

PAN@CLEF 2021
Style Change Detection Task

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Style Change Detection Task

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Style Change Detection Task

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Style Change Detection Task

Author 1

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Author 2

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Author 2

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Author 3

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Task Description

Given a document, we ask participants to answer the following three questions:

Single vs. Multiple. Given a text, find out whether the text is written by a single author or by multiple authors (task 1).

Style Change Basic. Given a text written by two or more authors and that contains a number of style changes, find the position of the changes (task 2).

Style Change Real-World. Given a text written by two or more authors, find all positions of writing style change, i.e., assign all paragraphs of the text uniquely to some author out of the number of authors you assume for the multi-author document (task 3).

Task Description

Example Document A

Author 1

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Author 1

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Example Document B

Author 1

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Author 2

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Author 2

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Example Document C

Author 1

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Author 2

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Author 3

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Task 1

no (0)

yes (1)

yes (1)

Task 2

[0]

[1,0]

[1,0,1]

Task 3

[1,1]

[1,2,2]

[1,2,2,3]

Dataset

- Realistic, non-artificial and comprehensive dataset
- Requirements
 - Find multiple authors that write about the same topic
 - Multi-authored texts need to contain the same topic / subtopic
 - Find texts that are freely available and of sufficient length
- StackExchange consists of several sites (170+ sites), data freely available
- Each question/answer associated with
 - Site
 - Set of tags (subtopics)
- Example: photography site – subtopics: lens, canon, nikon, lightroom, photoshop, ...

Home

PUBLIC

Questions

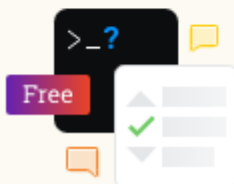
Tags

Users

Unanswered

TEAMS

Stack Overflow for Teams – Collaborate and share knowledge with a private group.



What is the word for the edible part of a fruit with rind (e.g., lemon, orange, avocado, watermelon)?

Ask Question

Asked yesterday Active today Viewed 2k times



9



This morning I found one avocado I bought had become over-ripe: part of its edible part had changed color and was no longer green. So I was trying to describe this to my friend and I wanted to say "Hey I wanted to make some smoothie with this avocado but I found it over-ripe and part of its _____ has changed color."

I wanted to find a word to fill in the blank. I speak Chinese and in Chinese we call the edible part "fruit flesh". **I'm wondering what the English word is.**

A quick googling gave me the word "pulp", but it looks like "fruit pulp" is created by processing the "fruit flesh" and it's not the "flesh" itself.

single-word-requests



As the post suggests it can be called the

34



flesh

NOUN

1.2 The edible pulpy part of a fruit or vegetable.

halve the avocados and scrape out the flesh

Calling it 'pulpy' doesn't mean it has been squashed. It means the soft part that isn't the skin/rind or pips/stone.

You don't have to call it 'fruit flesh', just 'flesh' will do when the fruit has already been mentioned.

Hey I wanted to make some smoothie with this avocado but I found it over-ripe and part of its **flesh** has changed color.

From [Lexico](#).

Dataset

- Randomly chosen thread
- Cleaning
 - Remove links, images, code snippets, bullet lists, block quotes
 - Remove very short questions/answers
 - Remove edited questions/answers
- Randomly choose question/answer thread
- Randomly choose number of authors $n \in \{1, 2, 3, 4\}$
- Randomly select n authors
- Take their paragraphs in thread, shuffle, concatenate

Dataset Parameters

Parameter	Configurations
Number of collaborating authors	1-4
Document length	1,000-10,000
Minimum paragraph length	100
Minimum number of paragraphs	2
Change positions	between paragraphs
Document language	English

Dataset Stats

Dataset	#Docs	Documents / #Authors				Length / #Authors			
		1	2	3	4	1	2	3	4
Train	11,200	2,800 25%	2,800 25%	2,800 25%	2,800 25%	1,519	1,592	1,795	2,059
Valid.	2,400	600 25%	600 25%	600 25%	600 25%	1,549	1,599	1,785	2,039
Test	2,400	600 25%	600 25%	600 25%	600 25%	1,512	1,564	1,793	2,081

Distribution: 70% train, 15% validation, 15% test set

Evaluation

- Score each document by F_1 measure
- Macro-averaged across all documents
- Three tasks evaluated individually
- Random baseline
 - Task 3: Uniformly random prediction for task 3 (with increasing author ids)
 - Task 1 and 2 results inferred from task 3

