

Can not detect right rows

Group two rows in to one -> wrong

We Can improve by text and layout information.

Table Structure Recognition

- Errors Analysis – High Score Samples

Errors of Score Group 70-80 (Structure only) 1/10

Ground Truth

DATE	DOCUMENT / TRANSACTION	PURCHASES	PAYMENTS & CREDITS	BALANCE
		PREVIOUS BALANCE		
		10.01		
13OCT23	32 430114			

Cell (even row) Cell (odd row) Column header cell

Labeling problem

Predicted Table

DATE	DOCUMENT / TRANSACTION	PURCHASES	PAYMENTS & CREDITS	BALANCE
		PREVIOUS BALANCE		
		10.01		
13OCT23	32 430114			

Data cell Column header cell Projected row header cell

Proposed ROI

DATE	DOCUMENT / TRANSACTION	PURCHASES	PAYMENTS & CREDITS	BALANCE
		PREVIOUS BALANCE		
		10.01		
13OCT23	32 430114			

Errors of Score Group 70-80 (Structure only) 2/10

Ground Truth

OPEN INVOICE LISTING						
DATE	INVOICE #	DUE DATE	PO NUMBER	ORIGINAL AMT	PAYMENTS	OUTSTANDING
11/6/2023	89939	11/16/2023	16650	\$207.50	\$0.00	\$207.50

Cell (even row)
Cell (odd row)
Column header cell

Labeling problem

Predicted Table

OPEN INVOICE LISTING						
DATE	INVOICE #	DUE DATE	PO NUMBER	ORIGINAL AMT	PAYMENTS	OUTSTANDING
11/6/2023	89939	11/16/2023	16650	\$207.50	\$0.00	\$207.50

Data cell
Column header cell
Projected row header cell

Proposed ROI

				OPEN INVOICE LISTING		
DATE	INVOICE #	DUE DATE	PO NUMBER	ORIGINAL AMT	PAYMENTS	OUTSTANDING
11/6/2023	89939	11/16/2023	16650	\$207.50	\$0.00	\$207.50

Errors of Score Group 70-80 (Structure only) 3/10

Ground Truth

DATE	DOCUMENT / TRANSACTION	PURCHASES	PAYMENTS & CREDITS	BALANCE
05JAN24	64900		PREVIOUS BALANCE	
		93.78		

Cell (even row) Cell (odd row) Column header cell

Labeling problem

Predicted Table

DATE	DOCUMENT / TRANSACTION	PURCHASES	PAYMENTS & CREDITS	BALANCE
05JAN24	64900		PREVIOUS BALANCE	
		93.78		

Data cell Column header cell Projected row header cell

Proposed ROI

DATE	DOCUMENT / TRANSACTION	PURCHASES	PAYMENTS & CREDITS	BALANCE
			PREVIOUS BALANCE	
05JAN24	64900		93.78	

Errors of Score Group 70-80 (Structure only) 4/10

Ground Truth

DATE	SRC	REF NO.	APPLY TO	CHARGES	CREDITS	BALANCE		
				PREV. BALANCE	\$0.00			
Company - 13 Gregg Young Chrysler World								
Schedule - 20								
12/05/2023	32	15257		\$1.54		\$1.54		
12/14/2023	56	10668			\$1.54	\$0.00		
12/18/2023	32	15412		\$363.00		\$363.00		

Labeling problem

Predicted Table

DATE	SRC	REF NO.	APPLY TO	CHARGES	CREDITS	BALANCE		
				PREV. BALANCE	\$0.00			
Company - 13 Gregg Young Chrysler World								
Schedule - 20								
12/05/2023	32	15257		\$1.54		\$1.54		
12/14/2023	56	10668			\$1.54	\$0.00		
12/18/2023	32	15412		\$363.00		\$363.00		

Data cell Column header cell Projected row header cell

Proposed ROI

DATE	SRC	REF NO.	APPLY TO	CHARGES	CREDITS	BALANCE
				PREV. BALANCE		\$0.00
Company - 13 Gregg Young Chrysler World						
Schedule - 20						
12/05/2023	32	15257		\$1.54		\$1.54
12/14/2023	56	10668			\$1.54	\$0.00
12/18/2023	32	15412		\$363.00		\$363.00

