A SENTIMENT ANALYSIS MODEL OF A CIVIL SERVICE PERFORMANCE EVALUATION USING A FEMINIST FRAMEWORK:

CASE STUDY OF OPEN GOVERNMENT INFOTMATION IN CHINA

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Abstract: This article aims to explore sentiment analysis, a text-analysis tool used to understand how customers feel about a particular piece of content. Through this method, we are able to assess the openness of governments by establishing a dynamic evaluation mechanism of supervision and, consequently, improving the administrative law on a feminist basis. The author of this research built a sentiment analysis model based on the communication between herself and governments, discussing the implication of the model and proposing potential improvements to the administrative law in China.

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INTRODUCTION

Ever since the birth of the Women's Suffrage Movement in the 20th century and nowadays' MeToo movement, feminism has sought to reshape how society functions and people view things. However, hidden and pervasive inequalities, stereotypes, and power relationships within technological transformation, have grown stronger due to the gendered tendency of digital media, automation, and broader technological research fields.[1] Feminists are faced with the challenge of having to reconnect feminist thinking practices with the regressively gendered political debates, social norms, and, most importantly, legal practices.[2] As emotion has remained one of the core conceptions of feminism,[3] incorporating emotion into both private and public law might serve as a legal foundation for feminism.

The author of this article, who identifies as a feminist thinker, sees new opportunities in sentiment analysis. It is a tool that can be considered feminist due to its focus on detecting the emotions in texts to improve administrative law for better communication between governments and citizens and ultimately establish a feminist jurisprudence. The field of law that they will focus on is the Open Government Information Regulations in China, as access to information has become a source of power in the age of big data.[4]

This project analyzes the communication content between citizens and government officials using the sentiment analysis model based on TensorFlow. In Section 2, the researcher will talk about their theories. Then, section 3 will explain the case study, present the model, evaluate the results, and discuss the implication. Finally, in Section 4, they will conclude and propose future directions.

I.   THEORETIC BACKGROUND

A. Emotion in Feminism

In recent years, feminism has become a heated field saturated with countless feminist perspectives.[5] One of the feminist viewpoints is postmodernism feminism which is rooted in the works of Derrida[6] and Foucault[7] about postmodernism. During

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[1] CATHERINE D'IGNAZIO & LAUREN F. KlEIN, DATA FEMINISM (2020).

[2] JUDITH A. BAER, FEMINIST THEORY AND THE LAW, The Oxford Handbook of Political Science (2011); Mary Jane Mossman, Feminism and Legal Method: The Difference It Makes, 3 Australian Journal of Law and Society (1986).

[3] Linda Ahall, Affect as Methodology: Feminism and the Politics of Emotion, 12 International Political Sociology 36 (2018).

[4] CATHERINE D'IGNAZIO & LAUREN F. KLEIN, DATA FEMINISM (2020).

[5] RORY DICKER & ALISON PIEPMEIER, CATCHING A WAVE: RECLAIMING FEMINISM FOR THE 21ST CENTURY (2016).

[6] JACQUES DERRIDA, STRUCTURE, SIGN, AND PLAY IN THE DISCOURSE OF THE SOCIAL SCIENCES (1972).

[7] MICHEL FOUCAULT, THE ORDER OF THINGS: AN ARCHEOLOGY OF THE HUMAN SCIENCES (1970); PRISON TALK (1980); STRUCTURALISM AND POST-STRUCTURALISM (1998).

the 1970s and 80s, feminist researchers such as Cixous,[8] Irigaray,[9] and Kristeva,[10] also led the postmodern theory to a critique of patriarchal culture. While their works vary, they share the assumption that language and meaning systems can structure experience. They agree on specific themes such as the rejection of dualism, focus on difference, interest in the role of discourse in constructing gendered relations of power and domination, and denial of normalization. Since language can shape the meaning of words in different contexts and discourses, the individual's subjectivity is then susceptible to construction through discourses. In particular, Irigaray rejected the binary oppositions in society such as "feminine" vs. "masculine"[11], stating that women's identity has become the mirror negation to men. In the 1970s, women who were neither white, middle class, nor western started questioning the unitary idea of "woman" as a category to unite women of different classes, nationalities, and races. Feminists like Hooks[12] criticized that traditional feminism was only representative of the white and middle-class women instead of englobing women universally. Such a narrow viewpoint only strengthened structure based on social classes since the needs of women of color and women in a state of poverty had been neglected. Intending to dismantle the man-woman dichotomy, postmodern feminists also seek to consider more variables such as nationality, class, and race.

