

The Sense of Well-being in a Livable City: Public Sentiment on Urban Environment

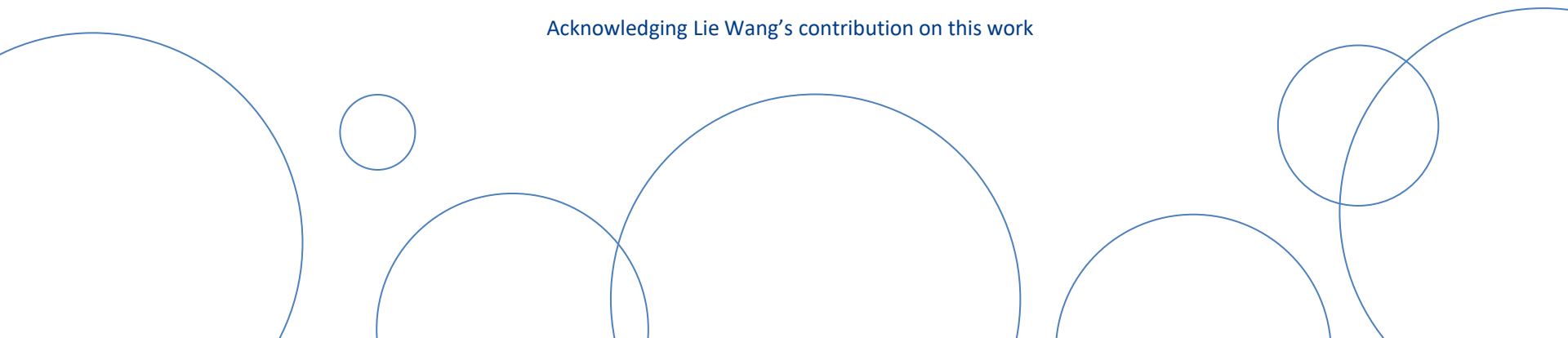
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Acknowledging Lie Wang's contribution on this work





01 ▶ Introduction

02 ▶ Research method

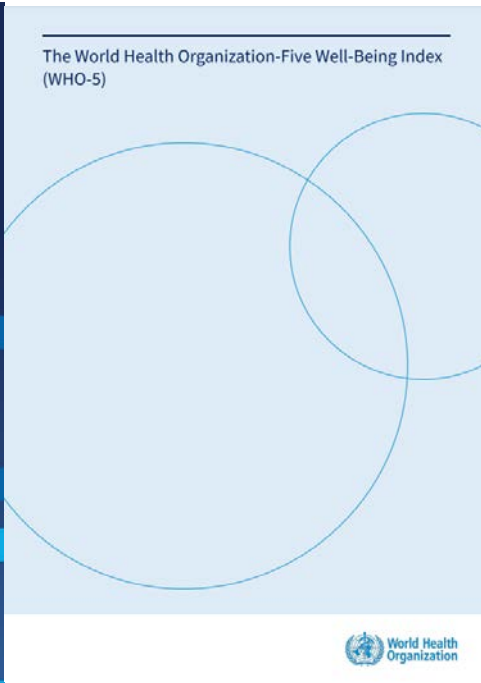
03 ▶ The analysis

04 ▶ Conclusion

PART 01

Introduction

INTRODUCTION — WHAT IS WELL-BEING



what is ultimately good for a person and a positive state experienced by individuals and societies.

encompasses quality of life and the ability of people and societies to contribute to the world with a sense of meaning and purpose

supports the tracking of the equitable distribution of resources, overall thriving and sustainability

INTRODUCTION — WHAT IS WELL-BEING

- Job & Labor Market Well-being
- Urban Child & Family Well-being
- **Urban Landscape & Environmental Well-being**
- **Social Cohesion & Urban Livability**
- Urban Environmental Health & Well-being
- Late-Life Adaptation & Age-Friendly Cities
- Lifelong Learning & Urban Livability
- Sustainable Urban Consumption & Well-being
- Youth Development & Livable Urban Environments
- Foundational Livability Drivers of Well-being

High-quality green spaces, natural landscapes, waterfronts, and biodiversity reduce stress, improve mental health, and boost people' subjective well-being—core to livable city design.

