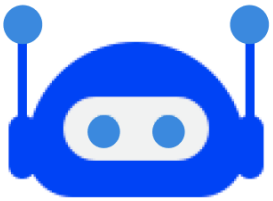

Bot Free

Product Design Specification Document

Team MANTYs

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1. Introduction

1.1 Problem

Aviation & Missile Center (AVMC) public affairs officers (PAO) need a better way to capture high fidelity data to gauge authentic social media engagement by detecting and eliminating any bot-like or inauthentic activity. Sprinkler, a content management tool, is currently used to track engagement on social media platforms but it does not filter inauthentic activity. As a result, several hours is spent manually sorting through postings to determine its true engagement and authenticity.

1.2 Solution Overview

This document will suggest a web-based application that gets rid of bot activity on social media accounts. Bot activity on social media takes the form of comments, follows, and shares that distort actual engagement metrics and clutter up a post. By using the fact that blocking an account stops it from being able to like, share, comment, or follow, we are hoping to stop bot accounts from engaging and get accurate analytics. We want this tool to be easy to use and not time-consuming.

1.3 Purpose

The purpose of this web-based application is to assist the US Army in increasing their engagement on social media by accurately detecting and filtering out bot activity.

1.4 User Stories

Below are user stories that help understand what the user is trying to accomplish and what their motivations are. These are helpful for developers to understand who they are building for.

- As a Social Media Manager, I want to get rid of Bot activity so that I can accurately measure user engagement.
- As a Social Media Analyzer, I want to not manually search through all posts so that I can spend more time doing more important tasks.

2. Design Considerations

2.1 Functional Requirements

The functional requirements for this product include:

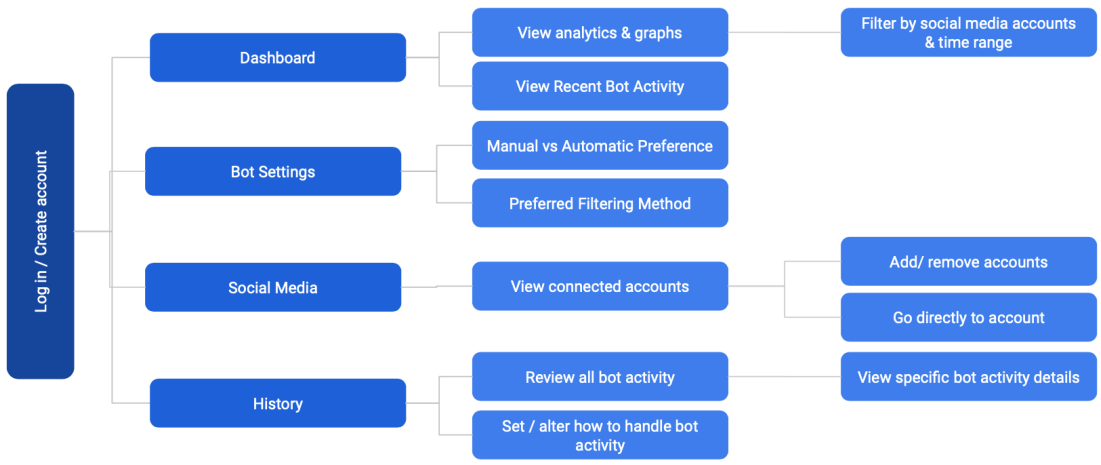
- Web application where users can create an account and connect their social media accounts as well as allow access for the web app to delete/remove bot activity
- Settings where user can select either to auto-delete or manual delete bot activity
    - Auto-delete: automatically deletes any flagged accounts/comments/posts
    - Manual delete: will provide user the option to review all flagged items and decide what they want to do with them
- Option to blocks, hide, or report bot accounts that follow, like, tag, comment, or share a post
- History of blocked accounts, comments, etc which will also allow users to recover any comments, accounts, etc that they believe is not bot activity
- Dashboard with analytics showing how many bots were detected and blocked

2.2 Constraints

The implementation must adhere to the American Data Privacy Protection Act (ADPPA).