The importance of emotion has long been neglected if one compares it to logicality. This is because emotion is usually associated with women and irrationality, which makes emotion a subjective concept and one of the focuses of feminist research.[13] Since the 1990s, there has been increasing research on emotions and subjective feelings. In Jaggar's early work,[14] she argued that emotion is essential for epistemology and constructing knowledge. Researchers such as Damasio[15] and Adolphs[16] add that decision-making depends on emotional processing. Reasoning is related to the state of the body as it uses biological information to make advantageous decisions based on past experiences.[17]

B. Emotion in Law

Recent studies have received attention on the presence and importance of affect in law.[18] For feminists, their research on emotions aims to promote women's inclusion

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[8] HÉLÈNE CIXOUS, THE LAUGH OF THE MEDUSA (1976); CASTRATION OR DECAPITATION?, 7 Signs (1981).
[9] LUCE IRIGARAY, THIS SEX WHICH IS NOT ONE (1985).
[10] JULIA KRISTEVA, NEW MALADIES OF THE SOUL (1997).
[11] LUCE IRIGARY, THIS SEX WHICH IS NOT ONE (1985).
[12] BELL HOOKS, AIN'T I A WOMAN? (1981).
[13] Linda Ahall, Affect as Methodology: Feminism and the Politics of Emotion, 12 International Political Sociology 36 (2018).
[14] Alison M. Jaggar, Love and knowledge: Emotion in feminist epistemology, 32 Inquiry 151 (1989).
[15] ANTÓNIO DAMÁSIO, DESCARTES' ERROR: EMOTION, REASON, AND THE HUMAN BRAIN (1995).
[16] Ralph Adolphs et al., Cortical systems for the recognition of emotion in facial expressions, 16 The Journal of Neuroscience : the Official Journal of the Society For Neuroscience 7678 (1996).

[17] Ralph Adolphs et al., Cortical systems for the recognition of emotion in facial expressions, 16 The Journal of Neuroscience : the Official Journal of the Society For Neuroscience 7678 (1996).
[18] Susan A. Bandes & Jeremy A. Blumenthal, Emotion and the Law, 8 Annual Review of Law and Social Science 161 (2012).

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in the legal system.[19] By narrating her emotional experience resulting from rape and a confusing episode with the criminal justice system, Estrich argued that the law should take emotions into account. [20] More specifically, she proposed that physical or verbal resistance alone was insufficient to prove the lack of consent and that victims' emotions should also be considered. Feminist scholars also questioned the dichotomy of reason and emotion in law.[21] Researchers like Bender[22] and Menkel-Meadow[23] promoted the combination of reasoning and affective perceptions to improve the quality of legal decision-making.

Researchers from other fields, including legal theory, psychology, and philosophy, also joined the discussion and focused on the complex role of affect within the law. [24] Nussbaum and Kahan insisted that emotions should not be simple physiological and mechanical processes. Instead, they should be seen as authentic cognitivist and evaluative conception.[25] They believed that the evaluative notion of emotions allows studying the relationship between affect and the norms; this enables people to understand how individuals are socialized in this context. They maintained that current institutional practices should also consider how the norms reflect individuals' emotional experiences. In the Passions of Law, the author established that cognitive emotions lead to more moral, accurate, and just decisions. [26]

After exploring the complex relationship between emotion and law, many researchers have come forward and proposed new goals for the law, to reform the current institutional practices.[27]

Below, the author of this work addresses several aspects where the law – such as criminal and tort law – fails to consider emotions in its nature.

Two Conceptions of Emotion in Criminal Law discussed the necessity of applying the evaluative conception of emotions in criminal law doctrines such as voluntary manslaughter and self-defense. [28]

Voluntary manslaughter—The law admits the presence of emotion when assessing the offender's state of mind at the moment of committing the crime. In