Public open spaces and inclusive urban environments foster social interaction, community belonging, and social cohesion, which directly elevate well-being and livability.



INTRODUCTION - TRADITIONAL LIVABILITY-ORIENTED URBAN DESIGN

01

Focus on human settlements and built environment

The liveability-oriented design approach confronts challenges in recent years with the development of cities. Traditional liveability-oriented urban design centred on the construction or improvement of physical environment, lacking concerns on the actual perception and feelings of space users on the environment.

02

People's perception and feelings toward the city are largely overlooked

Liveability can be measured by various factors that matter for quality of life, but people's perception and feelings toward the city, especially the built environment, is considered fundamental to the evaluation of urban liveability. (Ooi & Yuen, 2009; Sheikh & van Ameijde, 2022).



- ◆ Most existing studies on liveable environment depend on objective indicators, the subjective preferences/sentiment of individuals are largely overlooked.

= INTRODUCTION - RESEARCH SIGNIFICANCE

How can people's subjective
sentiment/preferences be evaluated?

EVALUATE PEOPLE'S
SUBJECTIVE PREFERENCES

Against the background of new data environment, **availability of big data and machine learning** makes it possible to evaluate people's subjective preferences on the built environment.

Sentiment analysis

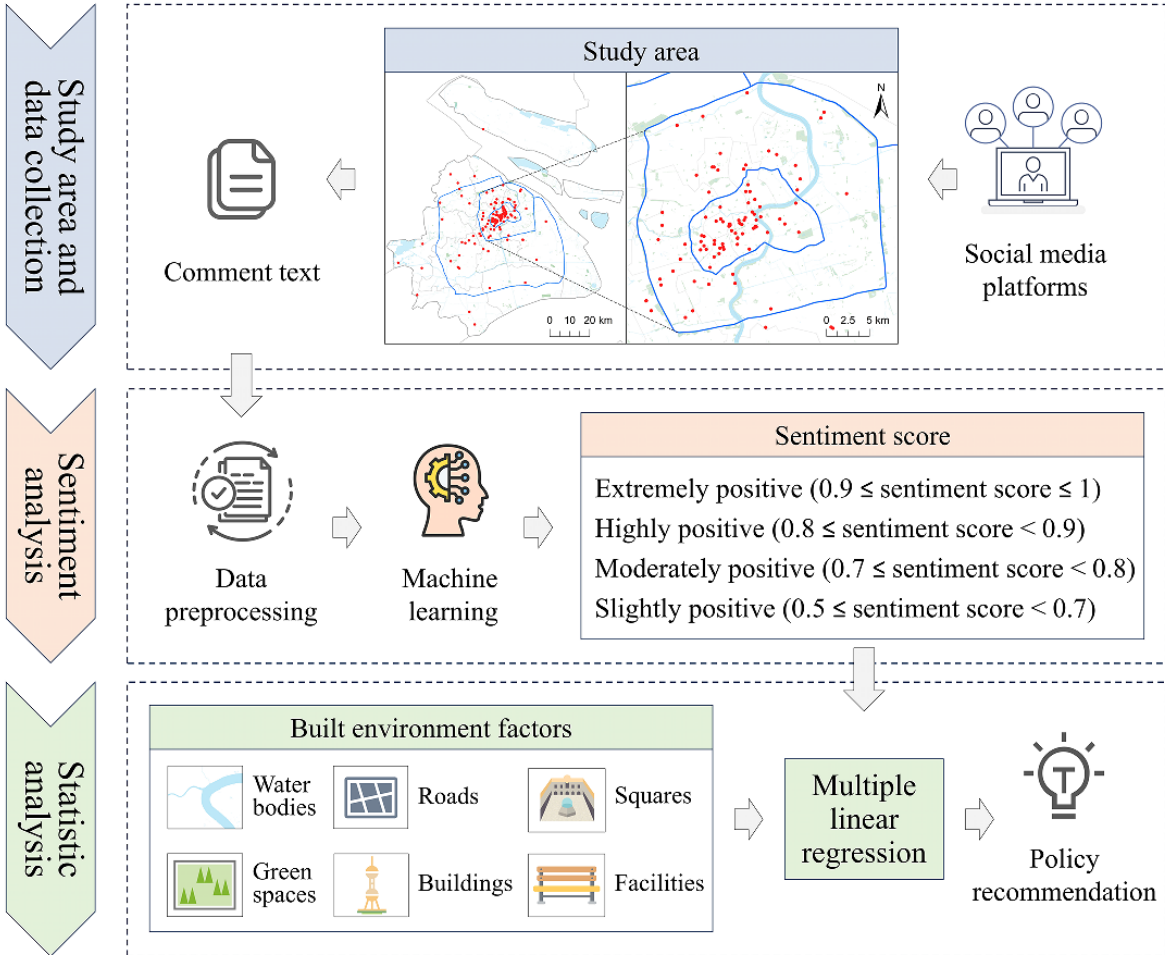
PART 02

Research method

RESEARCH FLOW

Three step research
flow chart

People's sentiments are
scored and classified by
several hierarchies



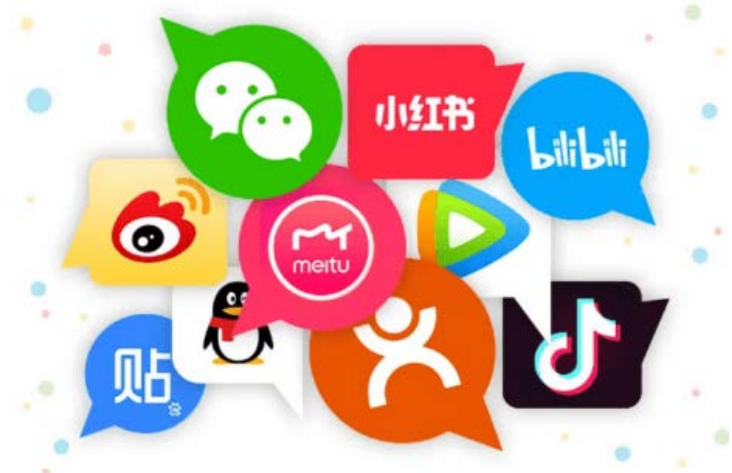
SOCIAL PLATFORMS APPS

Apply a text emotion analysis approach

Using social platforms apps and applying a text emotion analysis approach of natural language processing, this research explores such possibility in **urban environment of Shanghai** and **reveals how the public perceive the micro, street-level built environment therein.**

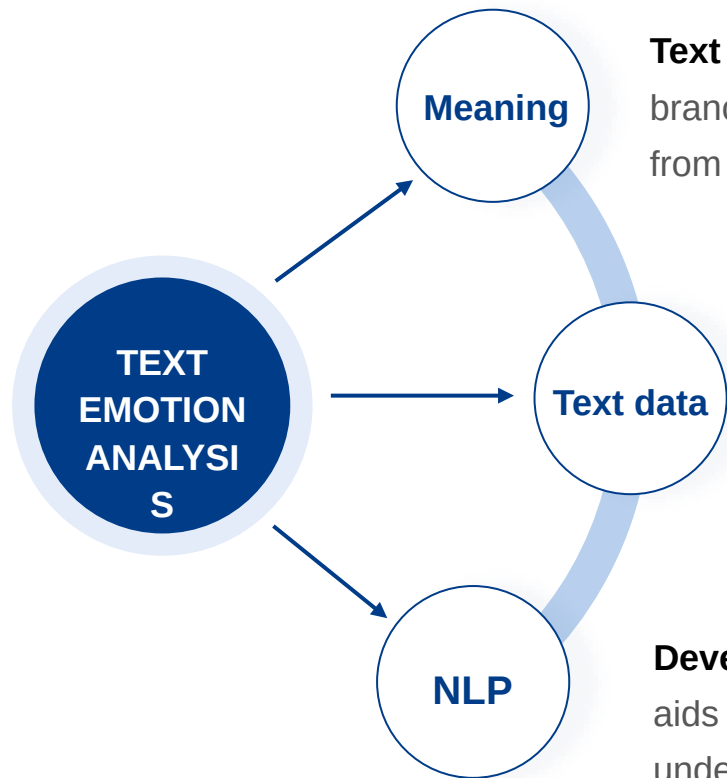


Social media/platforms apps



Chinese social platforms apps

TEXT EMOTION ANALYSIS



Text emotion analysis (or emotion detection) represents a branch of sentiment analysis that extracts or analyses emotions from the text.

