

A Results on the validation set

We also provide the results on the validation set when combining STAS with PACSUM in Table 1. The result shows that STAS and PACSUM evaluate the sentences from different perspectives.

Methods	valid set			test set		
	R-1	R-2	R-L	R-1	R-2	R-L
CNN/DM						
PACSUM	-	-	-	40.70	17.80	36.90
STAS	41.67	18.47	38.00	40.90	18.02	37.21
STAS + PACUSM	42.20	18.84	38.44	41.26	18.18	37.48
NYT						
PACSUM	-	-	-	41.40	21.70	37.50
STAS	40.36	20.20	36.00	41.46	21.80	37.57
STAS + PACUSM	41.46	21.22	37.05	42.42	22.66	38.50

Table 1: Results of the combination using ROUGE F1 for CNN/DM and NYT

B Examples

We show some example gold summaries and system outputs of REFRESH(Narayan et al., 2018), STAS and PACSUM (Zheng and Lapata, 2019) on the CNN/DM dataset in table 2 and 3.

References

- Shashi Narayan, Shay B. Cohen, and Mirella Lapata. 2018. [Ranking sentences for extractive summarization with reinforcement learning](#). In *Proceedings of the 2018 Conference of the North American Chapter of the Association for Computational Linguistics: Human Language Technologies, Volume 1 (Long Papers)*, pages 1747–1759, New Orleans, Louisiana. Association for Computational Linguistics.
- Hao Zheng and Mirella Lapata. 2019. [Sentence centrality revisited for unsupervised summarization](#). In *Proceedings of the 57th Annual Meeting of the Association for Computational Linguistics*, pages 6236–6247, Florence, Italy. Association for Computational Linguistics.

	Article 1	Article 2
GOLD	<p>Filmmaker Michael König from Cologne, Germany has created an amazing video showing solar activity. It was made by stitching together footage from Nasa’s Solar Dynamics Observatory over five years. The footage includes loops of ‘coronal rain’ showering the surface of the sun. Transits of the moon, Venus and Earth are also seen - and a comet breezes through the outer solar atmosphere.</p>	<p>Patrick Kramer, 33, is a hyper-realist artist from Springville, Utah. Works from photos and builds up layers of oil paints on canvas. Each work of art takes anywhere between 50 to 300 hours to complete.</p>
REFRESH	<p>An incredible video has stitched together footage from a Nasa spacecraft, revealed the beauty of the solar surface as it bursts with energy. Taken over five years, the footage includes plasma raining down on the sun, an extreme solar eruption and even a comet breezing through the sun’s atmosphere. The movie, called Sun, was created by filmmaker Michael König from Cologne, Germany. It uses footage recorded by Nasa’s Solar Dynamics Observatory (SDO) spacecraft between 2011 and 2015.</p>	<p>They become even more awe-inspiring at the realisation that they’re paintings, and someone spent between 50 to 300 hours painstakingly creating them. Patrick Kramer is a 33-year-old artist hailing from Springville, Utah, who specialises in remarkably hyper-realistic paintings. One of his images is an imitation of the cover art for musician Drake’s 2013 album, Nothing Was the Same. The US artist works from photos and builds up delicate layers of oil paint on a board or canvas.</p>
STAS	<p>An incredible video has stitched together footage from a Nasa spacecraft, revealed the beauty of the solar surface as it bursts with energy. Filmmaker Michael König from Cologne, Germany has created an amazing video showing solar activity (shown). It uses footage recorded by Nasa’s Solar Dynamics Observatory (SDO) spacecraft between 2011 and 2015.</p>	<p>Patrick Kramer is a 33-year-old artist hailing from Springville, Utah, who specialises in remarkably hyper-realistic paintings. The US artist specialises in beautifully in-depth oil painted portraits, including this intricate black and white portrait of a man called Matt. It’s almost impossible to tell that Kramer’s flawless creations are in fact oil paintings due to their incredible pin-sharp detail and clarity.</p>
PACSUM	<p>You might have seen fantastic images of the sun before, or even clips showing its activity - but you’ve never seen anything like this. An incredible video has stitched together footage from a Nasa spacecraft, revealed the beauty of the solar surface as it bursts with energy. Taken over five years, the footage includes plasma raining down on the sun, an extreme solar eruption and even a comet breezing through the sun’s atmosphere.</p>	<p>Love the lighting in these photography shots? They become even more awe-inspiring at the realisation that they’re paintings, and someone spent between 50 to 300 hours painstakingly creating them. Patrick Kramer is a 33-year-old artist hailing from Springville, Utah, who specialises in remarkably hyper-realistic paintings.</p>

