CONTEXTUAL VALENCE SHIFTER FOR VIETNAMESE

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Abstract. There are many researches on Contextual Valence Shifters in the world. Nowadays, there are not any researches on Contextual Valence Shifters for Vietnamese. We have built Contextual Valence Shifters for Vietnamese (called as CVSfV), which is very important for the emotion classification for Vietnamese texts. The sentiment orientation of a document can be positive (+), negative (-), or neutral (0). Vietnamese texts, events, things, and descriptions contain probably sentiments of authors (of this text) or the participants. We have defined the sentiment values of Vietnamese words, Vietnamese phrases. If we use only the sentiment values of Vietnamese words and phrases to classify sentiment of sentences and texts in Vietnamese, then the results will be not accurate. Therefore, we need use Contextual Valence Shifters model for determining more exactly sentiment classification of Vietnamese sentences and texts.

Keywords. Sentiment classification, sentiment orientation, valence shifters, contextual valence shifters, term counting, Vietnamese sentiment classification, Vietnamese sentiment orientation, Vietnamese valence shifters, Vietnamese contextual valence shifters.

1   INTRODUCTION

Classifying sentiment correctly for English texts is very difficult, but the sentiment classification for Vietnamese sentences, Vietnamese texts is harder .

In Vietnam, there are Vietnamese sentiment classification researches, but is not any research for Vietnamese sentiment classification using Contextual Valence Shifters. We have built Contextual Valence Shifter for Vietnamese sentiment classification(called as CVSfV), which is very important and prerequisite to classify sentiment for Vietnamese sentences, texts. Besides, it is able to apply in different researches related to sentiment of Vietnamese texts. The paper describes the sentiment values of Vietnamese words, phrases first, then we depict sentiment values which shift according to context of sentences and texts in Vietnamese.

The rest of the paper is organized as follows: Section 2 discusses the related works about CVS in [3] and Vietnamese sentences in [1]. In Section 3, the data set for classify sentences, Vietnamese, and discourses in Vietnamese language is presented. Section 4 represents the methodology of our proposed CVSfV method. Section 5 is the conclusion of the proposed method.

2   RELATED WORK

Diep Quang Ban[1] has detailed all Vietnamese grammatical structures.

According to [3], to define the emotions of an article, a sentence, a paragraph is done based on the valence of the word or term only, which sometimes does not have an absolute accuracy, but does not get correctly results. However, the identification of emotions in an article, a sentence, a paragraph is able to perform based on the chemotherapy of words or terms with their context. This method identifying the emotion is called Contextual Valence Shifters (CVS), that can give results with a high accuracy. Normally, the terms are classified as positive, or negative, or neutral emotions. The simple calculation of emotions is a total number of negative and positive subjects appeared in a text; then the classification result is based on the high valence of negative or positive. [3] found out the simple count is not efficient for classifying the emotions. Because, many words or terms have positive or negative valences, which valences depend on the context of those words or those terms. [3] counted the emotions by CVS for a sentence or an article level, but the authors of [3] did not give the accuracy of the results. CVS in [3] includes: English sentence and English discourse based CVS.

3   DATA SET

CVSfV is used to classify sentiment for any datasets, include sentences, paragraphs, discourses.
In this paper, we illustrate CVSfV for almost all kinds of Vietnamese sentences, Vietnamese paragraphs, Vietnamese discourses.

4   METHODOLOGY

4.1   From Simple Valence to Contextually Determined Valence

Simple Lexical Valence

Vietnamese has many words which carry sentiment values, are negative, positive, besides non-sentiment words (neutral values). The examples of Vietnamese words carrying sentiment values are presented on the Table 1.