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[19] JUDITH A. BAER, FEMINIST THEORY AND THE LAW, The Oxford Handbook of Political Science (2011).
[20] Susan Estrich, Rape, 95 The Yale Law Journal 1087 (1986).
[21] JUDITH A. BAER, FEMINIST THEORY AND THE LAW, The Oxford Handbook of Political Science (2011).
[22] Leslie Bender, From Gender Difference to Feminist Solidarity: Using Carol Gilligan and an Ethic of Care in Law, 15 Vermont Law Review 19 (1990).
[23] Carrie J. Menkel-Meadow, Portia in a Different Voice: Speculations on a Women's Lawyering Process, 1 Berkeley Journal of Gender, Law and Justice 39 (1985).
[24] Terry A. Maroney, Law and Emotion: A Proposed Taxonomy Of an Emerging Field, 30 Law Human Behavior 119 (2006).
[25] Martha Craven Nussbaum & Dan M. Kahan, Two Conceptions of Emotion in Criminal Law, 96 Columbia Law Review (1996).
[26] SUSAN A. BANDES, THE PASSIONS OF LAW (2000).
[27] Susan A. Bandes & Jeremy A. Blumenthal, Emotion and the Law, 8 Annual Review of Law and Social Science 161 (2012).
[28] Martha Craven Nussbaum & Dan M. Kahan, Two Conceptions of Emotion in Criminal Law, 96 Columbia Law Review (1996).

criminal law, emotions like fear, anger, and hate are considered when the court decides the legal category of the offense. The "heat of passion" defense is an example of how a murder crime is downgraded to voluntary manslaughter, as the defendant may have acted on affective reactions following an adequate provocation instead of the malice usually required for murder classification.[29] Even the distinction between adequate and non-adequate provocation is vague, remaining too underinclusive to be categorized in current criminal law.[30] Modern authorities also find it difficult to specify rigid legal categories in advance since an individual's provoked emotions are too diverse. They instead believe that the jury can decide the adequacy of a provocation more accurately than a judge since they come from diverse backgrounds.[31]

Nevertheless, it is also possible that decision-makers like judges and jury members determine the adequacy of the provocation based on whether the law should encourage or not particular actions.[32] Moreover, Nussbaum and Kahan argued that it is difficult to distinguish between justification and excuse for voluntary manslaughter.[33] But the evaluative conception of emotions allows the law to track the appropriateness of the emotional motivations behind the intentional killers'.

Self-defense—Although the law permits citizens to use deadly force when they are faced with an imminent threat to their life, Nussbaum and Kahan further claimed that the affective reactions behind self-defense are more complex than merely instinctive fear or conflict of rights.[34] Apart from life, people also value honor and dignity as they refuse to be subordinate to other people's wrongful acts or will. Therefore, Nussbaum and Kahan believed that the law should include endorsing the evaluation of morally appropriate emotions like dignity.[35]

According to Nussbaum and Kahan, the law should respond to shifting social norms and reforms in current practices, which would allow making better judicial decisions.[36]

While performances of repentance serve as a condition for the application of commutation and parole, the assessment of criminals' repentance also remains problematic in criminal law.[37] For example, in China, criminals' performances of repentance can be objectively shown in their actions and behaviors, such as completed labor tasks and disciplined performances in prison.[38] Although the decline of criminals'

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[29] Deborah E. Milgate, The Flame Flickers, but Burns On: Modern Judicial Application of the Ancient Heat of Passion Defense, 51 Rutgers Law Review 193 (1998).

[30] Martha Craven Nussbaum & Dan M. Kahan, Two Conceptions of Emotion in Criminal Law, 96 Columbia Law Review (1996).

[31] Sanford H. Kadish et al., Criminal Law and Its Processes: Cases And Materials (1995).

Sanford H. Kadish et al., Criminal Law and Its Processes: Cases And Materials (1995).

rovocation, 80 California Law Review 133 (1992).

[33] Martha Craven Nussbaum & Dan M. Kahan, Two Conceptions of Emotion in Criminal Law, 96 Columbia Law Review (1996).

[34] Martha Craven Nussbaum & Dan M. Mahan, Two Conceptions of Emotion in Criminal Law, 96 Columbia Law Review (1996)

[35] Id.

[36] Id.

[37] Liang Geng & Yongqiang Zhang, Determination of Criminals' " True Repentance Performance", 181 Journal of Southwest Petroleum University (Social Science Edition) 68 (2016).

[38] Id.

threat to society can be indeed shown in their personal feelings of regret, it isn't easy to assess their subjective emotions regarding repentance. For this purpose, researchers proposed that it is necessary to have an assessment system to meticulously evaluate criminals' repentance, such as a psychological evaluation mechanism or a questionnaire mode. [39]

Similarly, in the tort of infliction of emotional distress, the assessment of emotion remains an issue of dispute. In the workplace, it is not uncommon for employees to suffer from anguish, fright, or grief, which directly results from their employers' intentional or reckless actions such as discrimination or verbal abuse.[40] However, the real challenge linked to emotional damages is distinguishing where the defendant exceeds the limit and discerning the plaintiff's emotional distress on a unitary standard. For example, elusive and vague terms defined in the Tort Law of the United States, such as "extreme emotional distress" and "the defendant's conduct was outrageous" lead to "entirely different things to different judges"[41] which results in diverse decisions in different contexts.

