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Mastodon social media threat alert extension

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Thesis Registration Form

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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 and a list of codes.

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 and then use the following command in the command prompt to clone the repository:

```
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 the repository there is a file called requirements and installing it will fulfill 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.

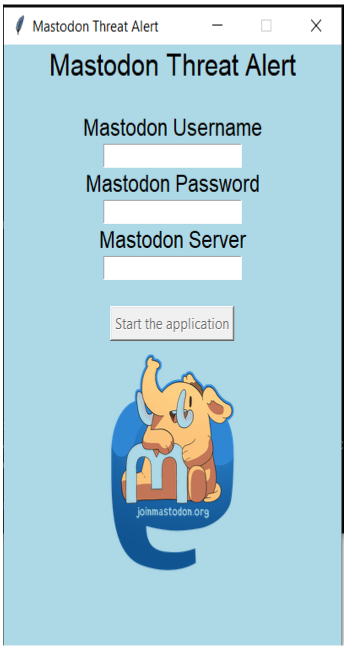
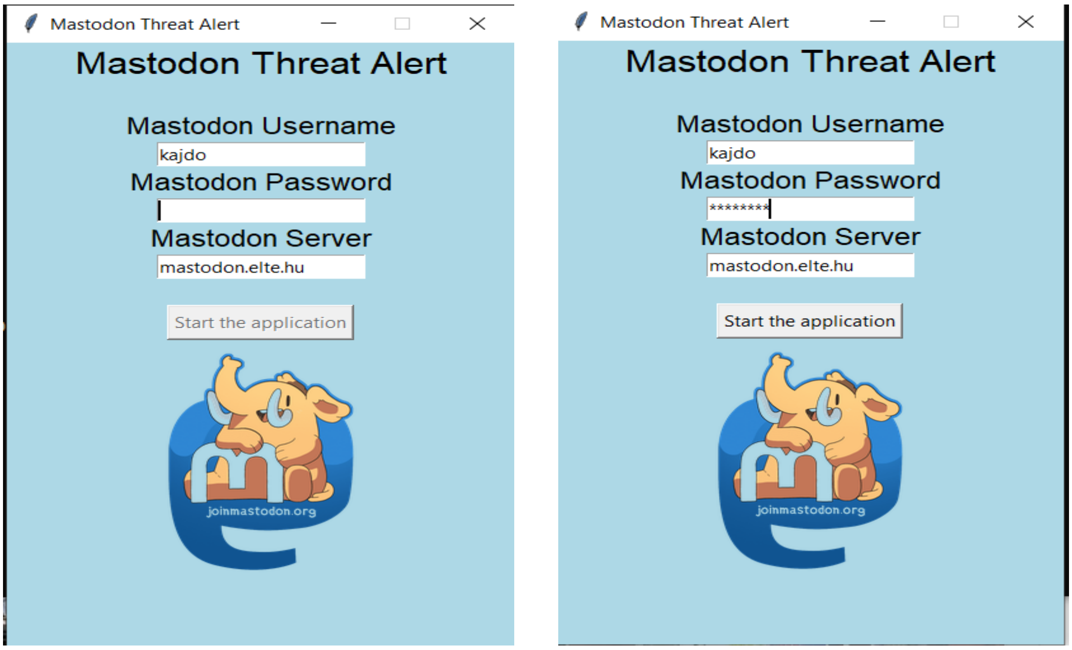


Figure 2.1: Application main page

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.



Mastodon Username: kajdo
Mastodon Password:
Mastodon Server: mastodon.elte.hu

Mastodon Username: kajdo
Mastodon Password: ********
Mastodon Server: mastodon.elte.hu

(a) Missing password field - Button disabled

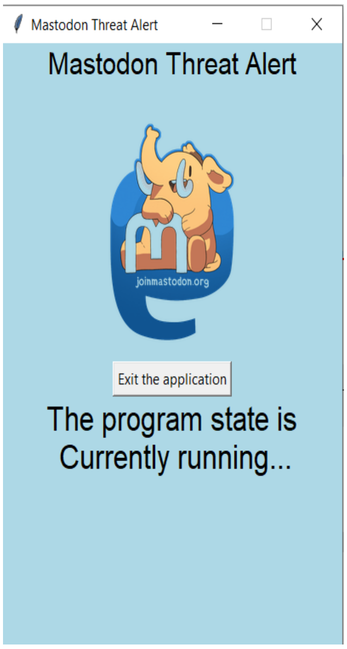
(b) No missing field - Button enabled

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.

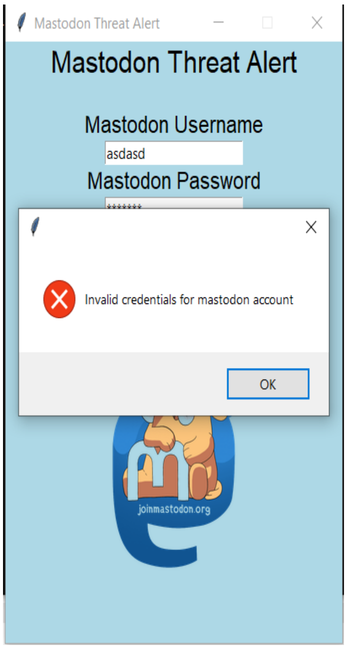


The program state is Currently running...

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.



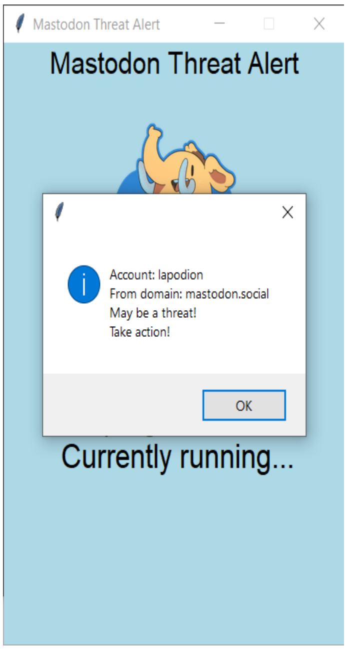
Invalid credentials for mastodon account

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.

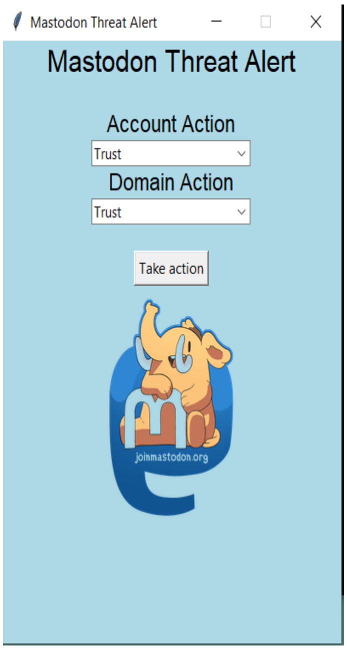
Every time that we are going to receive a direct message or a tag notification, that account's data is going to be checked whether it has a possibility to be a threat or not. After checking if the account, that was trying to reach you, is considered to be a possible threat, the application will show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



Account: lapodion
From domain: mastodon.social
May be a threat!
Take action!

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.



Account Action: Trust
Domain Action: Trust

Figure 2.6: Action window