3. Architecture

Information architecture:



4. User Interface Design

4.1 Acceptance Criteria

The criteria of acceptance can be determined by:

- Ability to accurately filter out bot activity on multiple social media platforms
- Allow user to switch between manual vs automatic bot deletion
- Can connect multiple social media accounts
- Visual representations of bot activity
- Be able to make changes on behalf of the user on a social media platform, such as removing a detecting bot automatically

4.2 Product-mission fit achievement

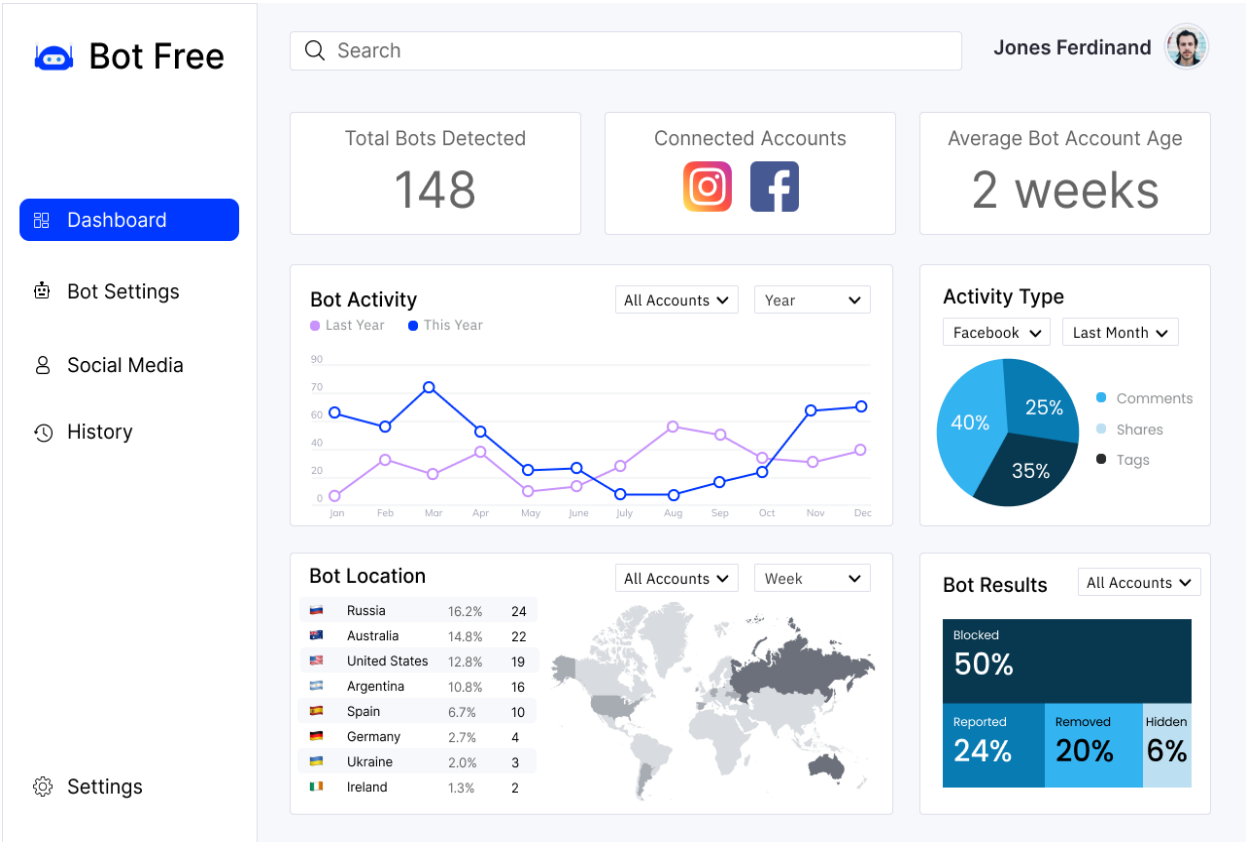
The following are reasons why the application achieves Product-Mission fit:

- Provides users guidance and assistance on dealing and identifying bot or inauthentic activity.
- Improves social media presence and creates accurate user engagement metrics that can be shared with other relevant stakeholders within the organization by removing bot activity.
- Reduces the time needed to manually identify and handle bot activity on each social media platform.
- Clear visual representation and insights on the bot activity occurring on social media platforms and the type of posts they target.

4.3 High-Fidelity Prototype

The prototype developed was made through Figma and can be interacted with using this link. Below is an in-depth review of the four main screens that need to be developed to achieve minimum viable product (MVP). We propose conducting user-testing on the MVP before fully implementing other screens, such as a log-in screen or a profile page.