Part of Speech	Positive Valence	Negative Valence	Neutral Valence
verbs	Trông nom (care), chăm sóc (care), tình cờ nói ra (drop), giúp đỡ (help)…	Tấn công (attack), nói xấu (blow), làm giả giá trị ((blow), bôi xấu (blow), bôi nhọ (blow), cháy (burn), khóc (cry)..	Trả lời (answer), hành vi/cư xử (behavior)..
nouns	Cạnh tranh (competition), sự tín nhiệm/lòng tin/danh tiếng (credit), tình bạn (friendship)…	Tội ác (crime), tiêu diệt (crush), tiếng kêu (cry)…	Bờ biển (coast), đề cương (design), quyết định (decision)..
adjectives	Rộng thùng thình (baggy), tốt (good), tốt hơn (better), đẹp (beautiful), hay (beautiful), tốt (beautiful), tốt đẹp (beautiful), phiêu lưu (adventurous)..	Xấu (bad), xấu hơn (worse), tồi hơn (worse), dở hơn (worse), ác hơn (worse), nguy hiểm hơn (worse), đau đớn (aching)…	Có tính chất học thuật (academic), trẻ (adolescent), nhào lộn (acrobatic)..
adverbs	Tốt đẹp (beautifully), đáng hài lòng (beautifully),	Tức giận (angrily), giận dữ (angrily), áy náy (anxiously),	Mới (new), khác thường

	hạnh phúc (blissfully), sung sướng (blissfully), táo bạo (boldly), liều lĩnh (boldly), vui vẻ (cheerfully), phấn khởi (cheerfully)…	lo âu (anxiously), kiêu căng (arrogantly), ngạo mạn (arrogantly)…	(abnormally), tình cờ (Accidentally), ngẫu nhiên (accidentally)..

Table 1: Examples of Vietnamese words with positive valence, negative valence, neutral valence

Lexical valence in texts

Now, this paper illustrates four short texts which attached to sentiment value of vocabularies, that affect sentiment discourses. The connotative force of each text is different with the other texts communicating the same denotative information. In the first text, who plays a key role is an ordinary young girl. In the second text, she is a kind girl, caring to everyone. In the third text, she is friendly, enthusiastic. In the text 4, she shows as a natural delinquent adolescents.

Text 1: Trước khi rời khỏi khu phố, *Cô gái trẻ 25 tuổi đã đi qua khu phố mà cô ta đã sống*. Cô ta *đã dừng lại để nói chuyện* với mọi người trong khu phố và sau đó đã *đi vào* một cửa tiệm ở ngoài khu phố để mua *vài thứ* để mang về *căn hộ nhỏ* nơi mà cô ta đã *sống* với *gia đình của cô ta*. (*Before leaving town, 25-year-old young girl went through the ward where she lived. She stopped to talk to people in the ward, and then went into a store outside the ward to buy something to take to small apartment where she lived with her family.*)

Text 2: Trước khi rời khỏi khu phố, cô gái trẻ$^+$ đã đi xung quanh khu phố mà cô ta sống. Cô ta đã dừng lại để chào hỏi$^+$, trò chuyện$^+$, hỏi thăm$^+$ sức khỏe với mọi người trong khu phố và sau đó cô ta đi nhanh vào$^+$ một cửa hàng$^+$ ở ngoài khu phố để mua vài món quà$^+$ để thăm bệnh$^+$ một người hàng xóm$^+$ mà cô vừa hay tin, trước khi cô trở về căn nhà nhỏ nơi mà cô ta đã sống hạnh phúc$^+$ với gia đình của cô ta. (*Before leaving town, young girl$^+$ went around the ward where she lived. She stopped to say hello$^+$, chat$^+$, inquire$^+$ health for everyone in the ward and then she went quickly$^+$ to shop$^+$ outside the ward to buy some gifts$^+$ to visit$^+$ the sick neighbor that she had just heard, before she returned to the small house where she lived happily$^+$ with her family.*)

Text 3: Cô gái trẻ$^+$ đã đi tản bộ$^+$ chậm rải xung quanh những người hàng xóm$^+$ trong khu phố mà cô ta sống, trước khi rời khỏi khu phố. Cô ta đã nán lại$^+$, tươi cười$^+$ để trò chuyện$^+$ với mọi người, không vội vã$^+$ để rời đi và sau đó đã lặng lẽ vào một cửa hàng$^+$ ở ngoài khu phố để mua vài thứ để mang về căn hộ ấm cúng$^+$ nơi mà cô ta đã sống với gia đình của cô ta. (*The young girl$^+$ was walking$^+$ andante surrounding neighbors$^+$ in the ward where she lived, before leaving town. She had lingered$^+$, smiling$^+$ to chat$^+$ with people, do not rush$^+$ to leave and then quietly into a shop$^+$ outside the ward to buy something to carry to cozy$^+$ apartment where she I was living with her family.*)