In new data environment, a large amount of text data generates from individuals every day, which **provide raw sources** for text mining and emotion analysis.

Development of natural language processing (NLP) further aids text emotion analysis as NLP empowers computers to understand human languages in the form of texts by deploying linguistics techniques.

STUDY AREA



Shanghai

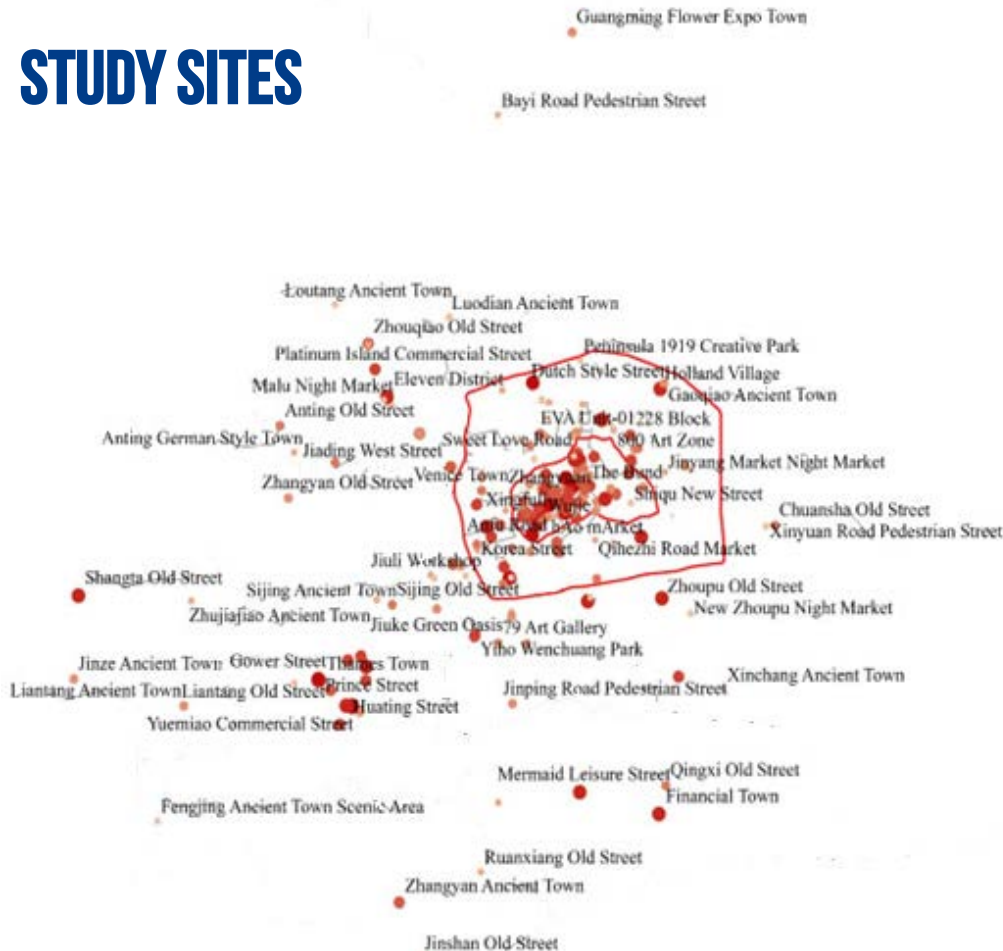
Location: Dragon head of Yangtze River
Delta, China

Area: 6,341 km²

Central city: 664 km² (Outer Ring
Expressway)