Errors of Score Group 70-80 (Structure only) 5/10

Ground Truth

Date	Due Date	Reference	Paid	Description	Amount	Balance
11/20/23	12/20/23	62928			150.00	150.00
12/11/23	1/10/24	62988			275.00	425.00
12/11/23	1/10/24	62989			170.00	595.00
12/11/23	1/10/24	62990			95.00	690.00
12/11/23	1/10/24	62991			135.00	825.00
12/11/23	1/10/24	62992			60.00	885.00
12/15/23	1/14/24	62010 - 63010			275.00	1,160.00
12/18/23	1/17/24	62011 - 63011			95.00	1,255.00
12/18/23	1/17/24	62012 - 63012			140.00	1,395.00
12/18/23	1/17/24	62013 - 63013			135.00	1,530.00

Predicted Table

Date	Due Date	Reference	Paid	Description	Amount	Balance
11/20/23	12/20/23	62928			150.00	150.00
12/11/23	1/10/24	62988			275.00	425.00
12/11/23	1/10/24	62989			170.00	595.00
12/11/23	1/10/24	62990			95.00	690.00
12/11/23	1/10/24	62991			135.00	825.00
12/11/23	1/10/24	62992			60.00	885.00
12/15/23	1/14/24	62010 - 63010			275.00	1,160.00
12/18/23	1/17/24	62011 - 63011			95.00	1,255.00
12/18/23	1/17/24	62012 - 63012			140.00	1,395.00
12/18/23	1/17/24	62013 - 63013			135.00	1,530.00

Need to correct header
By post processing?

Proposed ROI

Date	Due Date	Reference	Paid	Description	Amount	Balance
11/20/23	12/20/23	62928			150.00	150.00
12/11/23	1/10/24	62988			275.00	425.00
12/11/23	1/10/24	62989			170.00	595.00
12/11/23	1/10/24	62990			95.00	690.00
12/11/23	1/10/24	62991			135.00	825.00
12/11/23	1/10/24	62992			60.00	885.00
12/15/23	1/14/24	62010 - 63010			275.00	1,160.00
12/18/23	1/17/24	62011 - 63011			95.00	1,255.00
12/18/23	1/17/24	62012 - 63012			140.00	1,395.00
12/18/23	1/17/24	62013 - 63013			135.00	1,530.00

Errors of Score Group 70-80 (Structure only) 6/10

Ground Truth

TRANSACTION DATE	TRANSACTION NUMBER	PO NUMBER	DUe DATE	TRANSACTION AMOUNT	AMOUNT PAID	AMOUNT DUE
1846195952 - BERGSTROM Porsche of the Fox Valley						
Open Items from previous statements						
08/16/2023	8356322864100	13118	09/30/2023	119.92	0.00	119.92
Payment Summary						
12/19/2023	12343			14.99	14.99	0.00

Cell (even row) Cell (odd row) Column header cell

Labeling problem

Predicted Table

TRANSACTION DATE	TRANSACTION NUMBER	PO NUMBR	DUe DATE	TRANSACTION AMOUNT	AMOUNT PAID	AMOUNT DUE
1846195952 - BERGSTROM Porsche of the Fox Valley						
Open Items from previous statements						
08/16/2023	8356322864100	13118	09/30/2023	119.92	0.00	119.92
Payment Summary						
12/19/2023	12343			14.99	14.99	0.00

Data cell Column header cell Projected row header cell

Proposed ROI

TRANSACTION DATE	TRANSACTION NUMBER	PO NUMBER	DUe DATE	TRANSACTION AMOUNT	AMOUNT PAID	AMOUNT DUE
1846195952 - BERGSTROM Porsche of the Fox Valley						
Open Items from previous statements						
08/16/2023	8356322864100	13118	09/30/2023	119.92	0.00	119.92
Payment Summary						
12/19/2023	12343			14.99	14.99	0.00

Errors of Score Group 70-80 (Structure only) 7/10

Ground Truth

<u>Invoice #</u>	<u>Date</u>	<u>Due Date</u>	<u>Description</u>	<u>Amount</u>	<u>Invoice Balance</u>
09052023AR	09/05/2023	10/20/2023	09052023AR	(218.72)	(218.72)