Text 4: Một người nữ thành niên$^-$ đi khênh khang$^-$, hung hăng$^-$ trên con đường của khu phố mà cô ta sống, trước khi rời khỏi khu phố. Cô ta lảng vảng$^-$ nói lời tục tỉu$^-$, kiêu căng$^-$ với vài người trên đường và sau đó cô ta cúi xuống$^-$ để vụt lao biến đi$^-$ vào một cửa tiệm cho việc mua vài thứ để mang về căn nhà dơ bẩn$^-$ mà cô ta đã nhiều lần đập phá$^-$, ở cùng với gia đình của cô ta. (*A woman- goes conceitedly$^-$, aggressively$^-$ on the path of the ward where she lived, before leaving town. She loitered$^-$ to shoot the bull$^-$, cocksure$^-$ with some people on the street and then ducked$^-$ into a dive- to a store for buying something to take to the dirty$^-$ home where she has repeatedly beaten$^-$, living with her family.*)

The choice of synonyms (or near synonyms) to depict the persons, events and situation involved, emerges the difference in perlocutionary force among these texts. These have led researchers to classify terms become positive attitude and negative attitude. Counting simply positive terms and negative terms will not give correct result. Let us consider the example: " Cô ta sinh ra trong một gia đình nghèo⁻, cha mẹ của cô ta có trình độ văn hóa thấp⁻. Cha mẹ của cô ta nói chuyện thô lỗ⁻, mọi người đều xa lánh⁻ gia đình cô. Tuy nhiên, nhờ rất chăm chỉ⁺ làm việc và học hành, cô ta đã giúp⁺ gia đình rất nhiều nên mọi người đều muốn làm bạn⁺ với gia đình cô. " (*She was born in a poor⁻ family; her parents have low⁻ culture level. Her parents talk crude⁻; everyone is away cold⁻ her family. However, through hard⁺ work and education, she has helped⁺ her family a lot, so everyone wants to be friend⁺ with her family.*)

That above discourse has four words which carry negative sentiment (nghèo⁻/poor⁻ , thấp⁻/low⁻ , thô lỗ⁻/crude⁻ , xa lánh⁻/away cold⁻) and three words carrying positive sentiment (chăm chỉ⁺/hard⁺ , giúp⁺/help⁺ , làm bạn⁺/friend⁺). If we use the method which simply counts sentiment terms then the discourse will give a negative sentiment result but the discourse is really positive sentiment. Therefore, we can not use the simple counting to identify sentiment of sentences, paragraphs, discourses. To solve that problem, the paper uses a more complex method of insteading simple counting method. We found that sentiment of terms has different strength. For example, "đẹp/beautiful" has positive sentiment valence (+2), but "dễ thương/nice " has positive valence (+1), because positive sentiment strength of " đẹp/beautiful " and " dễ thương/nice " is different. The sentiment strength of terms can change depending on the context of the sentence, paragraph, discourse. For examples: "đẹp/beautiful" has positive valence (+2), but "Cô ấy không đẹp/ That girl is not beautiful" has negative (-2); "Anh ấy rất đẹp, hơn tất cả chàng trai ở khu phố của anh ấy./ That young man is very handsome, more than all of the young men on his quarter" gives positive sentiment very strongly (+3) with " đẹp/beautiful " has positive valence (+2) and term " rất/very " increases valene of " đẹp/beautiful " by adding 50% . The sentence " Cô ấy có bề ngoài xấu, bị tật ở chân nhưng chăm chỉ làm việc, siêng năng học tập./She looks ugly, handicapped leg but hard working, diligent study " has valence (+1). Because, valence of " xấu/ugly " is (-2), valence of " tật/handicapped" is (-1), " chăm chỉ/hard" has valence (+2), " siêng năng/diligent" has valence (+ 2), so, total sentiment score is (-2) + (-1) + (+2) + (+2) = (+1) .

