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Mastodon social media threat alert extension

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Thesis Title: Mastodon Social Media Threat Alert Extension

Topic of the Thesis:

(Upon consulting with your supervisor, give a 150-300-word-long synopsis os your planned thesis.)

Social media thread alert extension is an extension which is planned to improve the security of Mastodon social media platform by letting the users know when there is a possibility for a threat towards them in this social media. This extension will provide social media threat alert for the users, for example when an account texts you it will detect and let you know whether that account has a possibility of being a fake account and afterwards will allow you to decide whether you want to be still connected with that account or not. Besides this it will prevent these kind of users getting the attention they seek in this social media and by that it will start to get them off the network since they will not get the attention they seek for in it, other than this it will encourage students and professors to use their university social media even more than they actually do.

Budapest, 2021. 11. 30.

Contents

Chapter 1

Introduction

1.1 Motivation

Nowadays we all know someone who has been affected negatively by the bullying happening on social media, which is becoming a very common problem in our society. Sometimes those cases escalated to the point where it turned into a serious mental health problem for the ones who have been affected. I was always wondering for a way to help people prevent similar cases and feel safe while surfing the social media feed. Everyone has it's rights to feel safe while doing a certain activity, but bringing safety to the social media in these kind of cases has been neglected throughout these last years.
The main reasons mentioned before have pushed me to brainstorm an idea to help people feel safe on Mastodon, which is open source, and enjoy the beauty of connecting with real profiles and use the social media to the point where it changes their life for good.

1.2 Thesis structure

This thesis consists of 4 chapters, which help users understand the installation steps of the software,the correct way of using the software and the possible behavior that can lead to errors, as well as help developers understand the functionality behind the software, the software architecture and the testing made on the software. Besides those main chapters it also contains a bibliography, a list of figures, a list of codes and a list of tables.

Chapter 2

User documentation

In this chapter we will discuss the installation steps, the correct way of using the software and a brief description about the software.

2.1 Project Description

My project is a desktop application that is meant to run on the background while using Mastodon social media. The whole project was built using the latest *Python* 3 version. The main goal of the project is to detect possible threats coming from other accounts in form of direct messages and tags, after warning the user about possible threats it let's the user decide the kind of action he wants to take against the account that may be a threat and the domain where the account came from.
As a prerequisite for using this desktop application is a stable internet connection and a Mastodon account.

2.2 Installation guide

As earlier mentioned, in order to use Mastodon social media threat alert application we need to have a stable internet connection and a Mastodon account in any server and *Python* 3.10.2.
The application is currently supporting Windows and Linux but the goal is to extend it as a mobile application which supports IOS and Android. Hence, the installation steps are the same for both, Windows and Linux, but we will go through the steps in Windows specifically.

To download the application we need to clone the following repository: `https://github.com/DionKajdomcaj/Mastodon-Social-Threat-Alert.git`.
Prior to cloning the repository we need to make sure that we have git. If git is missing, the user can dowload it at the following url: `https://git-scm.com/download/win`
If the git prerequisite is met, we can clone the repositery by entering the following command in the command prompt:

```
C:\Users\dionk>git clone https://github.com/DionKajdomcaj/
    Mastodon-Social-Threat-Alert.git
```

Code 2.1: Cloning Repository

After succeeding to clone the repository we need to install the requirements for our environment. In order to install the requirements we need to make sure we have pip command. If the pip command is not installed, the user can install it by clicking the following url: `https://phoenixnap.com/kb/install-pip-windows`.
In the application folder there is a file called requirements, installing it will fulfill all the requirements to run the application.
We can install them by using the following command in command prompt:

```
C:\Users\dionk\Mastodon-Social-Threat-Alert>pip install -r
    requirements.txt
```

Code 2.2: Installing requirements

Now we are ready to run the application.

2.2.1 Running the application

In order to run the application we need to make sure that we are in the correct directory and then run the following command:

```
C:\Users\dionk\Mastodon-Social-Threat-Alert>python ThreatAlert.py
```

Code 2.3: Running the application

After running the command, if all the prerequisites are met, we can see our application log in page.