■ Cell (even row)
 ■ Cell (odd row)
 ■ Column header cell

Predicted Table

<u>Invoice #</u>	<u>Date</u>	<u>Due Date</u>	<u>Description</u>	<u>Amount</u>	<u>Invoice Balance</u>
09052023AR	09/05/2023	10/20/2023	09052023AR	(218.72)	(218.72)

■ Data cell
 ■ Column header cell
 ■ Projected row header cell

Header problem

Proposed ROI

<u>Invoice #</u>	<u>Date</u>	<u>Due Date</u>	<u>Description</u>	<u>Amount</u>	<u>Invoice Balance</u>
09052023AR	09/05/2023	10/20/2023	09052023AR	(218.72)	(218.72)

Errors of Score Group 70-80 (Structure only) 8/10

Ground Truth

INVOICE NO.	DATE	DESCRIPTION	DOLLAR AMOUNT
I0019D0089	02/19/24		125.90
I0019E4514	02/22/24		130.84

Cell (even row) Cell (odd row) Column header cell

Labeling problem

Predicted Table

INVOICE NO.	DATE	DESCRIPTION	DOLLAR AMOUNT
I0019D0089	02/19/24		125.90
I0019E4514	02/22/24		130.84

Data cell Column header cell Projected row header cell

Proposed ROI

INVOICE NO.	DATE	DESCRIPTION	DOLLAR AMOUNT
I0019D0089	02/19/24		125.90
I0019E4514	02/22/24		130.84

Errors of Score Group 70-80 (Structure only) 9/10

Ground Truth

Invoice #	Date	Due Date	Description	Amount	Invoice Balance
1-1600524	10/04/2023	11/18/2023	PARTS INVOICE	301.10	301.10
1-1607611	10/26/2023	12/10/2023	PARTS INVOICE	184.87	184.87
1-1609079	11/01/2023	12/16/2023	PARTS INVOICE	14.41	14.41
1-1609546	11/03/2023	12/18/2023	PARTS INVOICE	117.06	117.06
1-1609580	11/03/2023	12/18/2023	PARTS INVOICE	372.88	372.88
1-1610472	11/07/2023	12/22/2023	PARTS INVOICE	998.32	998.32
1-1610515	11/07/2023	12/22/2023	PARTS INVOICE	428.68	428.68
1-1611761	11/10/2023	12/25/2023	PARTS INVOICE	702.59	702.59
1-1612241	11/13/2023	12/28/2023	PARTS INVOICE	345.72	345.72
1-1612821	11/15/2023	12/30/2023	PARTS INVOICE	227.55	227.55
1-1613893	11/20/2023	01/04/2024	PARTS INVOICE	274.03	274.03

er 12/11

■ Cell (even row)
 ■ Cell (odd row)
 ■ Column header cell

Predicted Table

Invoice #	Date	Due Date	Description	Amount	Invoice Balance
1-1600524	10/04/2023	11/18/2023	PARTS INVOICE	301.10	301.10
1-1607611	10/26/2023	12/10/2023	PARTS INVOICE	184.87	184.87
1-1609079	11/01/2023	12/16/2023	PARTS INVOICE	14.41	14.41
1-1609546	11/03/2023	12/18/2023	PARTS INVOICE	117.06	117.06
1-1609580	11/03/2023	12/18/2023	PARTS INVOICE	372.88	372.88
1-1610472	11/07/2023	12/22/2023	PARTS INVOICE	998.32	998.32
1-1610515	11/07/2023	12/22/2023	PARTS INVOICE	428.68	428.68
1-1611761	11/10/2023	12/25/2023	PARTS INVOICE	702.59	702.59
1-1612241	11/13/2023	12/28/2023	PARTS INVOICE	345.72	345.72
1-1612821	11/15/2023	12/30/2023	PARTS INVOICE	227.55	227.55
1-1613893	11/20/2023	01/04/2024	PARTS INVOICE	274.03	274.03

