

University of South Florida

ISM 3113

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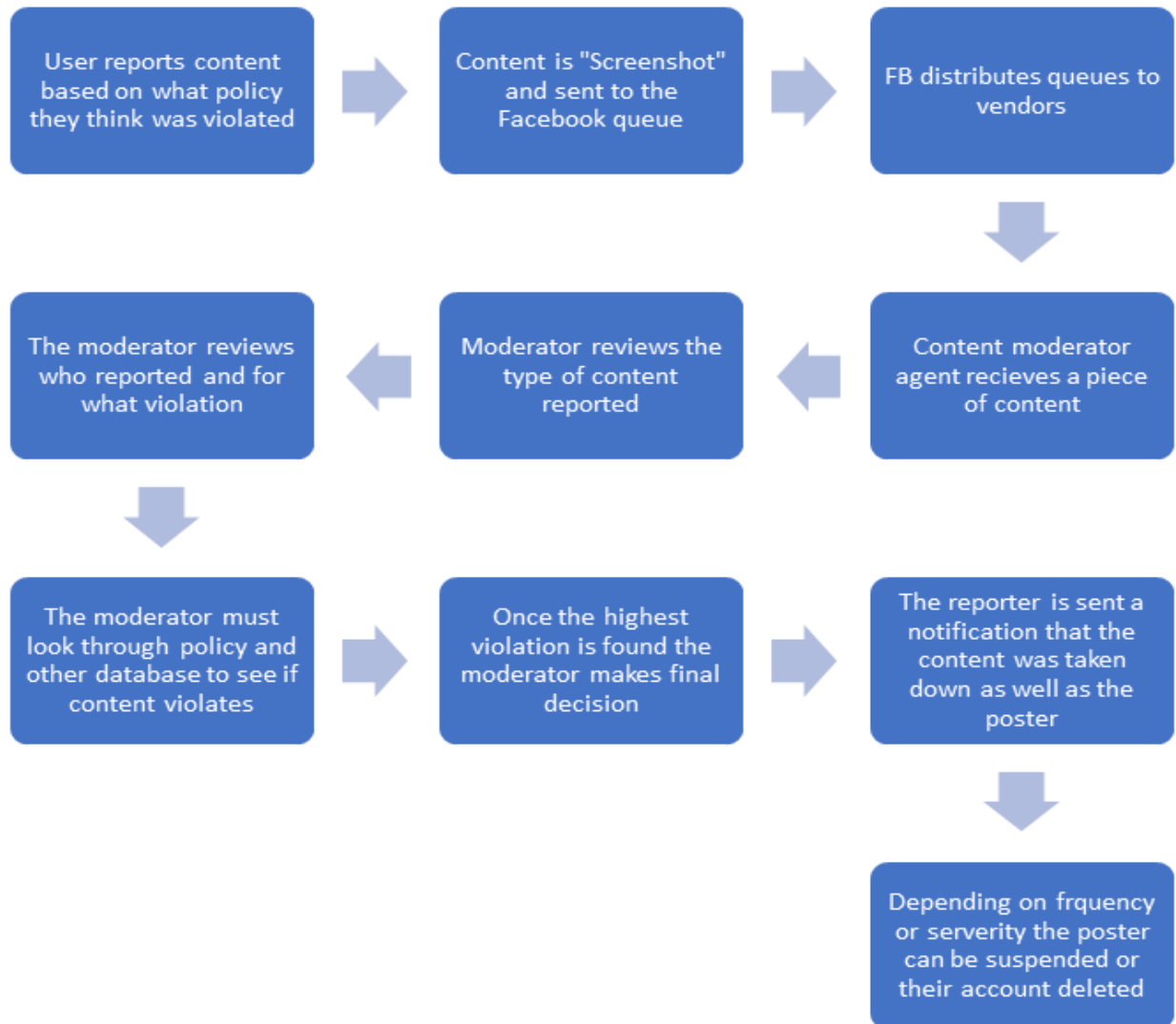
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Introduction

Since the beginning of social media with Friendster and Myspace, the ability to connect with friends or strangers over the internet and share your interests and beliefs has been the large draw to it. As social media and the internet evolved, newer websites became popular such as Instagram or Facebook. However, one problem has been prevalent in all social media platforms, which continues to cause issues even today. Spam and troll posts have always been an opposing side of social media since the early days of the internet, and they have continued to increase in prevalence in recent years. Nowadays, a social media company must have entire departments or outsourced firms to stem the tide of virus links, spam advertisements, or gruesome imagery. Facebook is specifically notable for its issues with spambots, account hacks, and even hate groups that pop up on the site. This document will break down the problems with the current moderation system and attempt to design a more effective one.

