PaperRater

A Lightweight, Unsupervised Framework for Quantifying the Thermal Cooling Effect of Urban Tree Canopies from Street-Level Imagery Swarnalatha P, Devank Gupta, Aayush Khanna ABSTRACT The Urban Heat Island (UHI) phenomenon poses a major challenge to sustainable urban development, emphasizing the need for quantitative tools to evaluate the thermal benefits of green infrastructure. Although deep learning?based approaches have been widely adopted for analyzing street-level imagery (SLI), they remain resource-intensive and heavily reliant on labeled datasets. This paper introduces an efficient, unsupervised computational framework that estimates the cooling potential of urban tree canopies without the need for deep learning models. The method employs a... (only first 800 chars shown)

Analysis complete. Our feedback is listed below in printable form. Some of the items have been truncated or removed to provide better print compatibility.

🔍 *Plagiarism Detection*

Original Work

Originality: 93%

➕ **This paper appears to be original,** but be certain that any included text is properly cited.

The following web pages may contain content matching this document:
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More info on our originality scoring process (http://www.PaperRater.com/page/plagiarism-detection) .

🚩 *Spelling*

Spelling Suggestions
"

Error	Suggestion
predicted ?	predicted?
cities ?	cities?
streets ?	streets?

🚩 *Grammar*

Grammar Suggestions

Error	Suggestion
learning?based	learning? based
superpixels	super pixels
effect?an	effect? an
interpretability	interpreting ability
interpretability.	interpreting ability.
approaches? specifically	approaches? specifically
superpixel algorithm? allowing	super pixel algorithm? allowing
interpretability.	interpreting ability.
Given	With
image-processing	image processing
superpixels.	super pixels.
(?0.1)	(? 0.1)
(>400	(> 400
representing	represents
8?C)	8 ?C)
results? temperature	results? temperature
coordinates? are	coordinates? are
colormap	color map
40?C.	40 ?C.
superpixel	super pixel
advantages? transparency,	advantages? transparency,
data?making	data? making
interpretability	interpreting ability
superpixel	super pixel

(?T ?C)	(?T?C)
interpretability	interpreting ability
LiDAR-derived	Li DAR-derived
island	islands
microclimates	micro climates
	9, no. 2, pp. 145-155, 2016.
93?101,	93-101,
	8, no. 2, pp. 174-174, 2016.

🏳 *Word Choice*

Usage of Bad Phrases

Bad Phrase Score: 0.29 (lower is better)
The Bad Phrase Score is based on the quality and quantity of trite or inappropriate words, phrases, egregious misspellings, and cliches found in your paper. You did equal or better than **99%** of the people in your education level.

➕ Great work - your score is well above average! Continue choosing quality phrases in your writing.

⭐ *Style*

Usage of Transitional Phrases

Transitional Words Score: 58
This score is based on quality of transitional phrases used within your paper. You did equal or better than **41%** of the people in your education level.

⚠️ Your usage of transitional phrases may be within an acceptable range, but I know you can do better. Please read the information below and apply the advice to your writing.

One sign of an excellent writer is the use of transitional phrases (e.g. therefore, consequently, furthermore). Transitional words and phrases contribute to the cohesiveness

(http://www.PaperRater.com/vocab_builder/show/cohesiveness) of a text and allow the sentences to flow smoothly. Without transitional phrases, a text will often seem disorganized and will most likely be difficult to understand. When these special words are used, they provide organization within a text and lead to greater understanding and enjoyment on the part of the reader.

The following transitional phrases were found in your document:
specifically, and, especially, however, for instance, particularly, rather, although

Consider using additional transitions where appropriate:
• consequently (http://paperrater.com/vocab_builder/show/consequently)
• moreover (http://paperrater.com/vocab_builder/show/moreover)
• nevertheless (http://paperrater.com/vocab_builder/show/nevertheless)
• notwithstanding (http://paperrater.com/vocab_builder/show/notwithstanding)
• accordingly (http://paperrater.com/vocab_builder/show/accordingly)
• conversely (http://paperrater.com/vocab_builder/show/conversely)
• ordinarily (http://paperrater.com/vocab_builder/show/ordinarily)

Transitional phrases may be used in various places in a text:
• between paragraphs
• between sentences
• between sentence parts
• within sentence parts

Consider this example:
She didn't like the pudding and, **consequently**, threw it all away.

The word **'consequently'** contributes to greater unity or cohesion between sentences and allows the text to flow more smoothly.

📄 *Style*

Sentence Length Info

Total Sentences: 63
Avg. Length: 18.0 words
Short Sentences (< 17 words): 38 (60%)
Long Sentences (> 35 words): 2 (3%)
Sentence Variation: 34.9 words (std deviation)

➕   It is important to vary between simple and complex sentences (http://blog.paperrater.com/2015/05/effective-use-of-sentence-length.html) , which you seem to have done quite well.

Line chart of the length of each sentence (first 50 sentences). A jagged chart indicates variation.