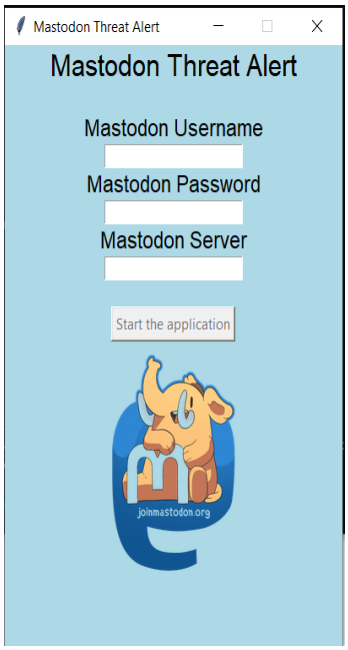
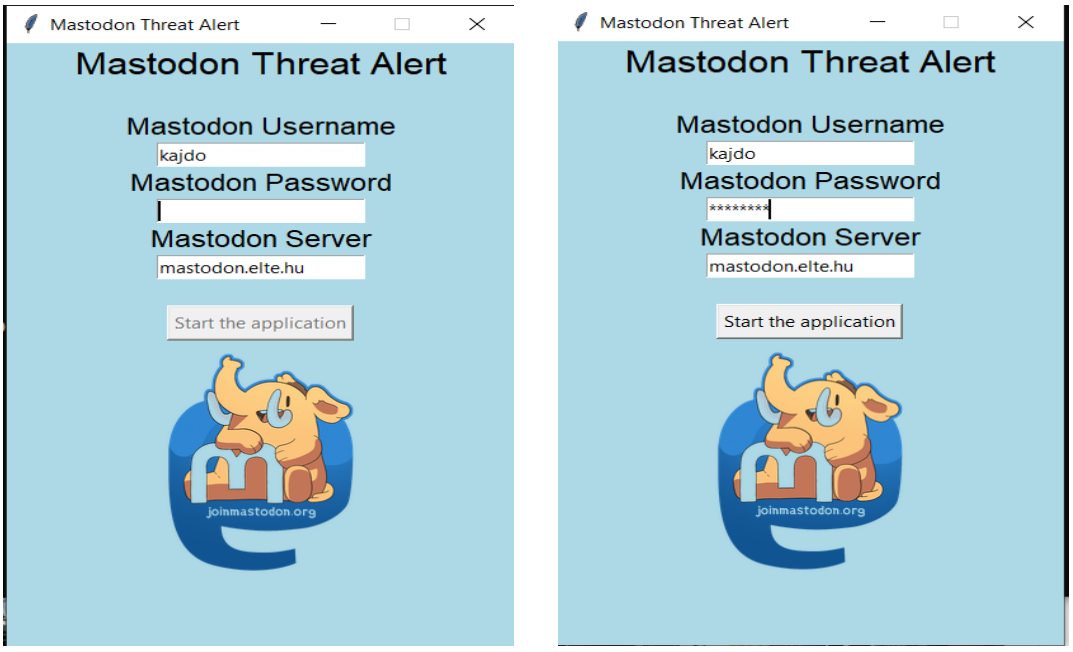


Figure 2.1: Application main page

2.3 Logging in

As we saw in Figure 2.1 the button to actually start the application is disabled. In order to enable it we must fulfill the requirements which are: filling the username, password and server field. If only one of them is missing then the user will not be able to start the application nor use it.



(a) Missing password field - Button disabled

(b) No missing field - Button enabled

Figure 2.2: Button disabled and enabled

The fields must be filled with the Mastodon account information.
In the username field you must enter your Mastodon username, and the same goes up to password. About the server you need to know which server are you in and only type the domain, for example in case there is an account like: example@mastodon.social then the username is example and the server is mastodon.social. All of the data are case sensitive, so you must give them exactly as they are originally.

2.3.1 Correct log in data

If every data is correct then the application will be connected to the Mastodon API after we click on the button. The program will let us now that it is running, and it will not change it's state until it recognizes a possible threat for the logged in user.