Background Overview

Facebook was started in 2004 by Mark Zuckerberg to help college students connect. The website grew in popularity from college students to high school students and then to the world. The platform went from simply having a wall to sharing pictures, to like buttons, to what we see on the platform today. With the growth of the platform came the growth of harmful content, so they added a feature to report such content. Facebook engineers created an internal tool to assist with the growing need to keep the platform safe. The below diagram explains the flow of how violating content is handled.



If the content is not violating, the moderator will select the benign option, and the reporter would be notified that the content did not violate policy. This process from start to finish can take anywhere from 2 days to months. This process has also been shown to be faulty because Facebook reported that over 10% of the content is incorrectly actioned, meaning 300,000 errors made per day, and 109,500,000 a year.

Identification

Facebook is a social network that most young adults, adults, and seniors use daily. Facebook contracts human moderators to keep a secure social media network. Sometimes humans make a mistake which is causing the company a lot of money and mental health issues. The objective of an automated monitor will lead to a new implementation of this social media. The goal is to reduce costs, increase productivity, and better human performance. Facebooks overall goal is to have a safe environment for all users to share photos, videos, and real information. The automated monitor will help Facebook catch users uploading spam, inappropriate content, and scamming.

The system goal is vital for the user experience and saving money along with time. Spam is labeled to affect the way you think about the way you want to purchase something. Scamming is huge on Facebook and other social media platforms. While human moderators are there, humans can't catch everything, so having this moderator system would be necessary. Finally, inappropriate content is vital to keep out of the social media area. This type of moderator would help to better keep this type of content off Facebook.

Requirements of the system

The proposed changes to Facebook's content moderation system are as follows:

- Elaborate and improve on policy guidelines of what is and isn't allowed on the platform.
- Keep a closer watch over newer accounts, in case they are bots or previously banned users.
- Invest in an automated system that can handle some of the less complicated parts of the moderation workload.

- Invest in the human moderators as well, by trying to improve their workload and mental health.
- Test links that are posted on their site to see if they go to dangerous websites or not.

The features and functions required for these changes would be:

- Updating policies to better dictate what they allow on their platform, so that they can remove the ambiguity that many trolls or hate groups have been able to hide behind.
- Flag any new accounts that are made and put them on a short probation period where they are closely monitored to see if they are a real user, a bot or previously banned account.
- Design an automated system that can skim posts and images for keywords such as hate speech, bullying or certain names alongside calls to violence, and allow those to be either removed immediately or flagged for review if there is ambiguity within the content.
- Reduce and ease daily workload of the human moderators with use of the above automated system, as well as providing mental health services such as counseling and therapy to assist with some of the violent imagery that they often must moderate.
- Program the auto moderating system to skim hyperlinks that are posted on the site to see if they go to known virus links, or other dangerous websites.

Assessment:

The current system that Facebook uses is inefficient and cannot maintain its expected growth. It fails to effectively and efficiently moderate the massive amount of traffic on their website. It currently relies heavily upon its own users who are responsible for flagging

inappropriate posts themselves which are then passed on to an already overworked team of moderators.

Add to this, that Facebook is constantly growing—with over 2.7 billion monthly users. Even with their impressively sized moderation team of over 15,000 they are, and will continue to, struggle.

The use of an automated flagging system would greatly cut down on the expanding number of flagged posts, as well as many falsely flagged posts. This would afford the workers some much needed breathing room—increasing their efficiency. This addition to the current workflow would also provide their users with a cleaner more-friendly environment which would positively impact the company's reputation.