4.2   Contextual Valence Shifters

Sentence based Contextual Valence Shifters

We see that terms are inherently carrying the sentiment: positive, negative and neutral. Sentiment of terms in sentences, paragraphs, discourses can shift to change based on context of sentences, paragraphs, discourses, such as increase, decrease, sometimes sentiment terms will become neutral.

Negation

The positive sentiment terms in negation sentence will shift polarity to become negative. For example, valence of "Anh ấy không giỏi./He is not good." is negative (-2), while "giỏi/good" has positive (+2). The negative sentiment terms in negation sentence will shift polarity to become positive. For example, "Cô ấy làm bài không tệ/She does exercise not bad" valence is positive (+2) with "tệ/bad" valence is negative (-2). The neutral sentiment terms in negation sentence will not change their polarities, for example, "anh ấy không uống nước/He does not drink water" valence is neutral valence (0) with "uống/drink" valence is neutral (0). The Vietnamese negation terms are used as: không/no/not ; chẳng/no/not ; chưa/yet ; không hề/never ; chẳng hề/never ; chưa hề/never ; không phải/not that ; chẳng phải/not that ; chưa phải/not that ; có … đâu ; nào có … đâu ; làm gì có … ; có phải … đâu ;

đâu phải … ; đâu có phải … ; đâu phải ; chẳng có … ; không cho ; nào .. có… đâu ; … làm sao .. được… ; … làm sao mà … được… ; …sao được ; chả ; chả dám ; … có biết.. đâu; không có ai ; không có.

Intensifier

The sentiment terms will shift sentiment strength to increase when they follow intensifier terms. Example: valence of " Anh ấy rất chăm chỉ/He is ver hard. " is positive (+3) with " chăm chỉ/hard " has positive valence (+2) and " rất/very " is an intensifier terms (50%). The sentence has valence (+3) =(+2) + (+2)*50% . Some Vietnamese intensifier terms are: ghê tởm/ hideous ; kinh tởm/ disgusting ; rất xấu/very bad ; tồi/wrong ; quá/too ; vượt/ beyond ; cao hơn/higher ; hoàn toàn/ totally ; tuyệt đối/ absolute ; chắc chắn/ surely ; xác thực/positively ; rất/very ;….

Diminisher

The sentiment terms will shift sentiment strength to decrease when they follow diminisher terms. Example: valence of "Anh ấy khá chăm chỉ/He is rather hard " is positive (+1) with với "chăm chỉ/har " valence is positive (+2) and " khá/rather " term is a diminisher (50%), sentence valence is (+1) = (+2) - (+2)*50%. The Vietnamese diminisher terms are used as: khá/rather ; hơi/rather ; phần nào/somethat ; độ ; chừng ; nói về ; đối với ; tình cờ/ incidentally ; ngẫu nhiên/random ; bất ngờ/ incidentally ; phụ ; không chủ yếu/ accidental ; tương xứng/proportional ; thỏa đáng…

Independent Transplant Sentence

According [2], Independent transplant sentence is transplant sentence which grammatical relation between clauses is independent relation. The words in independent transplant sentence are: và/and ; rồi/already ; còn/still/yet ; mà/but; hay/or. Valene of independent transplant sentence is total valence of clauses. For example: valence of " Anh ấy học giỏi và đẹp trai/He studies good and handsome " is (+4) = (+2) + (+2)   with "học giỏi/studies good " has valence (+2) và and "đẹp trai/handsome" has (+2). With connector " hay/either " ,   valence of independent transplant sentence is neutral (0), because it shows choice. Example: valence of "Tôi chưa kịp làm hay anh làm giúp tôi vậy ?/I could not do or you help me?" is neutral (0).