Population: 24.87 million

STUDY SITES



- ◆ This research applies a Chinese NLP package with well-trained skills on extracting keywords, translation, text emotion analysis, text classification etc. to micro, street-level built environment in Shanghai, to test the validity of the approach and reveal how the public perceive therein.
- ◆ Most of the sites are located in the central city

=

- ◆ The key words in the database (comments)

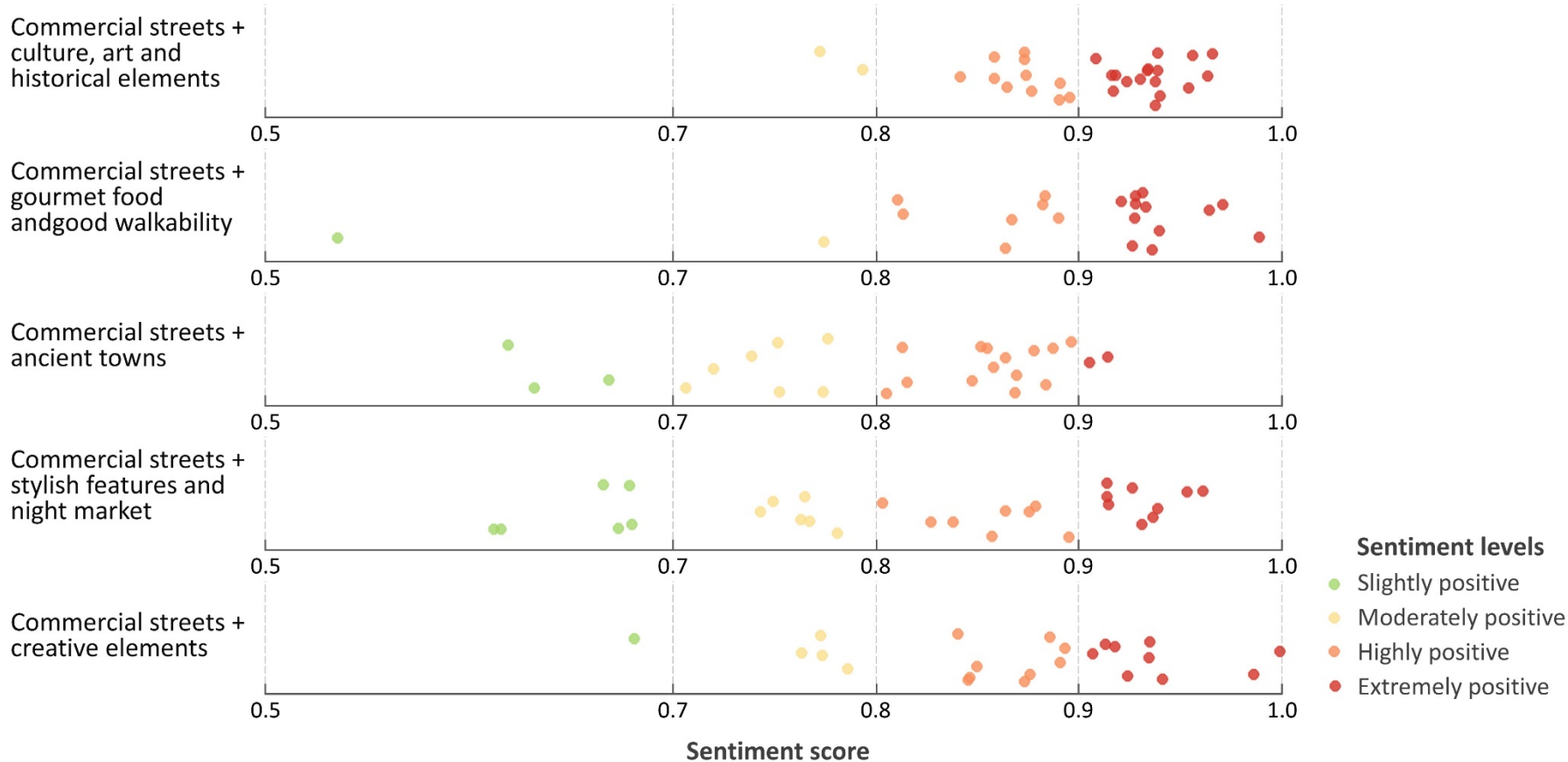
High frequency key words of urban environment and behavior



