The University of Texas at Dallas
CS 6322
Information Retrieval
Spring 2021
Class Project Report

Project TITLE: Affect Processing from Social Media

TEAM XX
Students: Fantastic Students

1. **The Problem** (2 points): Describe briefly how you generate an affect processing system operating on Twitter postings. The main affect that is processed is the stance for misinformation targets related to COVID-19 vaccines. In addition, affect is processed though:
   o sentiment recognition, which is compared with and integrated in the stance detection system;
   o emotion detection, which is analyzed and integrated in the stance detection system;
   o topic detection, which is compared against the targets of misinformation and integrated in the stance detection system;
   o affect connotation frames, resulting from the analysis of the integration of semantic role labeling and named entity recognition and their integration and in the stance detection system;

   The entire team describes what you learned, what was you experience, what were the difficulties you faced and how you resolved them.

Phase A of the project (20 points – based on quality of annotations).

The team is provided with a dataset of tweets, and a set of misinformation targets. The team annotates the stance of each misinformation expressed in each tweet with:
(a) The tweet AGREES with the misinformation target
(b) The tweet DISAGREES with the misinformation target
(c) The tweet has NO STANCE towards the misinformation target
(d) The tweet is NOT_RELEVANT for the misinformation target

A FEW EXAMPLES of annotations:

Misinformation Target:
    RNA alters a person's DNA when taking the COVID-19 vaccine.
Tweet:
    Do not take Covid 19 vaccine. It will change your DNA and many
    people are getting sick and even dying!
Stance:
    Agree

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Misinformation Target:
    More people will die as a result of a negative side effect to
    the COVID-19 vaccine than would actually die from the
    coronavirus.
Tweet:
    I find it funny how more people are scared of the covid
    vaccine than people who are scared of covid itself
Stance:
    Disagree

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Misinformation Target:
    The COVID-19 vaccine contains tissue from aborted fetuses.
Tweet:
    A note from the Congregation for the Doctrine of the Faith,
    which was approved by Pope Francis, gives the green light
    during the pandemic to the use of vaccines produced with cell
    lines derived from two fetuses aborted in the 1960s.
    URL: "Vatican CDF says use of anti-Covid vaccines "morally
    acceptable""
Stance:
    No_stance

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Misinformation Target:
    Natural COVID-19 immunity is better than immunity derived from
    a COVID-19 vaccine.
Tweet:
    If you support capitalism, you do not need to worry about what
    is in the coronavirus vaccine.
Stance:
    Not_relevant

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On April 16, each team member submits their annotations in eLearning.

Phase B : The team uses the whole set of annotated tweets produced by all the members of the team during Phase A as the training set and from it sets a Development set for Phase B of the project, when each student develops its own neural architecture and trains it and prepares it for demonstration.

2. Stance Detection (40 points): *written by the student that was responsible for this task* – A Figure of the neural architecture (**10 points**) is provided as well as the equations, input/output explanation. How the architecture was trained and what results it obtained on the development set (**10 points**). A Baseline architecture using BERT shall be also trained and presents– detailing what results this baseline architecture obtained on the Development set (**10 points**). How the stance detection was made available for the other affect processing tasks developed by other members of the team (**10 points**). *Make sure that the name of the student appears prominently, along with the student netID on every page of the description of the stance detection (5 points will be deducted if name/netID are missing).* Additional **35 points** will be obtained if during the Demo of the system, in front of the entire class, the system is able to detect the stance on several new tweets.

3. Sentiment Recognition for Affect Processing (40 points): written by the student that fine-tuned a neural sentiment detection system on the training data produced by the team on Phase A of the project. A Figure of the neural architecture for sentiment recognition (**5 points**) and a Figure for its incorporation in the stance detection system (**10 points**) is provided as well as the equations, input/output explanation. How sentiment recognition was tuned on the training set (**10 points**) and how the stance detection using sentiment recognition was trained and what results it obtained on the development set (**10 points**). Elaborate on how you have collaborated with the student responsible for the stance detection for incorporating sentiment detection (**5 points**). *Make sure that the name of the student appears prominently, along with the student netID on every page of the description of the sentiment recognition and its incorporation into stance detection (5 points will be deducted if name/netID are missing).* Additional **35 points** will be obtained if during the Demo of the system, in front of the entire class, the system is able to detect the sentiment and the stance on several new tweets.

4. Emotion Detection for Affect Processing (40 points): written by the student that fine-tuned a neural emotion recognition system on the training data produced by the team on Phase A of the project. A Figure of the neural architecture for emotion recognition (**5 points**) and a Figure for its incorporation in the stance detection system (**10 points**) is provided as well as the equations, input/output explanation. How emotion recognition was tuned on the training set (**10 points**) and how the stance detection using emotion recognition was trained and what results it obtained on the development set (**10 points**). Elaborate on how you have collaborated with the student responsible for the stance detection for incorporating emotion detection (**5 points**). *Make sure that the name of the student appears prominently, along with the student netID on every page of the description of the sentiment recognition and its incorporation into stance detection (5 points will be deducted if name/netID are missing).* Additional **35 points** will be obtained if during the Demo of the system, in front of the entire class, the system is able to detect the stance and emotions on several new tweets.

5. Topic Detection for Affect processing (40 points): written by the student that fine-tuned a neural topic detection system on the training data produced by the team on Phase A of the project. A Figure of the neural architecture for topic detection (**5 points**) and a Figure for its incorporation in the stance detection system (**10 points**) is provided as well as the equations, input/output explanation. How topic [processing was tuned on the training set to learn which hashtags are mapped into each topic (**10 points**) and how the stance detection using these mappings was trained and what results it obtained on the development set (**10 points**). Elaborate on how you have collaborated with the student responsible for the stance detection for incorporating topic detection (**5 points**). *Make sure that the name of the student appears prominently, along with the student netID on every page of the description of the sentiment recognition and its incorporation into stance detection (5 points will be deducted if name/netID are missing).* Additional **35 points** will be obtained if during the Demo of the system, in front of the entire class, the system is able to detect the stance and the topics on several new tweets.

6. <u>Connotation Frames with Semantic Role Labeling and Named Entity Recognition for Affect Processing (40 points)</u> written by the student that fine-tuned a neural Semantic Role Labeling (SRL) system and a Named Entity Recognition (NER) system on the training data produced by the team on Phase A of the project. A Figure of the neural architecture for SRL system (**5 points**) and the NER system (**5 points**) and a Figure indicating how the analysis pf the results of the stance detection system enabled the detection of which entities and predicates are most associated with AGREE and DISAGREE values of the stance (**10 points**) is provided as well as the equations, input/output explanation. How where the SRL and the NER systems tuned on the training set (**10 points**). Report the correlations between entities, predicates and stance values – and show if hashtags were also correlated with entities or predicates for each value of the stance (**10 points**). Elaborate on how you have collaborated with the student responsible for the stance detection for incorporating sentiment detection (**5 points**). *Make sure that the name of the student appears prominently, along with the student netID on every page of the description of the sentiment recognition and its incorporation into stance detection (5 points will be deducted if name/netID are missing).* Additional **35 points** will be obtained if during the Demo of the system, in front of the entire class, the system is able to detect NER and SRL on several new tweets.

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7. Conclusion – all team (3 points)