User Stories

There has been an abundance of complaints from content moderators reviewing reported content for Facebook. Once the content is received by the agent, they are to decide the correct action based on Facebook's current policies and policy guidelines. However, policies and guidance change daily. Due to information being spread across many different parts of the system, it is sometimes difficult for the correct guidance to be found. Agents are put under pressure because they have a job quota and time requirements. It is also required that agents maintain a certain accuracy level, meaning they need to decide the correct decision at least 96% of the time. Agents are also put at risk of viewing some of the internet's most gruesome images, videos, and text, leading to PTSD or other mental illnesses. The system also has many bugs, which makes it hard for moderators to make accurate decisions. This new system would help alleviate some of the issues content moderators have as well as enhancing the user experience.

Identification of Proposed System

Prior System

Stakeholders

- **Who relies on the system for what?**

According to a study done in 2019, 69% of adults use Facebook in the U.S. alone, and worldwide Facebook has over 2.7 billion active monthly users. Facebook can be used for a tremendous amount of complex and simple tasks. These range from connecting with friends through posts or messenger, creating pages about anything that constrains Facebook's policies, e-commerce pages, advertisements, videos, and Facebook is even used as a platform for many to gain the daily news. Essentially, Facebook is a medium for communication and information sharing on an enormous scale.

- **Who maintains this system?**

Facebook has a mix of auto reporting and human agents who help moderate and filter-out posts that should not be on Facebook and violate user agreements. The human moderator features are controlled by many third-party vendors such as PRO Unlimited, Accenture, Arvato, and Genpact.

- **Who pays for this system?**

Facebook pays this third-party system and outsourced vendors would be responsible for the care of the in person moderating.

- **Who decides go/no go for acquisition?**

This would be decided in the contract between Facebook and vendors however, Facebook has majority of control on what is acceptable and what is not based on their terms.

- **Who are the influencers for go/no go decisions?**

This would still be Facebook and the contract they outlined with vendors. The influencers are the executives who executed this plan which would be mostly CIOs, CFOs, and CEOs of Facebook.

- **Who supports the system?**

This would be the vendors and their employees who also help moderate the content. This can even include individuals who work for them and users that report content.

Features and Functions

The features and functions of the current system include:

- Image Recognition
- User Experience
- User Risk
- Algorithm deciding if the image requires a human to review

Priorities

The priorities of the current system include being able to automatically moderate content with having fewer human moderators. This is because Facebook is such a large platform used globally, and it would be extremely difficult, tedious, and expensive for all the content that is shared or posted to be filtered appropriately.

Current Proposed System (Primary and Secondary Stakeholders)

Primary:

- Facebook Users
- Employees

- Third-Party companies

Secondary:

- Investors as Facebook is one of the largest public companies in the world
- Media as they use Facebook as a platform to share and gain information even if it is about Facebook
- Politicians as misinformation can skew ideas about individuals and there are many laws trying to be passed regulating or controlling aspects of Facebook content

Features:

- Advanced AI algorithm that has tighter and more efficient filtering
- Ability to connect with legacy systems
- Highly proficient system of filtering with minimal errors
- Strict but does not delete appropriate content

Function:

- Use most up to date technology and update the system regularly
- Use prior information in legacy systems for simpler adaptation
- Updated system that can adapt with different trends to filter more efficiently
- Algorithm that can be computed to bypass certain

Traceability Matrix for Identifying Requirements, Features, Functions, and Quality

Requirement	Owner/Primary Stakeholder	Secondary Stakeholder	Feature	Function	Priority	Non-Functional/Quality Criteria
Stricter and more relevant filtering	Facebook Users, Employees	Investors, Media, and even Politicians	Advanced AI algorithm that has tighter and more efficient filtering	Use most up to date technology and update the system regularly	High	Capacity and scalability to take on the workload of Facebook
Compatibility with Facebooks System	Facebook Users, Employees	Investors, Media, and even Politicians	Ability to connect with legacy systems	Use prior information in legacy systems for simpler adaptation	High	Capacity and reliability to integrate with legacy systems in place
Human Moderators have less of a workload	Facebook Users, Employees	Investors, Media, and even Politicians	Highly proficient system of filtering with minimal errors	Updated system that can adapt with different trends to filter more efficiently	High	Scalability, serviceability for updates, and maintainability
Does not filter out what is not supposed to	Facebook Users, Employees	Investors, Media, and even Politicians	Strict but does not delete appropriate content	Algorithm that can be computed to bypass certain	High	Reliability so that it can take the workload of human employees

7.Preliminary Design Review

7.1 Scope of the Project (Fred)

The scope of the project for our Moder 8 solution, embodies the principles to make sure that Facebook has an auto moderator system that will improve efficiency, autonomy, relevant filtering, and it is compatible with Facebooks legacy system. This Moder 8 solution will be used as an add-on automated system that will just build on what Facebook is currently using to moderate their website. Also, this will consider the stakeholders at all levels, as they are the ones who will be affected by this modification. Our vision is to have an auto moderator system that will attract individuals to using Facebook and know they will not have to face any content that could be disturbing, false, or just plain blasphemous. The following WBS, Gantt breakdown, SOW, and other relevant documents will cover this more in depth.