PART 03

The analysis

SENTIMENTS ON DIFFERENT TYPES OF ENVIRONMENTS



SENTIMENTS ON DIFFERENT TYPES OF ENVIRONMENTS



Xintiandi (Shikumen)

SENTIMENT SCORE: 0.99

Review content: Xintiandi is full of a lofty atmosphere, and many catering brands have settled in. Visitors from other places can visit a major venue here first, and then feel the charm of fashion trends.



Tian'ai Road

SENTIMENT SCORE: 0

Review content: I don't know what's good about this broken road except for its beautiful name?! The sidewalks on both sides are extremely narrow, and there are not many shops, only graffiti walls...



Huanghe Road (TV)

SENTIMENT SCORE: 0.54

Review content: Yesterday's blossoms have withered, everything is the same but different, and all has come to an end. As a native Shanghaiese strolls down Huanghe Road again...



Sino-European Street

SENTIMENT SCORE: 0.78

Review content: There are basically no shops on Central European Street, just a few aunties taking photos. The architecture is beautiful, and the transport is convenient; the subway station is just nearby...

ASSOCIATION OF SENTIMENTS ON ENVIRONMENT ELEMENTS

- ◆ How people's sentiments on built environment elements relate to their general perception toward the public space
- ◆ Roads, buildings and green spaces positively contribute to the total sentiment scores
- ◆ For prudent reference

Elements	B	SE	Beta	t-Value	p-Value	VIF
Water bodies	0.038	0.029	0.075	1.296	0.198	1.134
Roads	0.495	0.065	0.478	7.579	0.000	1.341
Buildings	0.223	0.036	0.368	6.110	0.000	1.222
Green spaces	0.048	0.020	0.148	2.373	0.019	1.317
Squares	0.000	0.013	-0.001	-0.020	0.984	1.129
Recreational facilities	-0.001	0.012	-0.007	-0.114	0.910	1.228
Constant	0.204	0.049		4.170	0.000	
R ²				0.638		
Adjusted R ²				0.621		

XINTIANDI AS AN EXAMPLE



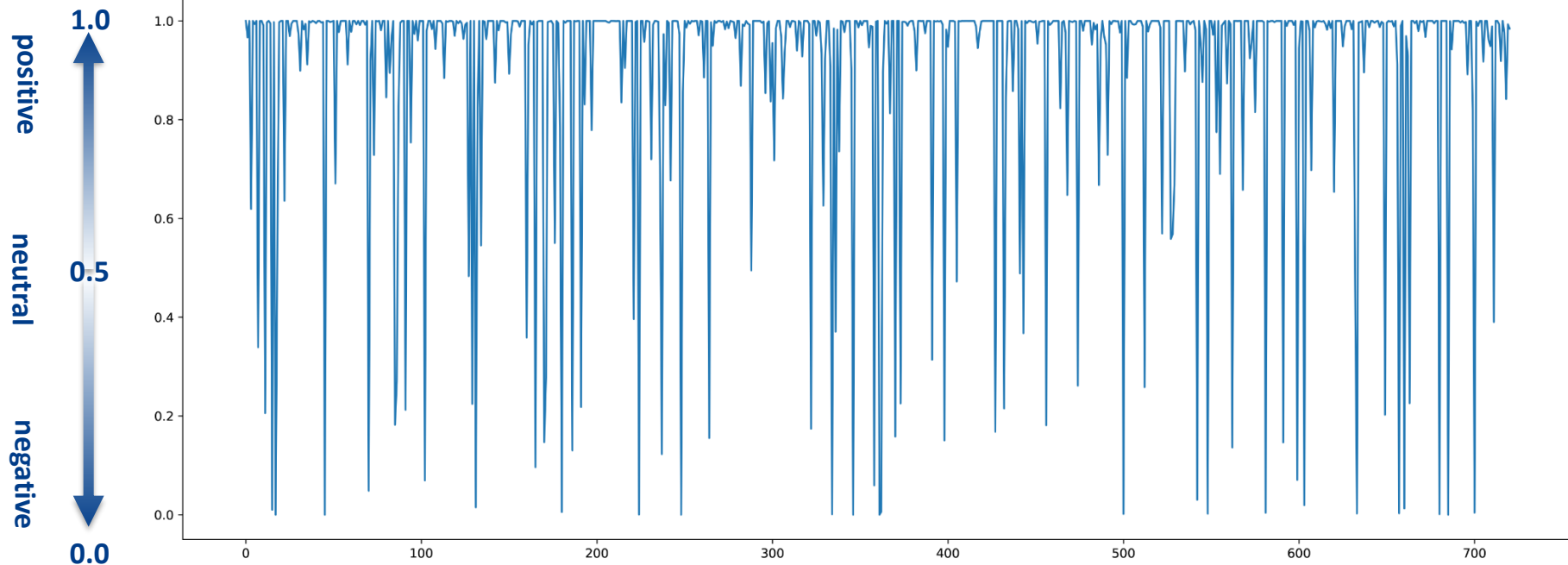
- ✓ Xintiandi , Shanghai
- ✓ a fashionable pedestrian street
- ✓ a famous leisure consumption area
- ✓ substantial comments and text messages online