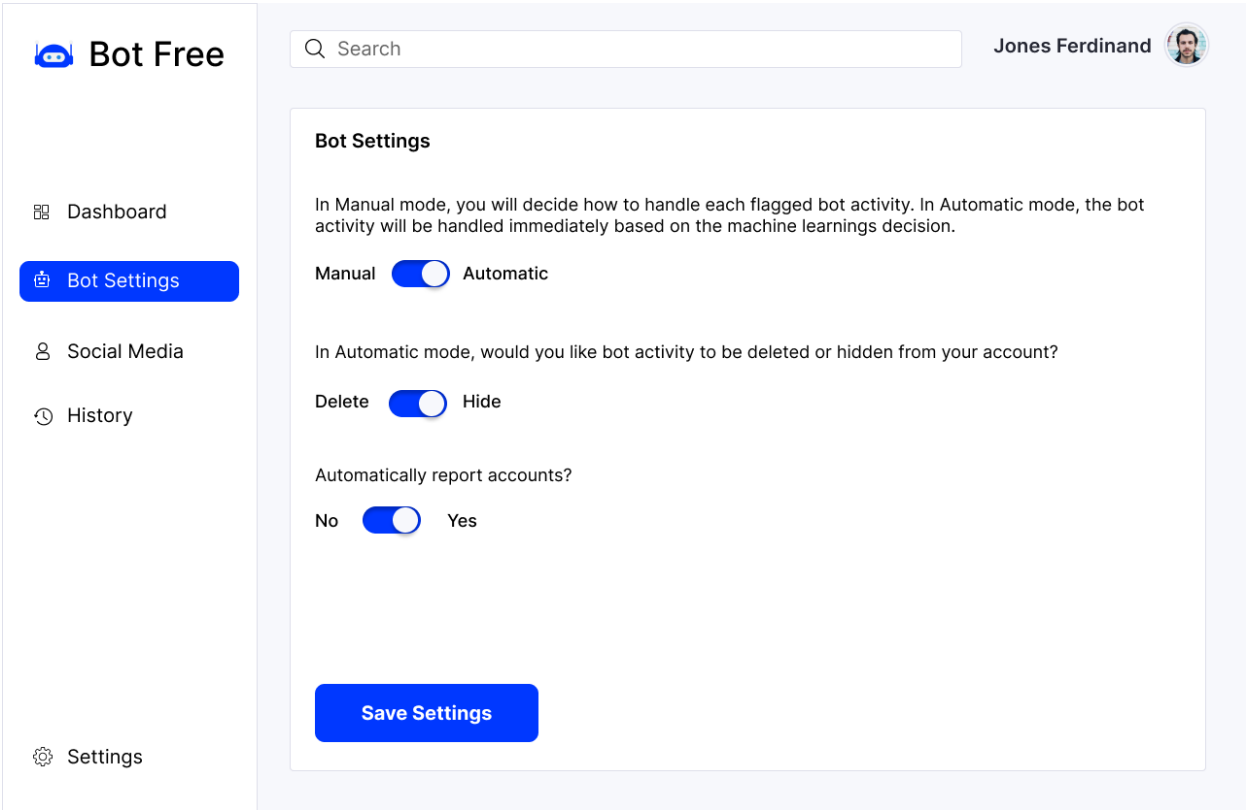
4.3.1 Homepage



Feature	Description
Menu navigation bar on the left side of screen (*present on all screens)	Contains the Bot Free logo and name, the four pages (Dashboard, Bot Settings, Social Media, & History), and a settings link at the bottom. The page the user is currently on will be highlighted in blue to indicate it is active.
Total Bots detected	Shows the total number of bots that have been detected across all social media platforms since the user has created an account with Bot Free.
Connected Accounts	Illustrates the social media accounts connected through icons.
Average Bot Account Age	Calculated by doing the average across the ages of all detected bot accounts.
Bot Activity trend graph	A graph demonstrating how many bots were found on the Bot Free website where the x-axis is the time frame and the y-axis is the number of bots found. Ability to filter the graph by account type (ex. Facebook, Instagram, or All Accounts) and by a time frame (week, month, year). An extra trend line is shown to be used as a comparison between the last week, month or year. Hovering over a

	data point on the trend lines will show the specific number of bots.
Activity Type pie chart	Pie chart illustrating where the bot activity is occurring. There are four possible ways: likes, shares, tags and comments. Users can filter the pie chart by account type and by a time frame as well.
Bot location map	Map showing where the bot activity is occurring in terms of regions. A table is shown to the left with the percentage of bots and the total number of bots found in that location. A map is shown to the right to visually see where the bots are being identified.
Bot Results tree map	Overview of the actions taken against the bots (aka what portion of the bots are blocked, reported, removed, etc)