Submissions

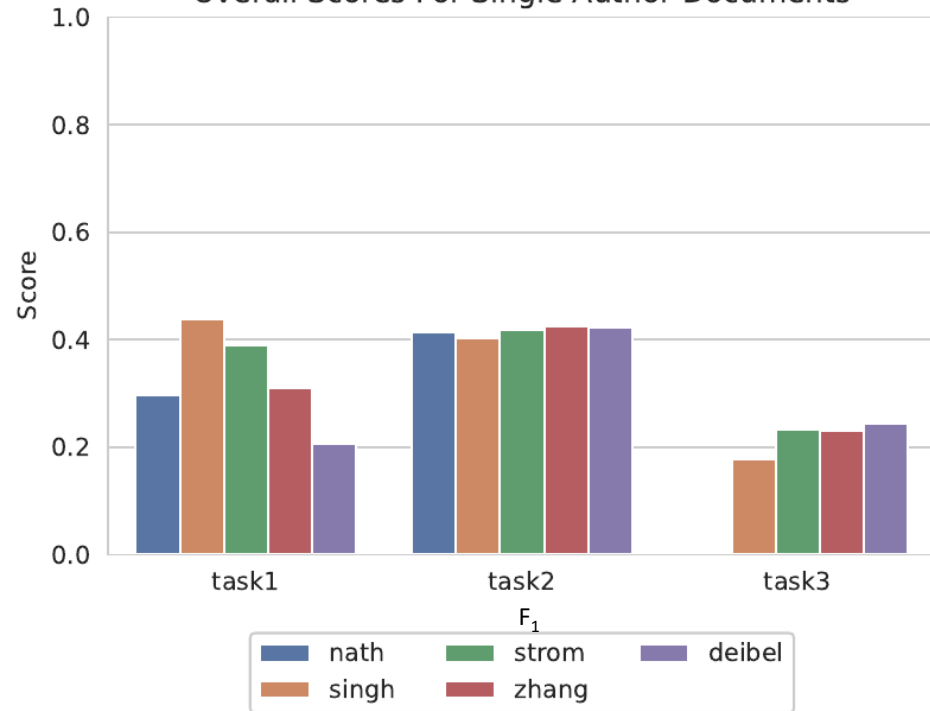
- **Deibel and Löfflad:** multi-layer perceptron, bidirectional LSTM based on wide set of features (e.g., fastText word embeddings, mean sentence length, etc.)
- **Nath:** Siamese neural networks for paragraph similarities (embedding layer, bidirectional LSTM layer, distance measure layer, dense layer)
- **Singh et al.:** based on authorship verification approach at PAN 2020; wide set of features (tf-idf, n-grams, etc.) for binary classification of pair of paragraphs
- **Strøm:** BERT embedding features and stylistic features; stacking ensemble for binary classification of style changes between paragraphs
- **Zhang et al.:** pre-trained BERT model, pair-wise comparison of paragraphs to augment training data; resulting labels are used to fine-tune the BERT model

Results: Overview

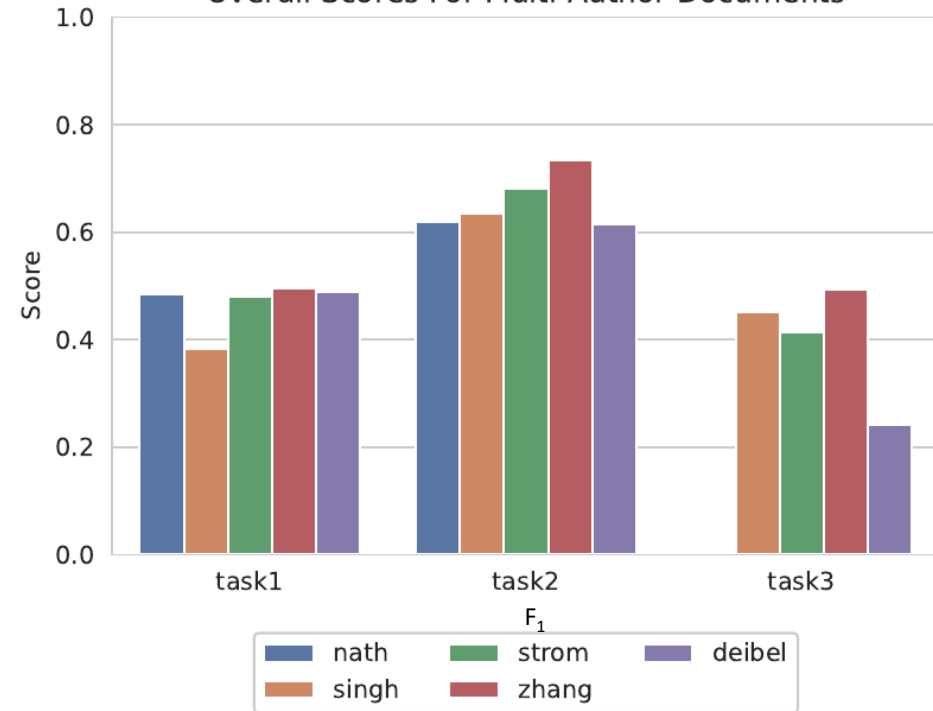
Participant	Task1 F ₁	Task2 F ₁	Task3 F ₁
Zhang et al.	0.753	0.751	0.501
Strøm	0.795	0.707	0.424
Singh et al.	0.634	0.657	0.432
Deibel et al.	0.621	0.669	0.263
Nath	0.704	0.647	—
Baseline	0.457	0.470	0.329