7.1.1 Statement of Work

The Moder 8 Solution general purpose is to have an auto moderator system that can have strict filtering while not filtering out what is supposed to fit the guidelines of Facebook. Another purpose is to help the workers who must review the moderated content as Facebook is such a massive company. It will also help improve the revenue of Facebook as less moderators will be needed and there will also be less lawsuits. For example, there are documented cases of individuals working with prior auto moderator software who have suffered severe PTSD from the images or content they had to review. Moder 8 will make this system more autonomous, resolving many of these issues. The Moder 8 Solution will also have to be compatible with the legacy system in place, so it needs to be written in the same code and be scalable to fit the over 2.7 billion monthly users.

During the initial stage of the Moder 8 Solution, there will need to be a WBS created that contains the requirements of the system. This will be traced back to the SOW and CSCI so that

there is integration at every step and to make sure nothing is missed. During the analysis stage, there will need to be an evaluation of what technology would best fit into the Moder 8 Solution. This will include what engineers or developers to hire and to make sure they have the skills to make this solution a reality. Cost is not the major issue as Facebook is one of the wealthiest companies in the world. The next step will include internal design, and this will ensure that the program is correctly working to the standards and principles of the intended solutions, traced to the CSCI. It will also include what is implemented, such as the proper AI, so these goals are met. Following this internal design will be a test stage where over 10,000 users, some working for Facebook others just users of Facebook, will use Moder 8 Solution as a demo on their page and report potential issues. The whole solution will be tested on every end from the code, to the user interface after the demo is released and only after these steps, will Moder 8 be fully implemented.

7.1.2 Scope Governance (Exclusions and Constraints)

This section will include the Master Service Agreement that will govern the entire Moder 8 Solution. The purpose is to make guidelines of what falls in and out of scope of the project. We start with the primary stakeholders who will be most affected by this and making sure the CSCI and WBS are hit in every category. This traceability will make it much simpler to make sure that the solution is on track and meeting its purpose. If any new work falls into a boundary that might need to be considered in the scope, it will be brought up to the team and they will see how or if they should include the feature. This can be concluded by seeing if it fits into the CSCI and WBS or if it affects it in some major way. The timeline for this will be 6 months with flexibility as there are already legacy systems in place. Also, the system is estimated to cost around \$2 million dollars if the scope time is kept and time constraints are met. This is determined by the average

software engineers making 200k and hiring 20 of them working for 6 months. This is also flexible with the major revenue that Facebook has and a system already in place.

7.1.3 Project Deliverables

Facebook Legacy System Compatibility	Cross compatibility with systems in place such as PRO Unlimited, Accenture, Arvato, and Genpact.
Enhanced AI Capability	This will do a better job at moderating content and sending the appropriate content, when unrecognizable, to an actual human worker.
Autonomy	This function will allow for human workers to take care of business
Training on the Moder 8 Solution	This will be completed in a few hours as the system is just building onto older systems.
Demo Testing	Demo testing will be completed to enhance the solution before moving it out to the mass public
Updates per need basis	There will be updates after the Moder Solution 8 is live as technology is always changing. This will be calculated as it comes up.
Enhanced key word and graphic ability	Enhancing the Moder 8 Solution will include using the algorithm to detect certain key words and graphics in pictures that will automatically remove the content. It will be very intricate so that it does not remove content that is fitting to Facebook's terms.