er 12/11

■ Data cell
 ■ Column header cell
 ■ Projected row header cell

Proposed ROI

Invoice #	Date	Due Date	Description	Amount	Invoice Balance
1-1600524	10/04/2023	11/18/2023	PARTS INVOICE	301.10	301.10
1-1607611	10/26/2023	12/10/2023	PARTS INVOICE	184.87	184.87
1-1609079	11/01/2023	12/16/2023	PARTS INVOICE	14.41	14.41
1-1609546	11/03/2023	12/18/2023	PARTS INVOICE	117.06	117.06
1-1609580	11/03/2023	12/18/2023	PARTS INVOICE	372.88	372.88
1-1610472	11/07/2023	12/22/2023	PARTS INVOICE	998.32	998.32
1-1610515	11/07/2023	12/22/2023	PARTS INVOICE	428.68	428.68
1-1611761	11/10/2023	12/25/2023	PARTS INVOICE	702.59	702.59
1-1612241	11/13/2023	12/28/2023	PARTS INVOICE	345.72	345.72
1-1612821	11/15/2023	12/30/2023	PARTS INVOICE	227.55	227.55
1-1613893	11/20/2023	01/04/2024	PARTS INVOICE	274.03	274.03

er 12/11

First Row Problem Handwriting

Errors of Score Group 70-80 (Structure only) 10/10

Ground Truth

DOCUMENT	DATE	DESCRIPTION	CHARGES	PAYMENTS/CREDITS	BALANCE
.....	12/04/23	Bal. Frw'd.	1414.98	.00	1414.98
170514	12/01/23	Inv 170514 (PO19268)	272.00	.00	1686.98
170584	12/08/23	Inv 170584 (PO19402)	59.40	.00	1746.38
170618	12/12/23	Inv 170618 (PO19450)	49.35	.00	1795.73
170639	12/14/23	Inv 170639 (PO19495)	72.89	.00	1868.62
211247	12/15/23	AR PAYMENT	.00	1414.98	453.64
170704	12/21/23	Inv 170704 (PO19612)	80.75	.00	534.39

■ Cell (even row)
 ■ Cell (odd row)
 ■ Column header cell

Predicted Table

DOCUMENT	DATE	DESCRIPTION	CHARGES	PAYMENTS/CREDITS	BALANCE
.....	12/04/23	Bal. Frw'd.	1414.98	.00	1414.98
170514	12/01/23	Inv 170514 (PO19268)	272.00	.00	1686.98
170584	12/08/23	Inv 170584 (PO19402)	59.40	.00	1746.38
170618	12/12/23	Inv 170618 (PO19450)	49.35	.00	1795.73
170639	12/14/23	Inv 170639 (PO19495)	72.89	.00	1868.62
211247	12/15/23	AR PAYMENT	.00	1414.98	453.64
170704	12/21/23	Inv 170704 (PO19612)	80.75	.00	534.39

■ Data cell
 ■ Column header cell
 ■ Projected row header cell

Proposed ROI

DOCUMENT	DATE	DESCRIPTION	CHARGES	PAYMENTS/CREDITS	BALANCE
.....	12/04/23	Bal. Frw'd.	1414.98	.00	1414.98
170514	12/01/23	Inv 170514 (PO19268)	272.00	.00	1686.98
170584	12/08/23	Inv 170584 (PO19402)	59.40	.00	1746.38
170618	12/12/23	Inv 170618 (PO19450)	49.35	.00	1795.73
170639	12/14/23	Inv 170639 (PO19495)	72.89	.00	1868.62
211247	12/15/23	AR PAYMENT	.00	1414.98	453.64
170704	12/21/23	Inv 170704 (PO19612)	80.75	.00	534.39

First Row Problem
Description Column

- Annotation
 - Need to correct ground truth
- Idea
 - Can use text and layout to improve precision



Cloud P2P Automation. Easy. Powerful. Smart.

Next Task

- **TFLOP [1]**
 - Train
 - Evaluation

#	Task	Status	%	2.2025				3.2025				4.2025			
				1	2	3	4	1	2	3	4	1	2	3	4
1	Literature Review/Survey														
2	Evaluation SOTA														
2.1	+ TATR - Table Detection & Table Structure Recognition											F			
2.2	+ CascadeTSRDet - Table Structure Recognition														F
2.2.1	- Install	Done	100%					F							
2.2.2	- Run Samples by Pre-trained model	Done	100%						F						
2.2.3	- Evaluation by Pre-trained model	Done	100%									D	F		
	+ Yooz English Dataset														
	- Pre-processing														
	- Code														
	- Analysis														
2.3	+ TFLOP - Table Structure Recognition														
2.3.1	- Install											D			
2.3.2	- Train														
	+ PubTabNet Dataset														
	+ FinTabNet Dataset (need change code)														
2.3.3	- Evaluation on Yooz English Dataset														

[1] M. Khang et al., "TFLOP: Table Structure Recognition Framework with Layout Pointer Mechanism" , IJCAI 2024.