C. Feminism and Law

In Feminism and the Power of Law,[42] author Carol Smart argues that the power of the law only disqualifies women's experience and knowledge while ignoring their concerns only because the law reflects a predominantly masculine culture. MacKinnon held similar views as she rejected the male view of sex in the rape law. She claimed that the rape law does not protect women because it is male-gendered.[43] She also promoted a feminist or ungendered jurisprudence to represent women and their experiences.[44] As discussed in the previous section, there is the need to establish a mechanism to assess or quantify emotions in the scope of the law. Law reforms associated with emotions can potentially push towards the construction of feminist jurisprudence, as emotion is one of the core conceptions of feminism.

D. Quantification of Emotions in the Private Sector

The private sector has already started quantifying emotions using technologies like sentiment analysis.[45] Sentiment analysis is a fast-developing technology that systematically identifies and quantifies affective information using natural language processing, content analysis, computational linguistics, and biometrics. The early 2000s saw an outbreak of sentiment analysis focused on product reviews published by

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[39] Id.

[40] Regina Austin, Employer Abuse, Worker Resistance, and the Tort of Intentional Infliction of Emotional Distress, Faculty Scholarship at Penn Law (1988).

[41] Russell Fraker, Reformulating Outrage: A Critical Analysis of the Problematic Tort of IIED, 61 Vanderbilt Law Review (2008).

[42] CAROL SMART, FEMINISM AND THE POWER OF THE LAW (1989).

[43] CATHARINE A. MACKINNON, TOWARD A FEMINIST THEORY OF THE STATE (1991).

[44] Id.

[45] Kushal Dave et al., Mining the peanut gallery: opinion extraction and semantic classification of product reviews, the Twelfth International Conference (2003).

customers over the internet.[46] Nowadays, many companies employ this technology for various topics and purposes, such as customer reviews and social media content.

Companies like IBM, Intel, and Twitter started to use sentiment analysis in the 2010s on employees' internal blogs, posts on internal social networking sites, and surveys. The objective was to analyze the employees' sentiment and identify those topics that raised strong opinions.[47] By identifying and responding to these issues, these companies seek to maintain good communication with their employees and long-term retainment.

Unilever started tracking customers' reviews in 2018 and updated this approach in 2020 by incorporating sentiment analysis.[48] Thanks to the study of reviews and ratings found on different websites, Unilever can identify key words, common themes and create product scores. These insights enable Unilever to create higher-quality products and improve customer experience. For example, Unilever proceeded to redesign the packages of its home care products in China after noticing leakage issues.

In marketing, sentiment analysis is widely used to associate customers' emotions with customer satisfaction and potential future sales. For example, researchers have analyzed major topics, tourists' emotions, and hot spots in Disneyland with social media analytics and geographic information system analysis.[49] Such studies propose new frameworks for marketers to better understand their customers.

After seeing the success of sentiment analysis in the private sector, the author of this study suggests extending it to the public sector, such as the administrative law. For example, administrative law could benefit by focusing on the issues raised by bureaucracy and transparency when open government information is requested.

II. CASE STUDY

In this case study, the researcher uses sentiment analysis to detect emotions in communication between the Departments of Education of 34 Chinese municipalities and I. They then apply a TensorFlow-based model to dialogue data collected from our phone calls.

A. Background

Article 27 of the Open Government Information Regulation published on April 4, 2007, and effective on May 15, 2019,[50] states that citizens, legal persons, or other

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[46] Id.

[47] Rachel King, How Do Employees Really Feel About Their Companies?, THE WALL STREET JOURNAL, (2015), https://www.wsj.com/articles/how-do-employees-really-feel-about-their-companies-1444788408.

[48] Unilever, How Your Product Reviews Are Shaping Out Brands (2020), https://www.unilever.com/news/news-and-features/Feature-article/2020/how-your-product-reviews-are-shaping-our-brands.html?utm_source=UI&utm_medium=Social&utm_campaign=AlwaysOn.

[49] Seunghyun "Brian" Park et al., Linking emotion and place on Twitter at Disneyland, 35 Journal of Travel & Tourism Marketing 664 (2018).

[50] Open Government Information Regulation of the People's Republic of China (promulgated by St. Council, Apr. 4, 2007, reviewed Apr. 3, 2019, effective May. 15, 2019), art. 711, 2019, P.R.C Laws (China).