Transplant Sentence having Concessions- Incremental Relation

The concessions- Incremental Relation words are used as: nhưng/but ; dù/ albeit ; mặc dù/ albeit ; tuy …. nhưng… ; mặc dù … nhưng… ; dù … nhưng .. . Valence of transplant sentence having concessions- incremental relation is valence of the second clause. For example: valence of sentence " Mặc dù Lan giỏi toán, cô ấy là một giáo viên khủng khiếp/Although Lan is good at Math, she is a horrible teacher" is valence of the second clause "cô ấy là một giáo viên khủng khiếp/she is a horrible teacher " which has negative valence (-2), because valence of "khủng khiếp/horrible " is (-2). Valence of the sentence "Cô ấy đẹp nhưng cô ấy học kém/She is beautiful but she studies bad." is valence of the caluse " cô ấy học kém/she studies bad " (-2), because valence of " kém/bad " is (-2).

Transplant Sentence having Cause-Effect Relation

The cause-effect relation words are used as: vì …. nên…; vì … mà…; vì…cho nên… ; bởi vì … nên…; bởi vì…mà…;bởi vì …cho nên…; …vì…; …nên…; … là vì…; tại vì…nên…; tại vì…mà…; tại vì…cho nên…; do…nên…; do… mà…; do … cho nên…; nhờ…nên…; nhờ…mà…; nhờ…cho nên…; bởi … nên…; bởi… mà…; bởi… cho nên…; tại…nên…; tại…mà…; tại…cho nên…. Valence of sentence is valence of effect clause. Example: valence of sen tence " Anh ấy thi đậu vì anh ấy chăm

học/He passed exam because he studied hard " is valence of effect clause "anh ấy thi đậu/he passed exam" that is (+2), because valence of " thi đậu/pass " is +2.

Transplant Sentence having Conditions / Assumptions Relation

Conditions / Assumptions Relation words are: nếu… thì…/if … then; hễ…thì…; miễn…thì…; miễn là…thì…; giá…thì…; giá mà…thì…; giả sử …thì…; … nếu … ; … thì… Valence of sentence is neutral (0) because conditions/assumptions are not surely happen. Example: valence of sentence "Họ yêu nhau thì họ kết hôn với nhau/They love each other then they get married " is neutral valence (0), because " họ có chắc chắn đã yêu nhau chưa ?/ Did they certainly love each other ?"

Transplant Sentence Having Purpose-Event Relation

Purpose-Event Relation words are used as: thà…chứ… ; để…thì…; …để… ; muốn … thì …; …nếu muốn… ; …nếu… muốn…. Valence of sentence is neutral (0). Example: valence of sentence "Để họ thi đậu thì họ cần chăm học/To pass their exam then they need to study hard" is neutral (0), because "Họ đã chắc chắn chăm học chưa?/ Did they certainly hard to learn?".

Question sentences

Valence of question sentence is neutral (0), because of unidentifiable emotion. For example, valence of question sentence "Anh ấy có đẹp hay không?/Is he beautiful? " is neutral (0), because it does not determine "anh ấy đẹp/he is beautiful" or " anh ấy không đẹp/he is not beautiful". The question words are used as: ai ; gì ; thế nào ; như thế nào ; sao ; bao nhiêu ; bao giờ ; bao lâu ; vì sao ; là vì sao ; là tại làm sao ; là sao ; là thế nào ; sao nhỉ ; hay ; hay là ; có … không …; hoặc .

Discourse Based Contextual Valence Shifters

Connectors

The words connecting sentences in discourses are: tuy nhiên/however ; trái ngược với ; trái ngược lại ; bất kể ; tuy thế ; tuy thế mà . Example: valence of sentence "Anh ấy chăm học. Tuy nhiên, anh ấy vẫn thi rớt/He studies hard. However, he fails " is valence of clause "anh ấy vẫn thi rớt /he fails" which is (-2), because valence of " thi rớt/fail " is (-2). Valence of sentence "Trái ngược với anh ấy chăm học, anh ấy vẫn thi rớt/Contrary to his hard studying, he still fails " is valence of clause "anh ấy vẫn thi rớt/he still fails ", it is (-2) with valence of " thi rớt/fail " is (-2). Valence of " Anh ấy chăm học. Trái ngược lại, anh ấy vẫn thi rớt " is valence of "anh ấy vẫn thi rớt " and valence is -2 with valence of " thi rớt " is -2. Valence of "Bất kể anh ấy chăm học, anh ấy vẫn thi rớt " is valence of "anh ấy vẫn thi rớt " and valence is -2 with valence of " thi rớt " is -2. Valence of " Anh ấy chăm học. Tuy thế, anh ấy vẫn thi rớt " is valence of "anh ấy vẫn thi rớt " and valence is -2 with valence of " thi rớt " is -2. Valence of " Anh ấy chăm học. Tuy thế mà anh ấy vẫn thi rớt " is valence of "anh ấy vẫn thi rớt " and valence is -2 with valence of " thi rớt " is -2.

