Machine Learning Twitter Analysis Tool

(Trendy Name [TBD])

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| **Section #:** | Tuesday, 6-6:30PM |
| **Stakeholder:** | David Stahl, atty |

**Revision History**

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| --- | --- | --- | --- |
| **Name** | **Date** | **Reason** | **Version #** |
| Rush Weigelt | 9/20/19 | Creation of base outline | 0.0 |
| Rush Weigelt | 9/21/19 | Met and took notes with Stakeholder | 0.01 |
| Rush Weigelt | 9/30/19 | Convert to legible Requirements Doc | 0.02 |

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1. [Introduction](#ToC)

* 1. Purpose of Document

This document will detail the requirements for our machine learning Twitter analysis tool.

* 1. Scope of Document

This document is scoped to enable a new programmer to join the team and be able to integrate themselves into the team within a day or two. It will lay out how the game will be coded, without ambiguity.

* 1. Overview of Document

Following this introduction will be our functional and non-functional requirements for *[TBD]*.It will also feature use-cases and UI mock-ups.

2. [Description](#ToC)

**2.1 Product Perspective**

*[tbd]* is a python-based application. It runs a machine learning Twitter analysis tool focused on two functions: 1) Detecting and reporting suspected ‘Bot’ accounts, with an attempted focus on politically-oriented bots and 2) Detect and log “potentially dangerous” tweets based on a supervised learning dataset.

**2.2** **‘Bot’ Detection**

‘Bot’ accounts, or automated accounts meant to mimic real users, are a prevalent issue on social media—none moreso than Twitter. While bots are an ever-present issue, analysts predict the run-up to the 2020 US election will see a large influx of fake users.

In an attempt to effectively help counteract the issue, we propose an application that will have two functions: 1) webscrape and, using supervised machine learning categorize, a certain number of tweets for a certain ‘hashtag’. Any posts categorized as “Likely Bot” would be linked and saved to a CSV file. This way, a human could then inspect the suspect accounts before deciding whether to report the account.

**2.3** **‘Potentially Dangerous’ Categorizer**

Develop an online dataset based on the posts and manifestos of convicted mass murderers. Using this dataset, use supervised learning to categorize posts from a provided hashtag into two groups. Export the ‘potentially dangerous’ posts to a CSV, to be inspected by an attorney or intern.

**2.4** **Python**

Python is the primary language we will be working in. This will allow us to utilize a bevvy of different modules.

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| --- | --- |
| **Module** | **Reason for Use** |
| Sklearn | Machine Learning |
| Numpy | calculations |
| Pandas | Dataframes |
| Pathlib | Universal paths |
| BeautifulSoup | Webscraping |
| Twitter API | Access to Twitter’s API |
| Mathplot | Basic visualization |

3. [Functional Requirements](#ToC)

**3.1** **‘Bot’ Detection**

An application that has all of the following:

1. User-input for a desired hashtag.
2. Webscrape a given number of the most recent posts.
3. Use supervised machine learning to categorize potential bots.
4. When done, export suspected accounts to a CSV file.

**3.2 ‘Potentially Dangerous’ Categorizer**

An application that has all of the following:

1. User-input for a certain hashtag.
2. Webscrape a given number of the most recent posts.
3. Use supervised machine learning to categorize posts.
4. Include a progress bar to indicate progress.
5. Export concerning accounts to a CSV file.
6. Save plotted ML results as a PNG file.

4. [Non-Functional Requirements](#ToC)

**4.1 ‘Bot’ Detection**

An application that has all of the following:

1. User must have an understandable UI to enter the desired hashtag.
2. Number of webscraped posts must be customizable, but within confines determined by commonsense (for now, greater than 300, less than 100,000).
3. Include an accurate progress bar to represent estimated completion time when categorizing.
4. Export links to accounts as a CSV that is readable in Microsoft Excel.
5. CSV should save to a local file.

**4.2 ‘Potentially Dangerous’ Categorizer**

An application that has all of the following:

1. User must have an understandable UI to enter the desired hashtag.
2. Number of webscraped posts must be customizable, but with confines determined by commonsense (for now, greater than 300, less than 100,000).
3. Must use supervised learning, to avoid claims of human-bias.
4. Include an accurate progress bar.
5. Export links to accounts as a CSV.
6. Save graph of results as a PNG file in a local directory.

5. [User Interface](#ToC)

**5.1 Application**

1. A dropdown menu to select whether it runs the search for bots or potentially dangerous posts.
2. User-supplied hashtag to concentrate on.
3. Dropdown menu to select from a range of recent posts to search through.
4. A ‘Run’ button in the bottom right.
5. An accurate progress bar to estimate time-to-completion.



6. [Use Cases](#ToC)

**6.1 Use Case Flow**

The following Use Cases are given in their likely sequential flow for the User. Differences between the two

**6.2** **Launch Application**

Make application launchable via Microsoft GUI, not command line.

**Precondition:** None

**Action:** User clicks to launch application.

**Postcondition:** The application runs, displaying the UI.

**6.3 Hashtag or User Selection**

Depending on how the user starts input (“#’ or “@”), make the search apply to the relevant field (hashtag or a specific user, respectively).

**Precondition:** Application is open and running.

**Action:** User enters something in the “Search” field, and starts the search with the appropriate symbol.

**Postcondition:** The proper search is conducted between a hashtag and a user, or a concise error code is rendered if the user fails to provide the proper first character.

**6.5 Categorizer Selection**

A clearly labeled dropdown menu will allow the user to select which categorizer they wish to run.

**Precondition:** Application is open and running.

**Action:** User clicks the dropdown error, with two choices: “Bot” and “Potentially Dangerous Posts”.

**Postcondition:** The selected Categorizer will be run.

**6.6 Number of Posts Selection**

A clearly labeled dropdown menu will allow the user to select from a preset range of recent posts to examine.

**Precondition:** Application is open and running.

**Action:** User clicks the dropdown error, with 10 choices: (temporary) 300, 600, 1200, 2400, 4800, 9600, 19,200, 38,400, 76,800, 153,600.

**Postcondition:** The selected number of posts will be scraped.

**6.7 Run**

A button in the bottom righthand corner will Run the categorizer with the desired attributes specified by the user.

**Precondition:** Application is open and running.

**Action:** User has entered all fields correctly and hits the “run” button.

**Postcondition:** A progress bar is displayed until results are rendered.

**6.8 Results**

Results are saved as a CSV file. It is to be titled with the date and searchterm used by the user. It will include profile names and links to suspected tweets. Lastly, graphs of our plots will be saved as PNG files in an adjacent folder.

**Precondition:** Application has run successfully.

**Action:** None.

**Postcondition:** A CSV specified to the user’s requirements and a PNG of the plot are saved in the appropriate directory.