Results: Single vs. Multi-Author Documents

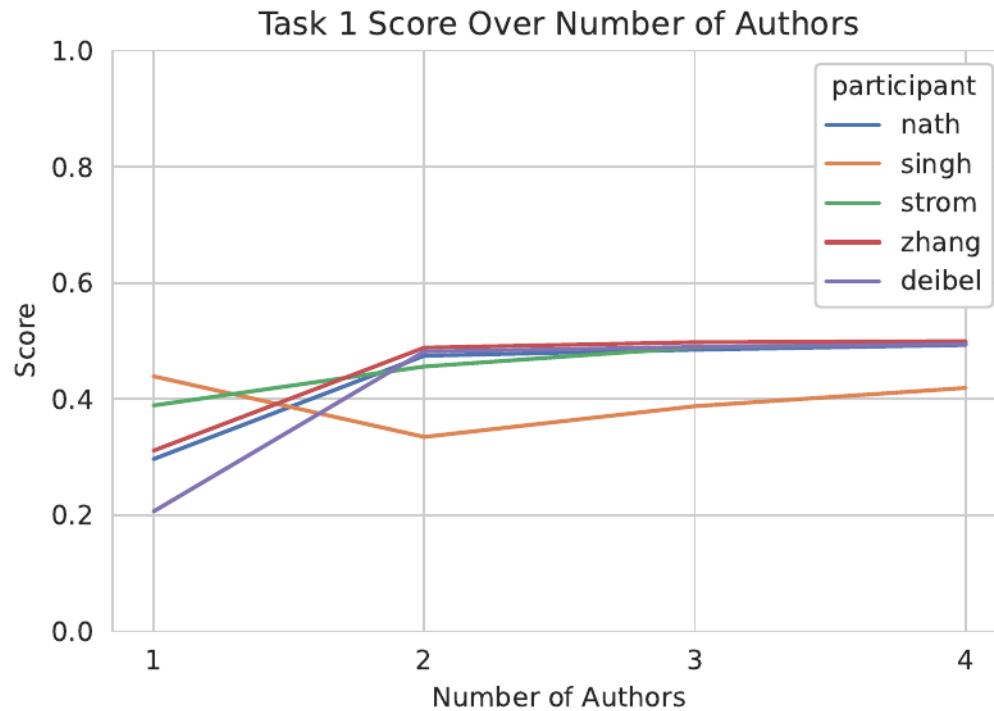
Overall Scores For Single-Author Documents



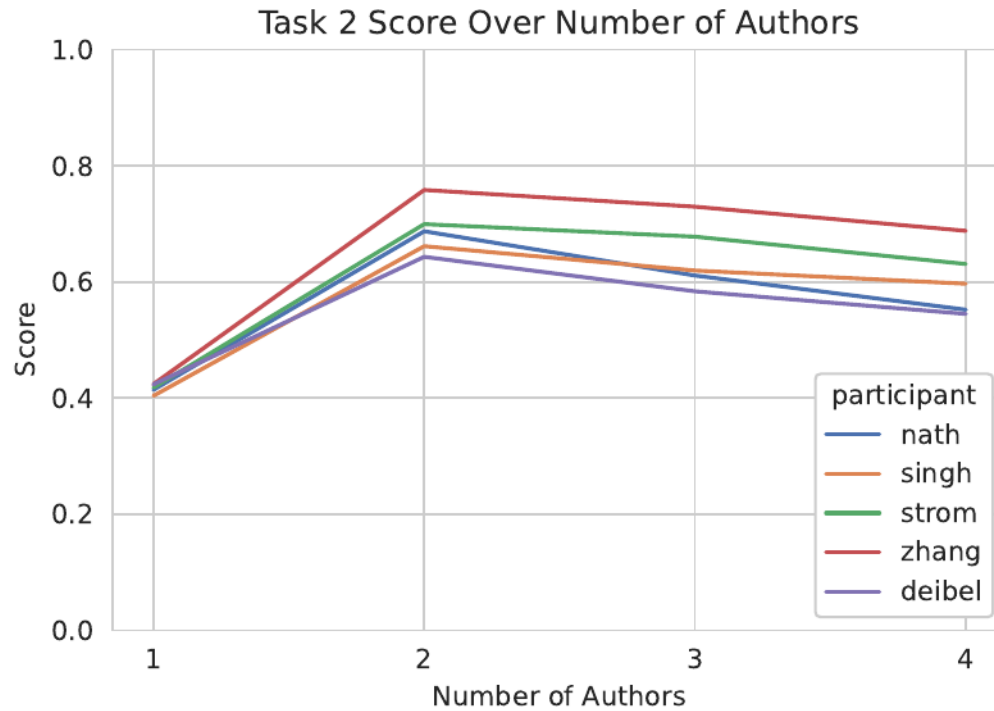
Overall Scores For Multi-Author Documents



Results: Number of Authors



Results: Number of Authors



Results: Number of Authors



Outlook PAN@CLEF 2022

- Multi-Author Writing Style Analysis task
 - Style Change Basic: given a text by two authors, find position of (single) change
 - Style Change Advanced: given a text by multiple authors, find all positions of changes (at paragraph level)
 - Style Change Real World: given a text by multiple authors, find all positions of changes (at sentence level)