Table 2: Example gold summaries and system outputs of REFRESH(Narayan et al., 2018), STAS and PACSUM (Zheng and Lapata, 2019) on the CNN/DM test dataset

	Article 3	Article 4
GOLD	AQAP says a “crusader airstrike” killed Ibrahim al-Rubaish. Al-Rubaish was once detained by the United States in Guantanamo.	Queen Victoria’s holiday residence was Osborne House on the Isle of Wight. But her journeys there involved train and ferry ride and then another train ride to a station more than two miles from the property. In 1875, a station was built at Whippingham just to serve Royal residence. Building is now a five-bedroom home, currently on the market for 625,000.
REFRESH	A top al Qaeda in the Arabian Peninsula leader – who a few years ago was in a U.S. detention facility – was among five killed in an airstrike in Yemen, the terror group said, showing the organization is vulnerable even as Yemen appears close to civil war. Ibrahim al-Rubaish died Monday night in what AQAP’s media wing, Al-Malahem Media, called a “crusader airstrike.” Al-Rubaish was once held by the U.S. government at its detention facility in Guantanamo Bay, Cuba.	‘ It is impossible to imagine a prettier spot,’ Queen Victoria said of her holiday residence, Osborne House on the Isle of Wight. It was at the beach there that she would take to the sea in her wooden bathing machine, and that all of her children learned to swim. She would travel to Portsmouth by train and then by ferry to Ryde. So, in 1875, a station was built at Whippingham, the closest point on the line to Osborne House – just to serve the Royal residence.
STAS	A top al Qaeda in the Arabian Peninsula leader – who a few years ago was in a U.S. detention facility – was among five killed in an airstrike in Yemen , the terror group said , showing the organization is vulnerable even as Yemen appears close to civil war. Ibrahim al-Rubaish died Monday night in what AQAP ’s media wing , Al-Malahem Media , called a “ crusader airstrike . ” Al-Rubaish was once held by the U.S. government at its detention facility in Guantanamo Bay , Cuba.	Pretty spot : Queen Victoria spent her holidays in Osborne House on the Isle of Wight. So , in 1875 , a station was built at Whippingham , the closest point on the line to Osborne House – just to serve the Royal residence. The current owners , retired electrician Tony Vickers , 69 , and his 70-year-old wife Sue , a retired hairdresser , are selling because they want to move to a smaller bungalow .
PACSUM	A top al Qaeda in the Arabian Peninsula leader – who a few years ago was in a U.S. detention facility – was among five killed in an airstrike in Yemen, the terror group said, showing the organization is vulnerable even as Yemen appears close to civil war. Ibrahim al-Rubaish died Monday night in what AQAP’s media wing, Al-Malahem Media, called a “crusader airstrike.” The Al-Malahem Media obituary characterized al-Rubaish as a religious scholar and combat commander.	‘ It is impossible to imagine a prettier spot,’ Queen Victoria said of her holiday residence, Osborne House on the Isle of Wight. It was at the beach there that she would take to the sea in her wooden bathing machine, and that all of her children learned to swim. But, however pleasing her days at Osborne House, Victoria’s journeys there were never easy.

Table 3: Example gold summaries and system outputs of REFRESH(Narayan et al., 2018), STAS and PACSUM (Zheng and Lapata, 2019) on the CNN/DM test dataset