Now we can choose independently the type of action for both, the account and it's domain.

After clicking the button the actions will take place and the application will go to it's running state again.

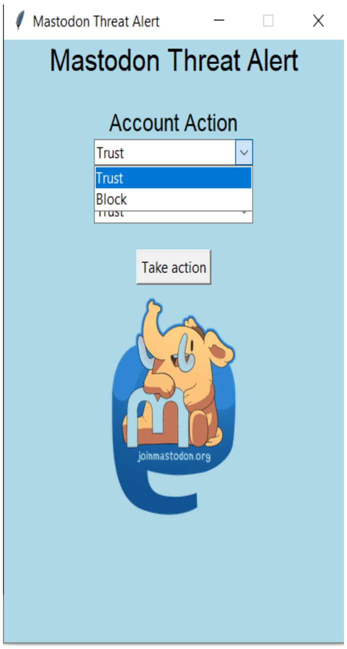


Figure 2.7: Choosing the type of action

2.4.1 Account action

As it was mentioned before that we can choose the actions separately for the possible threat account and it's domain. In both cases we have Trust and Block as actions, but they behave differently as account action and as domain action.

In case of the account the Trust action just trusts the account and does not check it again if it tries to reach you. However, the Block action blocks the account completely, and that account will not be able to reach you in any form.

2.4.2 Domain action

In case of the account's domain the trust action works the same as in the account action. However, in case of the Block action the domain is going to be blocked and the user will not receive any notifications from accounts that have the blocked domain.

Chapter 3

Developer documentation

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3.1 Theorem-like environments

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Theorem 1. *Nulla finibus ante vel arcu tincidunt, ut consectetur ligula finibus. Mauris mollis lectus sed ipsum bibendum, ac ultrices erat dictum. Suspendisse faucibus euismod lacinia. Etiam vel odio ante.*

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3.1.1 Equations, formulas

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

Phasellus mollis, elit sed convallis feugiat, dolor quam dapibus nibh, suscipit consectetur lacus risus quis sem. Vivamus scelerisque porta odio, vitae euismod dolor accumsan ut.

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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```cpp
#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++

```csharp
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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