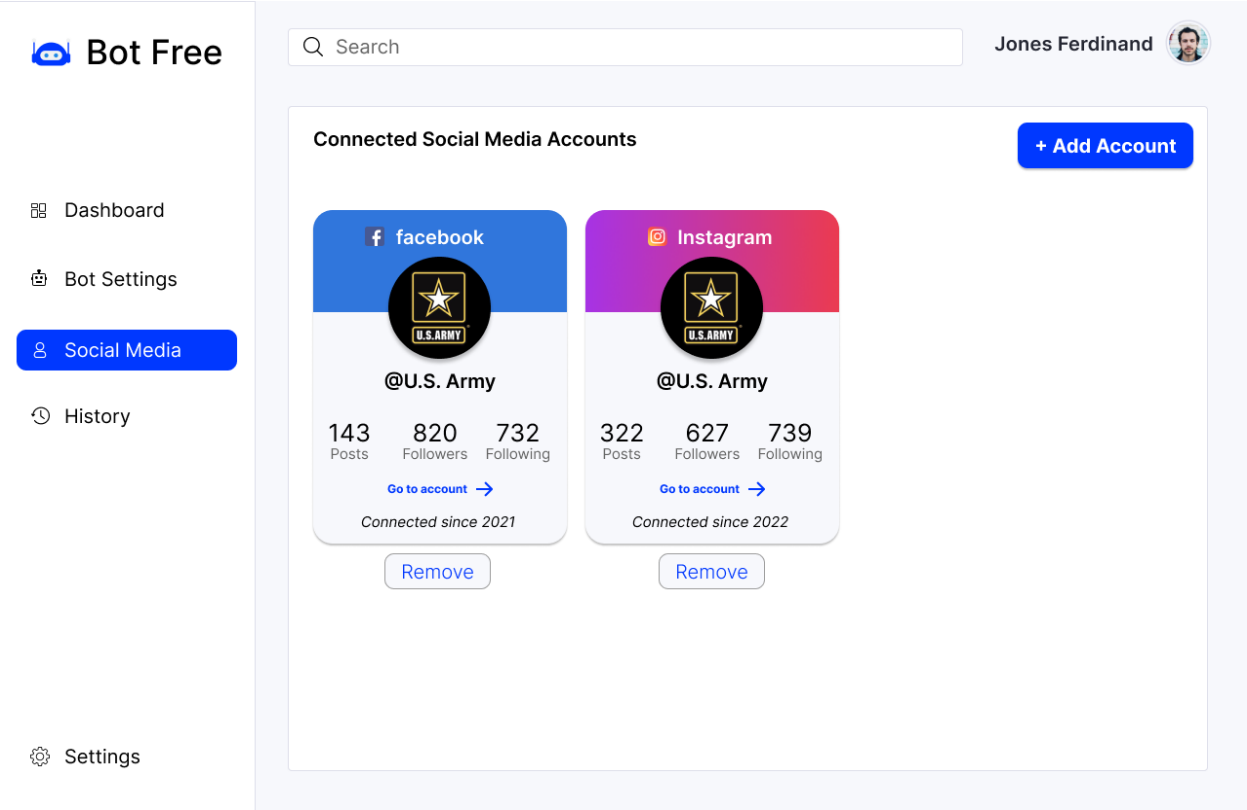
4.3.2 Bot Settings & Preferences



Feature	**Description**
Toggle switch for manual and automatic mode	Controls what mode the user wants to be in. Automatic will let the machine learning algorithm decide how to deal with the bot. Manual mode will let the user decide how to deal with the bot.

Toggle switch for deleting and hiding	This toggle switch is only present if in Automatic mode. User can add a preference for the machine learning algorithm to either delete the bot activity off of their social media account or simply hide it from the account.
Toggle switch for automatically reporting bot accounts	This toggle switch is only present if in Automatic mode. User can add a preference for the machine learning algorithm to automatically report bots that do not follow that specific social media guidelines.
Save Settings button	Button to save any settings that were changed.