XINTIANDI AS AN EXAMPLE

text sentiment analysis

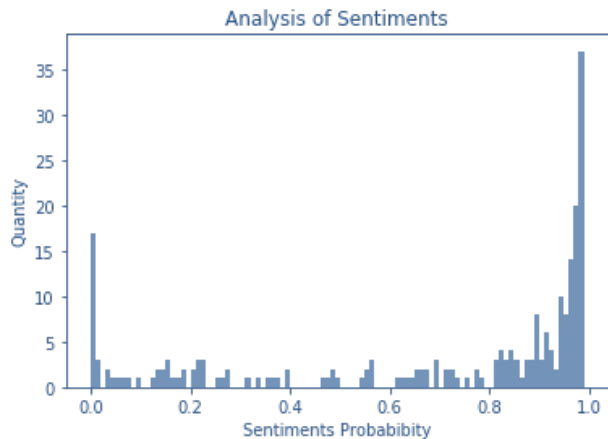
value



Values of sentiment analysis in Xintiandi, Shanghai (2024)

XINTIANDI AS AN EXAMPLE

- The result suggests that people's perception toward the environment of Xintiandi is **generally positive** with an average sentiment value of **0.90**.
- **March** and **May** got the highest values over **0.92** while **April's** value was the lowest at **0.875**.
- The approach is **valid** to assess the public attitude toward the built environment they stay and experience.



Distribution of SnowNLP sentiment value
in Xintiandi from 0 to 1 (2024)

MONTHS	SENTIMENT VALUE	RATIO OF VALUE <= 0.5	RATIO OF VALUE > 0.5
JANUARY	0.894	8.85%	91.15%
FEBRUARY	0.893	10.31%	89.69%
MARCH	0.924	5.83%	94.17%
APRIL	0.875	11.90%	88.10%
MAY	0.921	8.60%	91.40%
JUNE	0.902	5.81%	94.19%
JULY	0.892	10.62%	89.38%

Distribution of SnowNLP sentiment values
in Xintiandi, Shanghai (2024)

PART 04

Conclusion

CONCLUSION

>> NLP-based text analysis for **measuring people's sentiment on environment**

As a subfield of natural language processing, text emotion analysis is workable for identifying citizens' perception toward built environment in a city.

>> Quantifiable results

The approach can also quantify the intensity of emotions. With quantifiable results, the extent of people's perception can be linked to other built environment factors for correlation analysis.

>> Aid human-centred design for **improving urban environment well-being**

How characteristics of built environment affect people's subjective feelings can be evaluated, which would significantly aid human-centred design of urban environment.

>> Further development of artificial intelligence and emotion models

With further development of artificial intelligence and emotion models, more approaches are expected to supplement and optimize the analysis for human-centred urban design.

THANK YOU

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