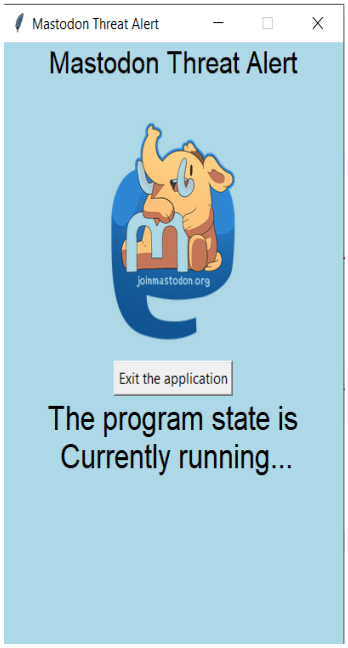


Figure 2.3: Application running

2.3.2 Incorrect log in data

Even if the button is enabled it does not mean that the log in data entered by the user are correct. So, if the user does not give the valid log in data then the application will not be connected to Mastodon API. Hence, it will give the user an error message. The following figure is going to show you the message you will receive for giving invalid log in data. After receiving the message you can just press the message button and try again as many times as you need.

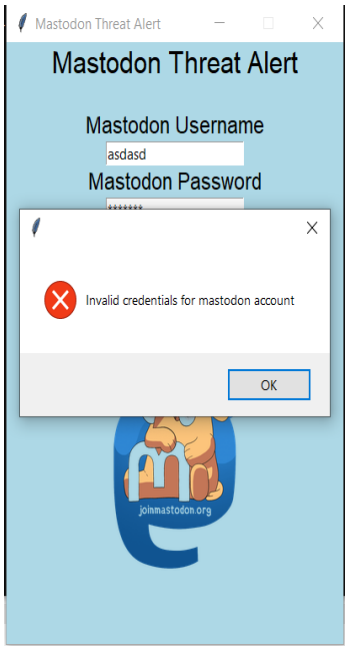


Figure 2.4: Incorrect log in data

2.4 Actions for the possible threat account

Now that we logged in successfully, we can start using Mastodon as usually, but this time we have the Mastodon threat alert application running on the background and looking for possible threats.

Every time that we are going to receive a direct message or a tag notification, that account's data is going to be checked whether it has a possibility to be a threat or not. After checking if the account, that was trying to reach you, is considered to be a possible threat, the application will show you a warning message containing the possible threat account username and domain, and will ask you to take a certain action against the account.

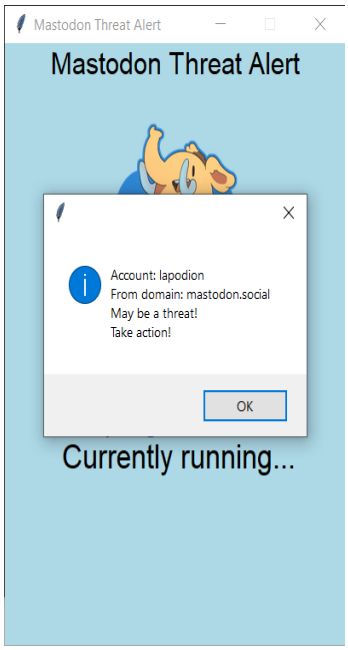


Figure 2.5: Possible threat notification

We have two kind of actions supported in our application which are: Trust and block, and they are applicable for the possible threat account or the possible threat account's domain. The default value for both of them is Trust which can be changed. We have to simply choose the action from a combo box for both, possible threat account and it's domain, and click the button in order to perform the actions.