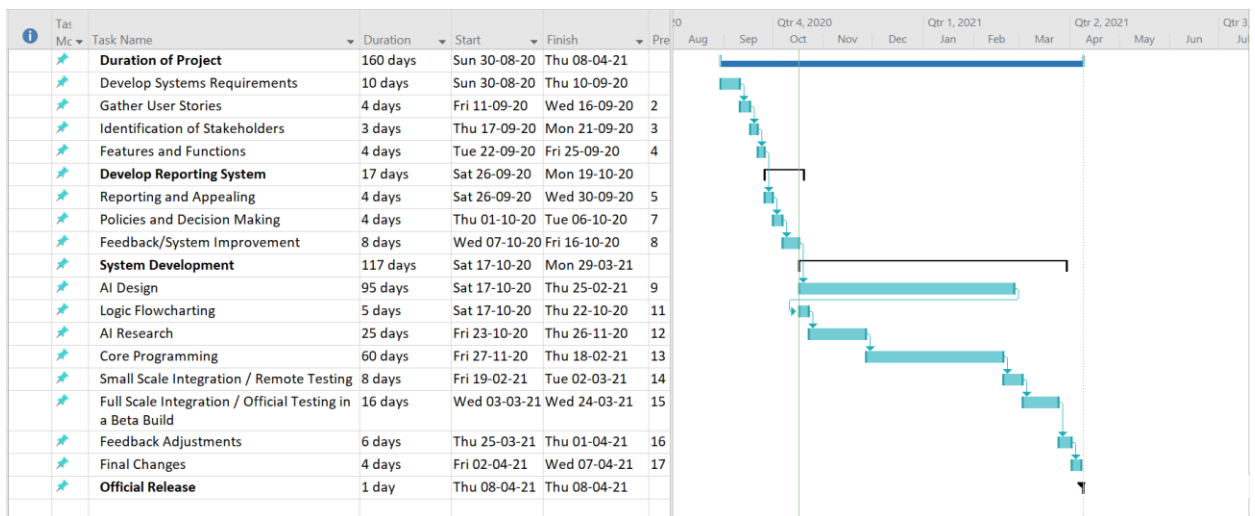
7.2 Work Breakdown Structure of the system. (Jasmine)

7.2.1 Organizational Chart



7.3 Project Schedule. (Jared)

7.3.1 Gantt Chart



7.4 Identification of Development Team. (Nelly)

7.4.1 Project Director- Alfred Marroquin

The Project Director supervises the team. He is responsible for overseeing managers in different departments assigned to a specific task of the project. Some of his duties are being physically involved once a week in each department, reviewing reports, attending meetings, and ensuring consistent progress according to timelines. Alfred Marroquin has 12 years' experience in different areas of Information Technology and vital management skills.

7.4.2 Database Manager- Jared Searle

The Database Manager's responsibilities are to maintain and implement standards of the database controls. He creates bi-weekly plans to ensure requirements are met and coordinates programming as needed. Jared Searle has 7 years of working in the IT field. His skills are analytical, planning, and the upgrades database system.

7.1.3 Software Engineer – Jasmine Tompkins

The Software Engineer is the main person of this enhanced project. She has improved the system value by identifying the current issues of Facebook Auto-moderator. Her skills consist of implementing the auto-moderator, update policies, and other databases as needed. She is also involved with other department managers to make sure there is a constancy of the programs. Jasmine Tompkins has 10 years of experience in project management and enhancing complex projects. Her passion in the IT field has made an easy transition for these much-needed enhancements of the project.

7.4.4 Quality Assurance Leader- Nelly Sarmiento

The Quality assurance Leader will be testing all the changes that are made to the programs. Her ability will help to use logic and reasoning to identify all the enhancement program's strengths and weaknesses. She will design any new tools and processes to confirm the team meets the goals. Nelly Sarmiento has 10 years of experience in mentor and management with different resources in the IT fields.

7.4.5 Business Analyst- Sean Volmuth

The Business Analyst handles all the documentation related to the enhancement of the system. His duties will consist of assessing the impact of any changes made on the network, obtaining/recording requirements. He will also be attending all stakeholder meetings with the Project Director to ensure everything gets handled correctly. Sean Volmuth has 8 years of experience in Business analytical. His expertise is in communication, problem-solving, self-managing, and relationship-building.

Identification of testing team

Project Director, Database Manager, Software Engineer, Quality Assurance Leader, Business Analyst, and primary stakeholders will perform comprehensive testing before releasing all the

enhancements to Facebook Auto-moderated. The testing will ensure that all the changes are error-free and have a positive Feedback. To demonstrate all the testing enhancements, we will generate a report and provide it to all Facebook stakeholders. The enhanced system will help millions of users worldwide from the harmful effects of spam content.