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organizations may request relevant government information from local people's governments at all levels. This additional clause applies to the information that was already voluntarily disclosed by governments, citizens, legal persons, or other organizations. According to Article 28, administrative agencies shall establish and improve channels that facilitate individuals and organizations in requesting government information.

According to this regulation, the process of requesting the information is twofold. Firstly, the person or entity submits a request for open government information by completing an application form via email, letter, fax, online website, or in person. These application forms require personal information (name, identity, contact information), the title, document number, or other specific description of the government information, and means and channels for accessing the data. Secondly, after receiving the request, the administrative agency provides guidance. For example, if the request contains ambiguous content, the agency may notify the requester to apply the necessary supplements or corrections within seven working days from submission. If the administrative agency can respond on the spot, it shall do so. If it cannot, it shall reply within 20 working days from the date of receipt of the request.

Administrative law clearly states that citizens can always request open government information. However, such information is not always easily accessible. In the author's personal experience with requesting government information from the Department of Education, several problems eventually hindered the obtention of such information. These problems might be universal to a lot of people.

Firstly, the application processes can be excessively complicated. The Department of Education usually accepts applications via email, mail, fax, or online forms. However, 6 out of the 34 municipalities in China do not accept applications submitted via online forms and one municipality only accepts applications via mail and fax. Even if an online application is available, the application form can be inconvenient. Application websites require the individual or entity to register an account. Sometimes there is a word limit in the application form, which makes it too short to allow the person or entity to fully explain their needs. Some municipalities even require citizens to provide specific documentation numbers linked to the information they need. This can be difficult to find for citizens that are not savvy or familiar with the open information government system. All such inconveniences cause citizens to spend unnecessary time on the application processes.

Furthermore, the communication between government officials and citizens can be discouraging. For example, after the researcher of this study submitted several application forms, government officials usually made phone calls to inform them of the application status. In their conversations, some officials were impatient and kept paltering with the author's questions. Some even asked them to cancel their application, which logically interfered with accessing the information. The official's irresponsible behaviors and negative attitudes made the researcher feel disrespected and ignored. These adverse emotional reactions greatly discouraged them from further requesting information. They also led to increasing distrust in the officials and governments' capabilities to serve the citizens.

Therefore, in this case study, the author explores how emotions can help governments better communicate with citizens and how administrative laws should improve this issue.

B. Data Collection

The methodology for collecting data was to request the same pre-specified information from the 34 provincial-level education departments in China. Using the benchmark of the U.S. Department of Education, the author chose 5 topics provided by the U.S. Department of Education but seldom provided by provincial education departments in China, including the following:

1. Campus security information refers to the number of cases of crimes which have happened on university campus during 2017 and 2020;

2. Student loan information refers to the total amount of loan offered by governments, annual repayment ratios, and demographics of students who have received such loans during 2017 and 2020;

3. Government funds distribution refers to the types of universities and projects that government funds have been allocated to during 2017 and 2020;

4. Teacher demographics refers to teachers' average salaries and benefits, educational backgrounds, and gender ratios in universities during 2017 and 2020;

5. Students demographics refers to students' ethnicity, race, disability, family income range, and gender during 2017 and 2020.

6. I recorded and transcribed the content of the phone calls between me and government officials and I during the process of requesting government information.

C. Model Setup

I will use Tensorflow to conduct sentiment analysis on the datasets, which are the responses given by the government officials during our phone calls.

Firstly, after I collect the responses, I divide the sentences into two groups (positive or negative) and label each sentence with a value from 1 or 0 (1 for positive or 0 for negative) according to my emotional reaction in response to government officials' communication. Positive sentences are defined to be responses that make me feel positive and that the responses are efficient and helpful during communication. They mainly include making explanations, asking questions or stating facts in a clear and polite manner with reference to specific articles from administrative law or government documentation. Sometimes the case is that the government officials refuse to disclose certain information but explain their reasoning clearly and provide the specific articles to support their arguments. I still label these sentences as positive as the officials' responses show their good attitudes which makes me feel respected, even if the result of the response is negative. On the contrary, negative responses are replies that influence my emotions negatively. Examples include the following:

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●   The officials' behavior is impolite, for example, interrupting me abruptly, sneering, speaking with an sarcastic or impatient tone, and so on;

●   The officials are perfunctory in their responses and attitudes, such as not answering my questions directly, refusing to provide further explanation, or speaking without any support of government regulations or documentation;

●   The officials make proposals that exploit loopholes in the administrative processes to reduce their workload, for example, asking me to withdraw my applications from my end so that they do not need to push forward my requests.