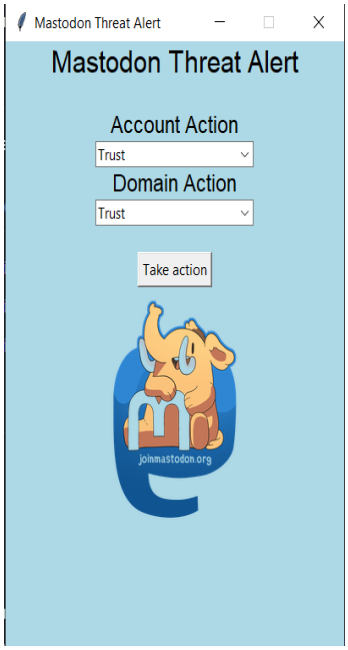
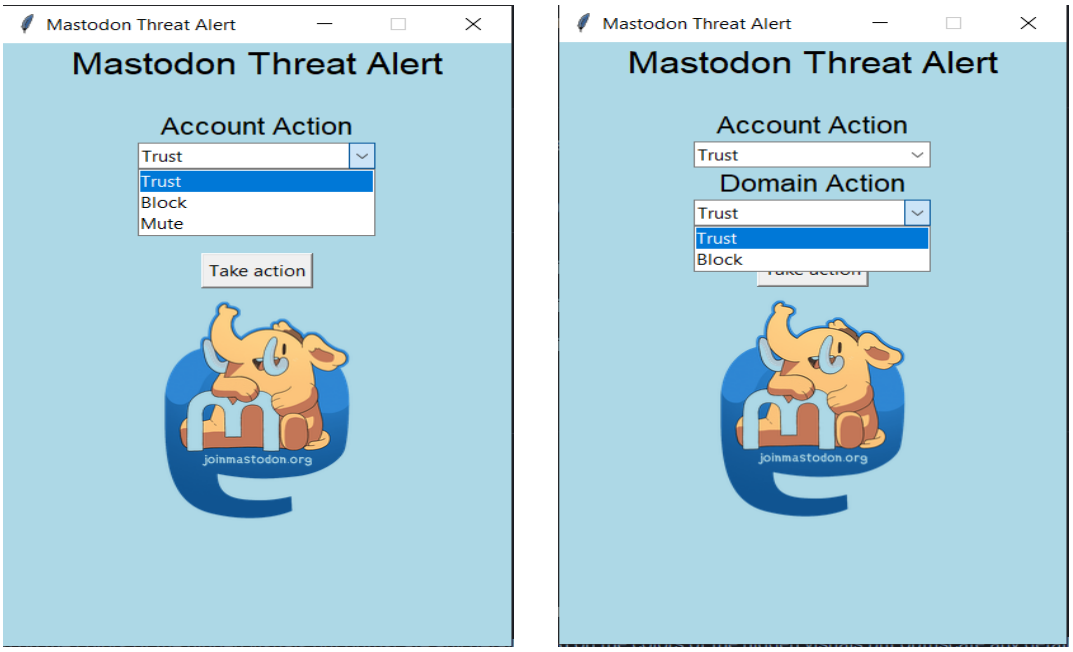


Figure 2.6: Action window

Now we can choose independently the type of action for both, the account and

it's domain.



(a) Account Actions (b) Domain Actions

Figure 2.7: Actions available for account and domain

When we click the button, a pop up window will show up, letting you know that the actions were successful.

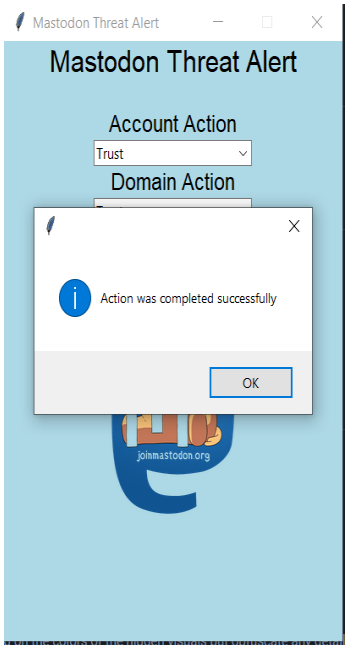


Figure 2.8: Pop up window to confirm the actions

After closing the pop up window, the application will go back to it's running state as in Figure 2.3.

2.4.1 Account action

As it was mentioned before, we can choose the actions separately for the possible threat account and it's domain. In this section we are going to talk about the possible threat account's action.
We have 3 types of actions for the account, which are: Trust, Block, Mute. The following table will describe each action.