Opinion holder

The paragraph, discourse can contain many different objects, not surely contain an object. For example: valence of "Con mèo kia rất đẹp. Con chó này hơi thấp/That cat is beautiful. This dog is slightly low " has neutral (0), because valence of sentence "Con mèo kia rất đẹp/That cat is beautiful " is +2 and valence of "Con chó này hơi thấp/This dog is slightly low" is (-2), if we do not consider " con mèo/cat"as subject and " con chó/dog" as subject. If we consider "con mèo/cat" as subject and "con chó/dog" as subject then valence of subject "con mèo/cat " will be (+2) and valence of subject

"con chó/dog " will be (-2). Now we consider two sentences together "Con mèo kia rất đẹp. Con mèo đó hơi thấp/That cat is beautiful. It is slightly low", that refer to a subject "con mèo/cat" ; by the same owner, so we get total valence of two sentences together. Valence of "Con mèo kia rất đẹp. Con mèo đó hơi thấp/ That cat is beautiful. It is slightly low "is neutral (0) which would be more accurate.

Reported speech

The reported speech words in reports are used as: nói ; nói rằng ; hay rằng ; nghĩ ; nghĩ rằng ; thấy ; thấy rằng ; thừa nhận ; thừa nhận rằng …Valence of sentence is valence of clauses after the reported speech words. For example, valence of "Lan nói rằng hôm nay tôi đẹp trai/Lan say that today I am handsome " is valence of "hôm nay tôi đẹp trai/today I am handsome " and it is (+2).

Directed speech

The words in directed speech are used as: nói ; nói rằng ; hay rằng ; nghĩ ; nghĩ rằng ; thấy ; thấy rằng ; thừa nhận ; thừa nhận rằng …are accompanied with " " or ' ' . Valence of sentence is valence of clauses in " " or " ". For example, valence of " Lan nói: 'hôm nay tôi đẹp trai '/Lan say: 'today you are handsome ' " is valence of " 'hôm nay tôi đẹp trai '/'today you are handsome' " which is (+2), because valence of "đẹp trai/handsome " equals (+2) . So, valence of sentence "Lan nói: "hôm nay tôi đẹp trai " / Lan say: "today you are handsome " " is valence of a " "hôm nay tôi đẹp trai"/ "today you are handsome " " and it is (+2).

Genre Constraints

This is a difficult problem, solving this problem takes time, effort to research. Genre constraints make sentiment classification more accurately. For example, sentiment classification in the film field, we just use the words, terms in Vietnamese dictionary only related to film. Sentiment classification in the electronic field, we only use the words, terms in Vietnamese dictionary related to electronic. Thus, we eliminate words, terms which are not relevant, so we have reduced the data noises.

Cultural Constraints

This is a difficult problem too, solving this problem takes time and effort to research. Cultural constraints make sentiment classification more accurately. For example, each region in Vietnam has used characteristic words, terms of that region.

5   CONCLUSIONS

We have presented the method counting terms which carries sentiment valences, which does not give correct results. In addition, we have presented that Contextual Valence Shifter method which gives results correctly. We also have presented that Vietnamese words, Vietnamese terms, Vietnamese sentences affect the use of shifting contextual valences for classification results. The identification of sentiment in discourses which have many entities will be more complex than other discourses which have one entity. The identification of sentiment in discourses which have many entities requires many models, many methods to support for getting sentiment classification accurately. We also see that cultural factors of regions and genre factors in Vietnamese language will need more many researches to improve the accuracy of sentiment classification for Vietnamese discourses. Results of our research is a prerequisite of Vietnamese discourse classification by using Contextual Valence Shifters on any Vietnamese datasets and is applied in research fields related to Vietnamese.

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