●   The above responses make me feel disrespected and paltered with, and consequently discourage me from further requesting government information, which violates the ultimate purpose of communicating with government officials.

Secondly, cleaning sentences includes removing punctuation marks. As Chinese words typically consist of two or more characters, I use Jieba to divide sentences into lists of meaningful words and tokenize these lists. As the sentences vary in length, I set the length to be the mean token length plus two standard deviations. Under the assumption that the lengths of tokens follow normal distribution, the length that I use (75 in this case) covers approximately 95% of the samples. I build an embedding matrix which is [numwords, embeddingdim].[51] Numwords is the number of words that I use in the dataset and in this case I set it to 50000. Embeddingdim is 300. [52]

Finally, I split my dataset into train and test sets and use GRU to build my model. When the sentences are inputted, the model outputs the prediction of the sentiment of the sentence, which is a coefficient between 0 and 1. If the coefficient is between 0.5 and 1, the sentence is considered to be positive, and otherwise it is negative.

D. Evaluation

Out of the dataset of 248 sentences, I label 158 sentences to be positive whereas the model predicts 204 sentences to be positive. The following are examples where my opinions and predictions of the model differ:

['[Silence] I don't know what you think, but if you are in a hurry to write this paper [silence], is it necessary to get the thing in early August?', TRUE, 0.6262503]

In this response, the government official questions my need in an impatient manner and stops talking twice. In a way, he urges me to stop my application and just accept that no information will be provided. This response makes me feel forced, which negatively impacts my satisfaction with the communication. The model predicts a coefficient of 0.6262, which is considered to be positive. The erroneous prediction might result from the lack of negation in the response. Text wise the response seems

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[51] Shen Li et al., Analogical Reasoning on Chinese Morphological and Semantic Relations, 2 Proceedings of the 56th Annual Meeting of the Association for Computational Linguistics 138 (2018); Yuanyuan Qiu et al., Revisiting Correlations between Intrinsic and Extrinsic Evaluations of Word Embeddings, Springer Cham 209 (2018).

[52] Shen Li et al., Analogical Reasoning on Chinese Morphological and Semantic Relations, 2 Proceedings of the 56th Annual Meeting of the Association for Computational Linguistics 138 (2018).

that the official simply asks for my opinion but in the context it seems aggressive. Hence it is understandable for the model to give a positive prediction solely based on the text.

['The first question you asked is that the data on the total amount of state student loans received by Beijing college students provided each year, right? Firstly, because Beijing has two types of colleges and universities, one is ministry-affiliated colleges and the other is municipal colleges. There are more than 30 affiliated colleges and universities. They all cooperate with banks on their own. They are not under our supervision. Then we are only responsible for the national student loans of some municipal colleges, so we can't provide the data you mentioned, that is, the total amount of this loan, we don't have this data now.', False, 0.30860615]

In this response, the government official provides a detailed explanation of the types of colleges in Beijing, and explains the reason that the information cannot be provided. I consider this response to be positive as the official explains with patience and details, even if she is not able to provide the information. However, the model predicts a coefficient of 0.3086 which is negative. The decision might have been made because, text wise, the response is a negation. I also notice such errors in other long sentences which I consider positive but the model predicts to be negative. It might be due to the length of the sentences and the model might need more long sentences in its train dataset to offer a more accurate prediction.

E. Implication

1. Emotional Value

Emotional value, defined as people's perceived utility derived from a product's capacity to arouse feelings or affection.[53] Nowadays, to boost their competitiveness, companies have paid increasing attention to design and user experience, which can influence customers' behaviors and increase their emotional values.[54] The superiority of emotional value compared to functional value, the perceived utility derived from functional and utilitarian performance, has been discussed especially by the marketing and consumer goods industries.[55] Some research shows that functional superiority can be defeated by emotional values that appeal to customers' sensibilities.[56] Studies also show that emotional value can contribute more to corporate brand image than functional value.[57]

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[53] Jagdish N. Sheth et al., Why We Buy What We Buy: A Theory of Consumption Values, 22 Journal of Business Research 159 (1991).

[54] Id.

[55] Takumi Kato, Functional Value vs Emotional Value: A Comparative Study of the Values that Contribute to a Preference for a Corporate Brand, 1 International Journal of Information Management Data Insights 100024 (2021).