Account Actions	
Trust	This action is very simple in context. When the user takes this function it means that he is trusting the possible threat account, and the application will not check the same account again, if it is trying to reach the user again.
Block	This action blocks the possible threat account, meaning it does not let the account reach the user anymore, not only by direct messaging or tagging, but even following, liking or any other social media activity. Besides those things the user will not see any activity from the possible threat account. To sum it up, the possible threat account will be non existent for the user.
Mute	Muting an account is same as ignoring the account, since the user will not receive notifications from the possible threat account anytime it tries to reach the user, but the user will still be able to check it's activity and the possible threat account will be able to try and reach the user, but simply the user will not be notified.

Table 2.1: Description of every action that can be taken against an account

However, every action that has been taken against the possible threat account can be easily reverted in Mastodon.

2.4.2 Domain action

In case of the possible threat account's domain we have less actions that can be taken against it.
The actions are Trust and Block. They might seem the same as the account actions described in table 2.1, but blocking a domain is completely different, since here we are working with the whole domain. However, in case of Trust, the functionality is the same as it was in the possible threat account's action.
In the following table you can understand their functionality.

Domain Actions	
Trust	This action works the same way as it works to trust an account. However, trusting the domain will not take any actual action against the domain. So, simply the accounts that are from that domain can freely reach the user in any form and without any restrictions.
Block	In case of Block the whole domain is blocked, meaning that any account that belongs in that domain can't reach the user. But, the user should always be very careful and is recommended not to block domains unless he/she was disturbed many times by the accounts coming from the same domain.

Table 2.2: Description of every action that can be taken against a domain

Same as in the account actions, the domain actions can be reverted in Mastodon.

2.5 Exiting the application

As we can see in figure 2.3, we can exit the application in two ways, by clicking the button named *Exit the application* or by simply closing the window. It is recommended to exit the application by clicking the button because it is terminated safely, but sometimes when we want to exit it while we are not on the running page, we can exit the application by closing the window as well. However, it is not recommended

to close the application while taking actions, like in figure 2.6, because the possible threat account's will not be saved in the database.

Chapter 3

Developer documentation

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3.1 Theorem-like environments

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3.1.1 Equations, formulas

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$$a^2 + b^2 = c^2$$

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In mathematica, identitatem Euleri (equation est scriptor vti etiam notum) sit aequalitatem Equation 3.1:

$$e^{i \times \pi} + 1 = 0 \tag{3.1}$$

3.2 Source code samples

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```
#include <stdio>

int main()
{
  int c;
  std::cout << "Hello World!" << std::endl;

  std::cout << "Press any key to exit." << std::endl;
  std::cin >> c;

  return 0;
}
```

Code 3.1: Hello World in C++

```
using System;
namespace HelloWorld
{
  class Hello
  {
    static void Main()
    {
      Console.WriteLine("Hello World!");

      Console.WriteLine("Press any key to exit.");
      Console.ReadKey();
    }
  }
}
```

Code 3.2: Hello World in C#

3.2.1 Algorithms

A general Interval Branch and Bound algorithm is shown in Algorithm 1. An appropriate selection rule is applied in Step 3.

Source of example: Acta Cybernetica (this is a hyperlink).

Algorithm 1 A general interval B&B algorithm

Funct IBB(S, f)

1: Set the working list $\mathcal{L}_W := \{S\}$ and the final list $\mathcal{L}_Q := \{\}$
2: **while** ($\mathcal{L}_W \neq \emptyset$) **do**
3: Select an interval X from $\mathcal{L}_W$ ▷ Selection rule
4: Compute $lbf(X)$ ▷ Bounding rule
5: **if** X cannot be eliminated **then** ▷ Elimination rule
6: Divide X into $X^j,\ j = 1, \ldots, p$, subintervals ▷ Division rule
7: **for** $j = 1, \ldots, p$ **do**
8: **if** X^j satisfies the termination criterion **then** ▷ Termination rule
9: Store X^j in $\mathcal{L}_W$
10: **else**
11: Store X^j in $\mathcal{L}_W$
12: **end if**
13: **end for**
14: **end if**
15: **end while**
16: **return** $\mathcal{L}_Q$

Chapter 4

Conclusion

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Appendix A

Simulation results

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