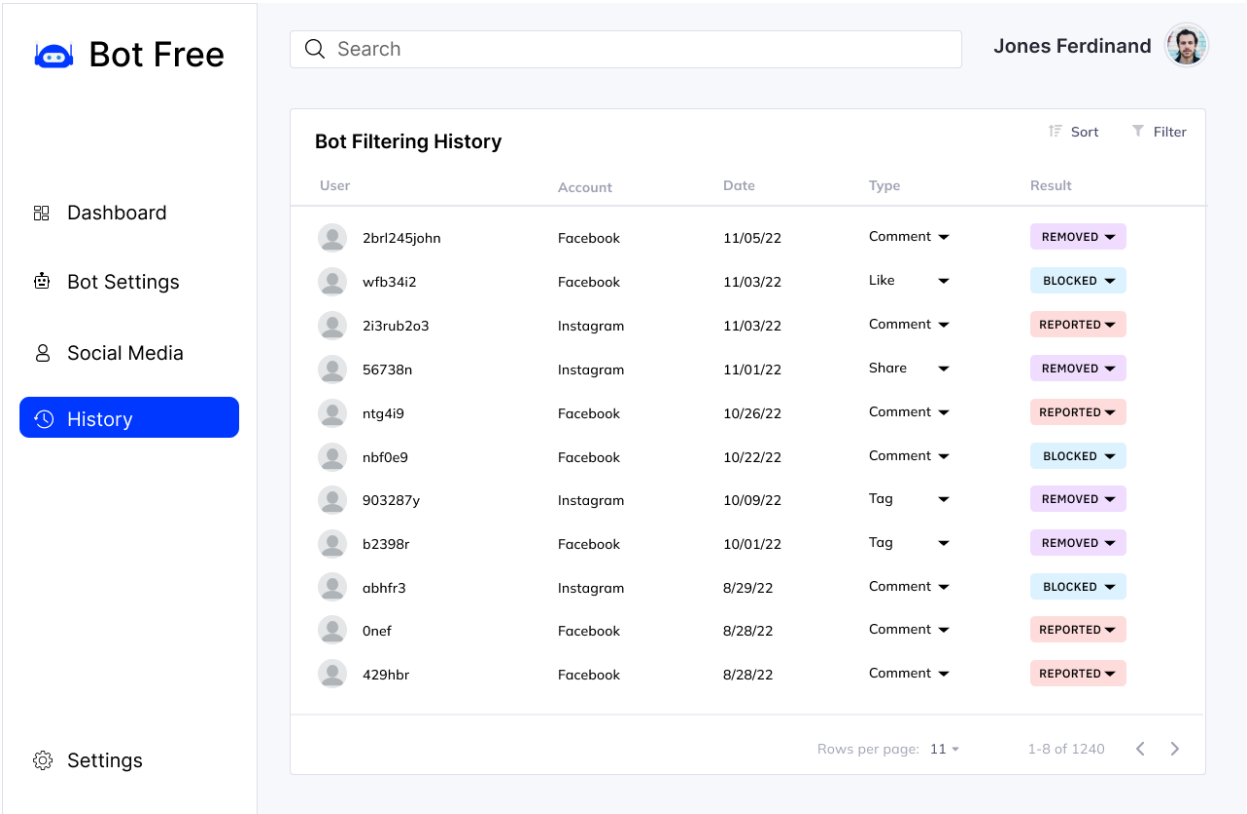
4.3.3 Social Media



Feature	**Description**
Social media card	Every connected social media account will get a card containing their profile pic, their username, the number of posts, the number of followers, the number of following, when they connected that specific account with Bot free and a link to go directly to that account
Remove button	An option to remove and disconnect a social media account from