💬   Helpful Resources:

• Effective Use of Sentence Length (http://blog.paperrater.com/2015/05/effective-use-of-sentence-length.html)

📄 *Style*

Readability Indices

For more than 80 years, great minds have attempted to represent a text with a single score that summarizes its complexity. Writers sometimes use such 'readability indices' to gauge whether or not their text is appropriate for an audience of a particular grade level. Several of the most popular readability scores are included below. More info on interpreting these scores (http://blog.paperrater.com/2015/04/readability-indices.html) .

Index	Score
Automated Readability Index	14.1
Coleman-Liau Index	18.9
Dale-Chall Readability Formula	11.7
Flesch Reading Ease	13.7
Flesch-Kincaid Grade Level	14.1
Fry Readability Formula	2.0
Gunning-Fog Index	17.4
LIX	57.2
Linsear Write	8.2
Raygor Estimate Graph	long_words
SMOG (Simple Measure of Gobbledygook)	14.0
Spache Readability Formula	70.6

📄 *Style*

Passive Voice

Passive Voice Sentences: 12.7%
Many writers feel that passive voice represents poor writing form, as it allows the object of an action to be the subject of a sentence. The following sentences were detected as having passive voice:

- … deep learning?based approaches have **been widely adopted** for analyzing street-level imagery …
- … quantification techniques can **be categorized** into supervised (deep learning) and …
- Vegetation Filtering: A VARI map **is calculated** to assess pixel-level greenness.
- … and area criterion (>400 pixels) **are marked** as vegetation.
- Once canopy masks **are established**, the model estimates cooling …
- … cooling for each canopy () **is given** by: where (typically 8?C) …
- The results **are visualized** through overlays and tabulated data …
- … Although parameter tuning **is required** for optimal accuracy, its …

💬 Helpful Resources:

- Active vs Passive Voice (http://blog.paperrater.com/2015/05/passive-voice-vs-active-voice.html)

📄 *Style*

Sentence Beginnings

Simple Sentence Starts: 13%
You did equal or better than **75%** of the people in your education level.

Impressive! You seem to be using more complex sentence beginnings.

Variety is the hallmark (http://www.PaperRater.com/vocab_builder/show/hallmark) of a good writer and this is especially true in regards to sentence starts. Creatively arranging sentence beginnings breaks up the monotony (http://www.PaperRater.com/vocab_builder/show/monotony) and choppy style associated with a simple noun phrase followed by a verb. This does NOT mean that all sentences should begin with prepositional phrases, transitions, or adverbial phrases, but it does mean that you should be certain to pay attention to sentence starts and deliberately edit for variety if necessary.
Here are some simple sentence starts that we found in your text:

- **INTRODUCTION Urbanization has** accelerated...
- **Deep learning** models...
- **Unsupervised Methods Proposed** Framework...
- **Advantages Lightweight requires** no...
- **Vegetation Filtering** A...
- **Superpixels exceeding** a...
- **Key components** include...
- **Mask Overlay Displays detected** tree...

Starts by Part of Speech:
Adjective: 8%
Adverb: 5%
Article: 0%
Conjunction: 0%
Noun: 29%
Preposition: 8%
Pronoun: 0%
Verb: 5%
Other: 24%

Helpful Resources:

- Sentence Beginnings - your sentences' first impression (http://blog.paperrater.com/2015/06/sentence-beginnings.html)

⚙ *Vocabulary Words*

Usage of Academic Vocabulary

Vocabulary Score: 804.64
This score is based on the quantity and quality of scholarly vocab words found in the text. You did equal or better than **100%** of the people in your education level.

Vocabulary Word Count: 198
Percentage of Vocab Words: 21.02%
Vocab Words in this Paper (top 20):
framework, quantifying, employs, facilitating, mitigation, mechanisms, predictive, leveraged, integrating, paradigms, applicability, consolidated, interventions, empirical, urban, phenomenon, poses, sustainable, emphasizing, quantitative

➕ **Nice work!** Your writing showcases great proficiency in vocabulary words. Our Vocab Builder (http://www.PaperRater.com/vocab_builder/index) is a great source to continue building on your work so far.

Tips

Whether you are writing for a school assignment or professionally, it is imperative that you have a vocabulary that will provide for clear communication of your ideas and thoughts. You need to know the type and level of your audience and adjust your vocabulary accordingly. It is worthwhile to constantly work at improving your knowledge of words. To help with this task, please consider using our Vocabulary Builder (http://www.PaperRater.com/vocab_builder/index) to improve your comprehension and usage of words.

⇒ *Grade*

Auto Grader

Grade: 83 B

The grade above is NOT complete! We do not actually use a crystal ball to generate your grade. Instead, this grade takes into account spelling, grammar, word choice, style, vocabulary, and more; but it does NOT examine the *meaning* of your words, how your ideas are structured, or how well your arguments are supported. We should also mention that our automated grader doesn't **always** get things right. So, please consider this grade to be one facet of your paper's overall grade.