[2] B. Xiao et al., "CascadeTSRDet: Rethinking Detection Based Table Structure Recognition for Visually Rich Document Images" , Expert Systems With Applications 2025.

- **TFLOP [1]**
- Train
- Evaluation

#	Task	Status	%	2.2025				3.2025				4.2025				
				1	2	3	4	1	2	3	4	1	2	3	4	
1	Literature Review/Survey															
2	Evaluation SOTA															
2.1	+ TATR - Table Detection & Table Structure Recognition											F				
2.2	+ CascadeTSRDet - Table Structure Recognition															F
2.2.1	- Install	Done	100%									F				
2.2.2	- Run Samples by Pre-trained model	Done	100%									F				
2.2.3	- Evaluation by Pre-trained model	Done	100%										D	F		
	+ Yooz English Dataset															
	- Pre-processing															
	- Code															
	- Analysis															
2.3	+ TFLOP - Table Structure Recognition															
2.3.1	- Install											D				
2.3.2	- Train												B			
	+ PubTabNet Dataset															
	+ FinTabNet Dataset (need change code)															
2.3.3	- Evaluation on Yooz English Dataset															
	+ Pretrained by PubTabNet Dataset															
	+ Pretrained by FinTabNet Dataset															
3	Propose new method															
3.1	+ Ideas															
3.1.1	- Table Detection															
	+ How to use text and layout information more effectively?															
	- Network architecture															
	- Post-processing															
3.1.2	- Table Structure Recognition															
	+ How to use layout information more effectively?															
	- Post-processing															
3.1.3	- Semantic Analysis															
3.2	+ Implementation															

[1] M. Khang et al., "TFLOP: Table Structure Recognition Framework with Layout Pointer Mechanism" , IJCAI 2024.

[2] B. Xiao et al., "CascadeTSRDet: Rethinking Detection Based Table Structure Recognition for Visually Rich Document Images" , Expert Systems With Applications 2025.

- Internship Student
 - DAO Viet-Long
- Research Topic
 - Table Detection
 - LLM for Table Information Extraction



	Table Information Extraction						2.2025				3.2025				4.2025			
#	Task		Member	Status	%	1	2	3	4	1	2	3	4	1	2	3	4	
3	Table Detection																	
3.1	+ TATR - Table Detection																	
3.1.1	- Post Processing		LongDV															
4	Semantic Analysis																	
4.1	- Llama 3.2 3B		LongDV											D				
4.2	- Mistral																	
5	LLM for Table Structure Recognition		LongDV															
5.1	- Llama 3.2 3B															F		
	+ Coding & Unit Test					Done	100%											
5.2	- SmolDocling																	
	+ Coding & Unit Test					Done	100%								F			

- Yooz English dataset
 - Annotate all cell inside tables
 - Test dataset (200 documents)
 - And Train dataset (1700 documents)

- Public dataset
 - Create new benchmark dataset???
 - For TSR

Service Date	Invoice ID & Service Transaction	Amount	Balance
05/31/2024	Balance forward		489.00
06/14/2024 06/30/2024	LM 2420 Science Pkwy. (2024)- PMT INV #50869.	489.00 356.00	0.00 356.00

Content domain and process	All items		New items		Trend items	
	Number	Percent	Number	Percent	Number	Percent
Total items	135	100	60	100	75	100
Purposes of reading						
Literary experience	72	53	33	55	39	52
Acquire and use information	63	47	27	45	36	48
Processes of comprehension						
Focus on and retrieve explicitly stated information	33	24	14	23	19	25
Make straightforward inferences	46	34	20	33	26	35
Interpret and integrate ideas and information	38	28	18	30	20	27
Examine and evaluate content, language, and textual elements	18	13	8	13	10	13

Table Column Row Spanning Cell Column Header Projected Row Header

(c) Six types of defined table components in PubTables1M (Smock et al., 2022). The defined Projected Row Headers in this sample share identical bounding boxes with two corresponding rows.



THANK YOU