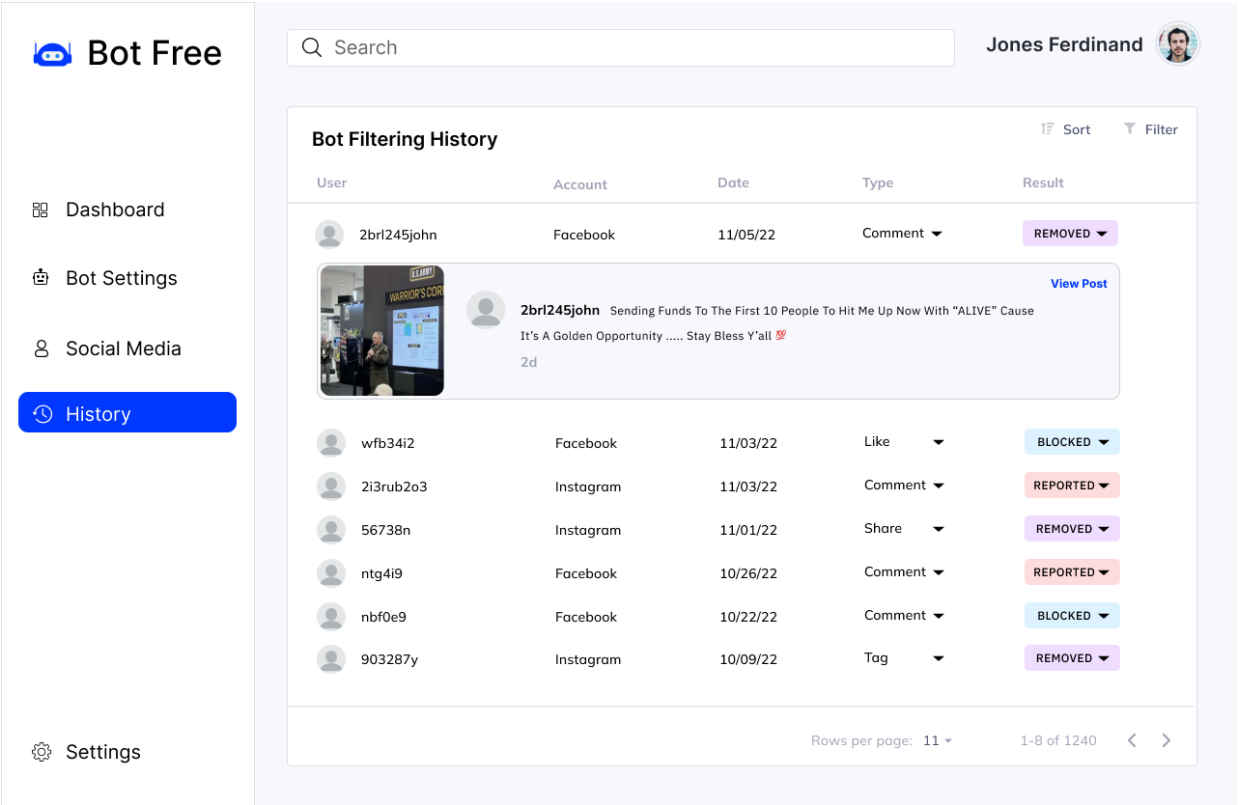
	Bot Free
Add Account button	An option to connect a new social media account with Bot Free

4.3.4 Bot History



Feature	**Description**
Table with identified bots	The table will be populated with the bots that are identified from the machine learning algorithm. For each bot it will show the username, the account it was found on, the date it was found, the type of bot activity, and the result the machine learning algorithm decided if in automatic mode (in manual mode, the result buttons will all be blank with the default being: Select an option)
Filter the table	Sort the table by one of the columns or filter the data by certain parameters.
View and/or change results	Each result option is editable allowing the user to override the result (if in automatic mode) or select a result (if in manual mode). The options are to: block, remove, hide, report, ignore, and not a bot. Multiple options can be selected, for example, a user may remove bot activity and report the bot account.

View more details	[see screenshot below for visual] ability to click on the arrow to expand the view to see more details



Feature	**Description**
Bot activity detail	View the exact post the Bot interacted with and what the activity looks like. Includes the ability to go directly to the post via the "View Post" link.

5. Ml Algorithm Design

The following is a suggested implementation.

We suggest using a binary classification approach that will be able to classify the data collected into two categories: "Bot" or "Not a Bot". The following data will need to be collected in order to get the most accurate results. We propose organizing and

collecting the data via the following csv files to feed into the algorithm: accounts.csv, posts.csv, comments.csv, likes.csv, shares.csv, users.csv.

accounts.csv

NAME	TYPE	DESCRIPTION
account_id	numeric	A unique id to reference each social media platform
account_platform	text	The name of the social media platform
account_username	text	The username for the social media account
account_posts	numeric	Total number of posts
account_followers	numeric	Total number of followers
account_following	numeric	Total number of users following
account_date	time series	The date the account was created

posts.csv

NAME	TYPE	DESCRIPTION
account_id	numeric	Reference to which social media platform the post was posted on
post_id	numeric	A unique id to reference each post
post_date	time series	The date the post was made
post _image	categorical	If the post had an attached image or video (yes or no)
post_text	text	The caption created for the post
post_likes	numeric	The total number of likes received on the post
post_shares	numeric	The total number of people who shared the post