[56] Takumi Kato, Functional Value vs Emotional Value: A Comparative Study of the Values that Contribute to a Preference for a Corporate Brand, 1 International Journal of Information Management Data Insights 100024 (2021).

[57] Luis Hernan Contreras Pinochet et al., The Influence of the Attributes of "Internet of Things" Products on Functional and Emotional Experiences of Purchase Intention, 15 Innovation & Management Review (2018).

In the context of this case study, functional value can be viewed as citizens' perceived utility derived from governments' capabilities to fulfill their needs. Do governments disclose the information that I need? How timely can they do that? These are the questions that citizens concern in terms of functional value. In contrast, emotional value is citizens' perceived utility derived from governments' capabilities to arouse feelings. Do government officials show me respect? Do they really care about my needs? Citizens are concerned with their experience when they seek help from governments.

In the past, the time, method and content of government information disclosure were largely determined by governments unilaterally, which made citizens at the downstream of the information chain and passive receivers of decisions made by governments. [58] There was an information asymmetry between governments and citizens and consequently the communication between these two parties tended to be unidirectional. Hence, citizens were naturally inferior to governments in the power relationship. Since the 1990s, in China there have been a large number of conflicts and disputes between the society and governments, which have required governments to intervene. [59] However, passive intervention pervades as many studies have seen the inefficiency of government intervention. [60] Usually citizens need to petition several times and attract the attention of government leaders to solve their problems. Only when issues cause problems to governments are they taken seriously. [61] Moreover, when governments handle disputes, their ultimate aim is to get things settled. In order to solve the disputes, governments might use multiple methods in a mixed way instead of solely following the regulations. [62] For instance, when dealing with disputes of rural land contracts, it is possible for governments to follow the contracts and protect the interests of the contractors. It is also possible for governments to break contract rules in order to calm villagers' anger. [63] The above situations show that governments attach more importance to citizens' functional value, getting things done, than emotional value. When solving disputes, governments might intervene passively and waste time due to inefficiencies, or they might use rough methods to solve issues as quickly as possible. Either way they neglect citizens' emotions during the process.

However in recent years, the emergence and development of omni media has led to changes in the way that information is produced, disseminated and received, which add new characteristics to the current process of government information disclosure. [64] Information dissemination becomes decentralized, feedback-focused, multi-directional

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[58] Wai Man Kuong, On Chinese Government Information Disclosure in the Omnimedia Era, 10 Social Science of Beijing 100 (2019).

[59] LIPING SUN, CLEAVAGE: CHINESE SOCIETY SINCE 1990s (2003).

[60] Xianhong Tian, Governing Grass-roots China: Qiaozhen's Case,1995-2009 (2012); YI WU, THE HUSTLE AND BUSTLE OF A SMALL TOWN: DEDUCTION AND INTERPRETATION OF THE POLITICAL OPERATION OF A TOWNSHIP (2007).

[61] Xing Ying, The "Problemization" Process in Collective Petitions——The Story of the Immigrants from A Hydroelectric Power Station in Southwest China, Tsinghua Sociology Review (2000).

[62] Id; XIAOLI ZHAO, NARRATIVE OF RELATIONSHIP/EVENT, ACTION STRATEGY AND LAW (1997).

[63] Jing Zhang, Uncertainty of Land Use Rules: An Interpretation Framework, 4 Social Sciences in China (2003).

[64] Wai Man Kuong, On Chinese Government Information Disclosure in the Omnimedia Era, 10 Social Science of Beijing 100 (2019).

and interactive and governments attach importance to citizens' feedback.[65] At the same time, citizens become more eager to obtain access to government information and they tend to demand that governments should disclose information in an efficient and timely manner, especially in cases of emergent public events. [66] If governments lack capabilities in responding to citizens' demand, which are manifested in irrational strategies like perfunctory prevarication, selective responses, and direct avoidance, citizens are likely to question and criticize such behaviors. [67] Such phenomena demonstrate that citizens do not only care about getting needs fulfilled but also how governments fulfill their needs.

2. Gap Between Regulations and Implementation

Although the purpose of Open Government Information Regulation is to promote citizens' access to government information and transparency in governments, cases are that government officials might abuse or misuse the regulation. According to Article 37 of Open Government Information Regulation, when part of the information requested contains content that shall be withheld, the administrative agency shall provide the rest of it which may be disclosed to the public. According to Article 38, if the information requested needs to be processed or analyzed based on the existing government information, the administrative agency may withhold such information.[68] In my communication with government officials, some have stated that they cannot provide the information requested because they need to do calculation with their data, which is allowed by the regulation. Statistics also show that the percentage of total disclosures out of the total number of applications have decreased from 80% in 2004 to 40% in 2013 in Shanghai.[69] The proportion of partial disclosures has been low with an average of 3.06% from 2004 to 2013 and the proportion shows a downward trend by year even though the government of Shanghai has paid increasing attention in government information disclosure in this time interval.[70] These phenomena show that when implementing the regulation, government officials might abuse the regulation to reduce their workload or they misuse the regulation by applying them in an extremely strict manner without flexibility.