7.5 Risk analysis. (Sean)

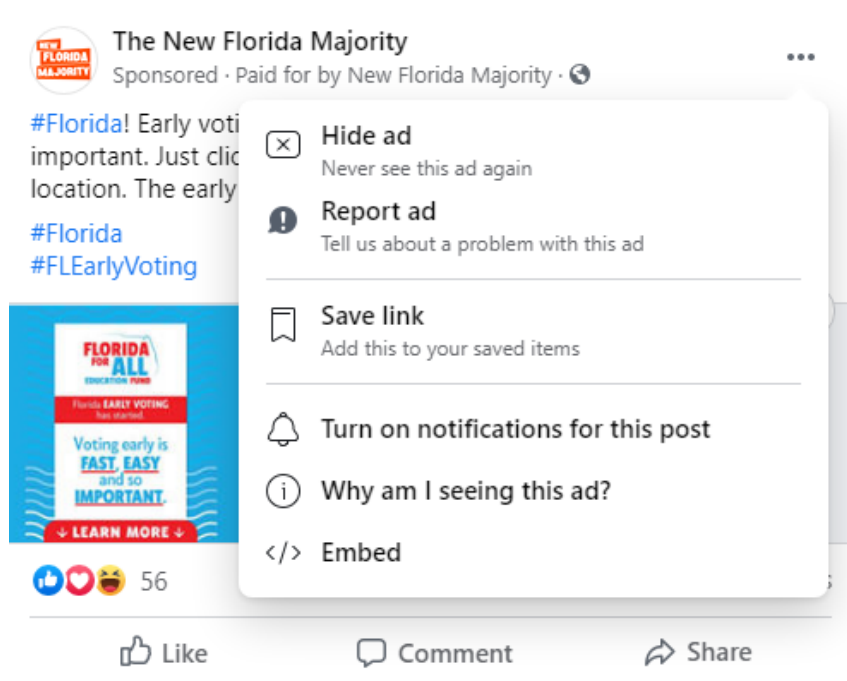
SCALE OF SEVERITY				
SCALE OF LIKELIHOOD		ACCEPTABLE	TOLERABLE	GENERALLY UNACCEPTABLE
	NOT LIKELY	Testing team misses minor bugs or glitches in system	Automoderation System Update is late or fails to roll out in time	Automoderation System Crashes
	POSSIBLE	Harmless Post is Taken Down	Wrongful Ban of Innocent User	Failure to find and remove gore, illicit images, or other ToS breaking posts
	PROBABLE	A bot account is not reported or banned	A user account is hacked	Hate speech or ToS breaking content in private groups or chat rooms going unreported

Risk Assessment List

RISK	AREAS AFFECTED	SEVERITY	LIKELIHOOD	RISK IMPACT	RECOMMENDED ACTION(S)
Wrongful ban of innocent user	User base/Automod system	Tolerable	Possible	Low	Create an appeals board.
Harmless post is taken down	user pages/Automod system	Acceptable	Possible	Low	Create an appeals board.
Failure to find and remove gore, illicit images, or other ToS breaking posts	User experience/moderation standards	Generally unacceptable	Possible	High	Inspect why content was missed and look into what can be done to ensure it doesn't happen again.
Automoderation system crashes	automod system/user experience	Generally unacceptable	Not likely	Medium	Create backups of system and a down detector, as well as having an employee on call to handle crashes.
Hate speech or ToS breaking content in private groups or chat rooms going unreported.	Automod system/ToS	Generally unacceptable	Probable	High	Improve automod skimming in relation to private messaging and closed groups, to attempt to prevent echo chambers/feedback loops of negative user bases generating bad content.
A user account is hacked	Password authentication system/user experience	Tolerable	Probable	Medium	Make 2 factor authentication mandatory, as well as having easy to access and use account recovery tools.
Automoderation System Update is late or fails to roll out in time	Automod system/dev team	Tolerable	Not likely	Low	Have strictly set out deadlines and development checkpoints to ensure all updates, patches, and general changes are scheduled to roll out properly.
A bot account is not reported or banned	Automod system/user reporting	Acceptable	Probable	Low	Encourage user reporting, as well as improve automod bot detection features.
Testing team misses minor bugs or glitches in system	Automod system/dev team	Acceptable	Not likely	Low	Have a bug reporting feature and encourage swift rollouts of updates and hotfixes when a bug is found.