post_comments	numeric	The total number of comments received on the post

comments.csv

NAME	TYPE	DESCRIPTION
account_id	numeric	Reference to which social media platform the comment was posted on
post_id	numeric	Reference to which post the comment was posted on
user_id	numeric	Reference to which user made the comment
comment_text	text	The comment itself
comment_likes	numeric	Number of likes the post received
comment_replies	numeric	Number of replies the post received
comment_date	time series	The date the comment was made

likes.csv

NAME	TYPE	DESCRIPTION
account_id	numeric	Reference to which social media platform the comment was posted on
post_id	numeric	Reference to which post the comment was posted on
user_id	numeric	Reference to which user made the comment
like_date	time series	The date the user liked the post

shares.csv

NAME	TYPE	DESCRIPTION

account_id	numeric	Reference to which social media platform the comment was posted on
post_id	numeric	Reference to which post the comment was posted on
user_id	numeric	Reference to which user made the comment
share_date	time series	The date the user shared the post

users.csv

NAME	TYPE	DESCRIPTION
account_id	numeric	Reference to which social media platform the user is on
user_id	numeric	A unique id to reference each user that has followed, liked, commented, shared, tagged, etc.
user_date	time series	The date the user joined the platform
user_username	text	The username of the user
user_posts	numeric	The total number of posts made by the user
user_followers	numeric	The total number of followers the bot has
user_following	numeric	The total number of following
user_location	categorical	The location of the user
user_bot	categorical	If the user is a bot or not. Two values: Bot and Not a Bot

The data will be classified as hard assignments, meaning the machine learning algorithm will directly say which category a user falls into: Bot or Not a Bot. The users identified as Bot will be shown on the platform via the “Bot History” page. Statistics, trends and demographics of the bot will be shown on the main dashboard.

We suggest training the classification model using a decision tree to identify what features or characteristics lead to an account being a bot so that users can learn to easily identify bot activity.

6. Data Privacy

After consulting a lawyer about adhering to the American Data Privacy Protection Act (ADPPA), Bot Free must do the following:

1. **All users must explicitly consent to the collection and use of their personal data.**
   SOLUTION: When users create an account they must accept/check a box saying they accept their data being collected. Offer a link for more information on how exactly their data will be collected and used.

2. **Every form of data processing activity requires the authorization and approval of all users.**
   SOLUTION: A notification pops up every time they make a change to how their data is collected or when a data-collection activity will take place

3. **Users should always have the ability to withdraw their consent.**
   SOLUTION: This action should be easily available via the “Settings” page or via clicking on their profile on the top right corner.

4. **Every company and every third party handling the data should be transparent and available for the users viewing.**
   SOLUTION: This information should be available via the “Settings” page or via clicking on their profile on the top right corner.

5. **Consent and the Terms and Conditions are not allowed to be bundled together and must be separate as they have separate forms.**
   SOLUTION: Make sure that the terms and conditions are a separate screen/interaction than the consent screen/interaction to make it clear they are not together.

6. **Explain why consenting will benefit their experience using the platform.**
   SOLUTION: This information should be available both when they sign up and after they have signed up

Note that extra design/prototyping and a consultation with a data protection lawyer will be needed before implementation and deployment of the above. However, the MVP product

shown in section 4.3 High Fidelity will not require the full extent of data privacy since it will only be used by a select number of individuals, overseen by a select number of individuals, and built for those select number of individuals who have consented to having their information used for the purpose of bot filtering.

7. Implementation

7.1 Costs

Please note that the below are only an estimation of the total costs and may vary. All costs are per hour.

Back-end Developer	$20 - $40
Front-end Developer	$15 - $35
Publish & maintaining website	$40 - $50

Extra costs for dual use case if Bot Free will be used by a wider audience:

Marketing	$80 - $200
IT Support	$15 - $29

8. Success Metrics

- Increase of total number of users using the website over time
- High weekly web traffic users: number of users visiting website
- High email open rates: the percentage of your users who have opened up your marketing emails
- High net promoter score (NPS): measurement of customer loyalty and satisfaction, your customer satisfaction score
- High customer retention rate: how many customers remain customers over time
- Low customer churn rate: how many customers stop using Bot Free
- High satisfaction rates through customer feedback
- Percentage increase in user engagement

9. Contact Information

The team may be contacted if assistance is needed from subject matter experts. Below is our contact information:

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