Moreover, the current supervision mechanism is that administrative agencies need to release annual reports on their open government information work, which is stated in Article 49 of the regulation. However, in my communication with government officials, some have encouraged me to cancel applications or to ask other administrative agencies so that they do not need to further process my applications and my applications will not be recorded in the annual reports.

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[65] ZHENG XU, THE GAME OF COMMUNICATION-RESEARCH ON PUBLIC OPINION GUIDANCE IN THE DIGITAL MEDIA ENVIRONMENT (2011).
[66] Wai Man Kuong, On Chinese Government Information Disclosure in the Omnimedia Era, 10 Social Science of Beijing 100 (2019).
[67] Id.
[68] Open Government Information Regulation of the People's Republic of China (promulgated by St. Council, Apr. 4, 2007, rev'd Apr. 3, 2019, effective May.15, 2019), art. 711, 2019, P.R.C Laws (China).
[69] Weibing Xiao, Ten Years of Shanghai Government Information Disclosure: Achievements, Challenges, and Prospects, 10 E-GOVERNMENT (2014).
[70] Id.

Hence, it is necessary for the regulation to make improvements to address these issues. For instance, administrative agencies should convert the non-existent information into existence or internally process existing data to promote total disclosures.[71] It is also necessary to promote internal communication between different administrative agencies and simplify internal processes to reduce the possibility of shirking responsibilities.[72]

Conclusion and Future Directions

This paper explores the use of sentiment analysis to analyze communication between governments and citizens and presents a possibility of assessing government officials' emotional reactions as a mechanism to supervise governments' services.

There are already cases where natural language processing and deep learning are applied to citizen service hotlines in China. But the applications are mainly automatic responses to questions, categorizing questions and automatically dispatching cases.[73] There remains space for more advanced methods for governments to better serve and communicate with citizens. By adopting sentiment analysis models, there exists new opportunities for improved administrative regulations on a feminist basis. There is a possibility to establish an evaluation mechanism which collects data on communication between citizens and governments and assesses the extent to which government officials respond to citizens' needs. Such mechanism offers opportunities to evaluate the openness of governments on a dynamic basis and can provide evidence for citizens to supervise the work performed by governments.

Still there are issues to be studied further. The texts in this case study are conversational, and consequently, the linguistic results without the context of conversations can be different from the participants' own perception of the interaction. Participants' emotions influence each other to a large extent. It is also common for citizens to interact with several government officials at one time. Reinforcement learning in multi-agent networks will be my step of research to address the interactive and dependent nature of communication between citizens and governments. Studies have shown the effectiveness of reinforcement learning in deriving scalable algorithms in networked systems.[74]

Moreover, conversations are logically and sequentially connected where decisions made are naturally influenced by previous dialogues. I will also explore

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[71] Weibing Xiao, Ten Years of Shanghai Government Information Disclosure: Achievements, Challenges, and Prospects, 10 E-GOVERNMENT (2014).

[72] Id.

[73] Department of Big Data of China, AI Empowers A New Model of Government Public Services--The Exploration and Application of Artificial Intelligence Based on NLP in the Citizen Service Hotline, 2019, http://www.sic.gov.cn/News/610/10307.htm#:~:text=%E4%B8%89%E3%80%81%E5%9F%BA%E4 %BA%8E%E8%87%AA%E7%84%B6%E8%AF%AD%E8%A8%80%E5%A4%84%E7%90%86,%E 4%BA%A7%E7%94%9F%E4%BA%86%E8%89%AF%E5%A5%BD%E7%A4%BE%E4%BC%9A %E6%95%88%E5%BA%94%E3%80%82.

[74] YIHENG LIN ET AL., DISTRIBUTED REINFORCEMENT LEARNING IN MULTI-AGENT NETWORKED SYSTEMS (2020).

hierarchical reinforcement learning to find more efficient solutions for sequential decision making problems.[75]

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[75] Wen Zheng et al., On Efficiency in Hierarchical Reinforcement Learning, NeurIPS 2020 (2020).