8. Critical Design Review

8.1 Ability to connect with legacy System (Jasmine)



Report

×

Report This Ad

Help us understand what's happening with this ad. How would you describe it?

Misleading or Scam

Sexually Inappropriate

Offensive

Violence

Prohibited Content

Spam

False News

Other

⚠️ Learn more about our Ad Policies.

Automatic Decision

Submit

Thank you for submitting a report.

×

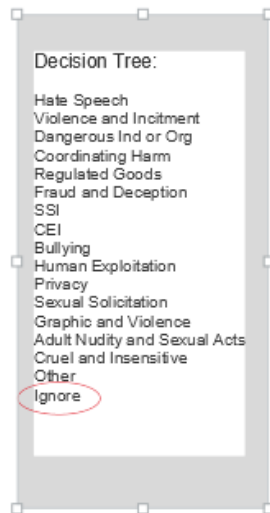
✓ Other

We will review your report and notify you of our decision.

Further explain violation to help our moderators better understand:

Done

Moderator view

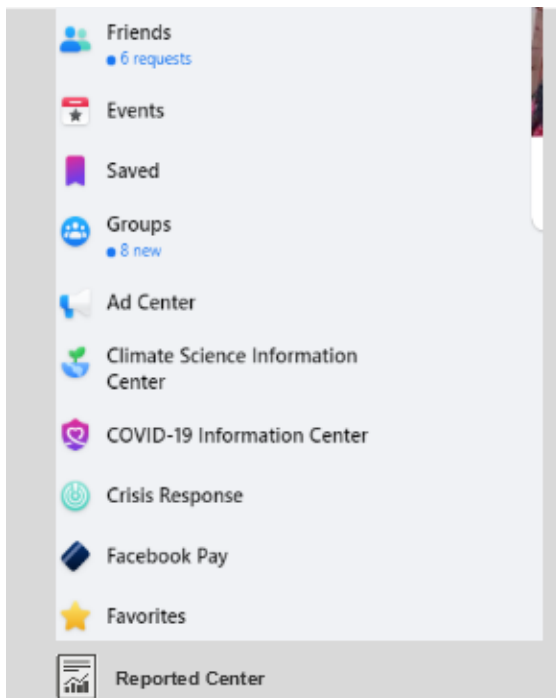


Why was this reported? Other
User Explanation: I hate seeing political post. In this day and age Facebook shouldnt bother us about politics.



Suggested Decision: Ignore

Submit Decision



8.2 Highly proficient system of filtering with minimal errors (Nelly)



→ Moder 8 is intergraded with Facebook moderation.



→ Will only receive notifications and reminders about flags and queued post for assigned categories.
→ Lists of flags and queued posts will be filtered by assigned categories

→ Moderator will be assigned to different categories.

Social Networks

Pages

Filter

Admin

Published

Inappropriate

Hidden

Comments

Explicit Video

Content Advocating unsafe behaviour, such as self-harm or eating disorders.

Content promoting hate based on race, religion, disability, sexual preference, etc.

Real or simulated violence

Content Promoting violent extremism.

Admin

How long to display image

24 Hours Ago

Video Display

24 Hours Ago

24 Hours Ago

24 Hours Ago


Historical data

Automator will automatically delete the comment from the user page

Comments from Facebook

8.2 Strict but does not delete appropriate content (Jared)

Report ID: 5647agxc1579
Sender: **Caprisun37**
Date: 10/31/2020 at 08:37
Ad ID: PolIndUSA37gxf

Independence USA
Sponsored · Paid for by Independence USA PAC · 
If Trump can fly 1,000 miles to vote, you can drop yours off at ballot box! Vote him out.

WILLVOTE.COM
Vote Early!
Vote Early for Biden

Learn More

Topic: Ad Removal

Explanation Given: My newsfeed is being flooded with Political Ads, increasing the time it takes for me to look through my feed. Please either remove these ads or decrease the rate at which they appear.

Keywords: **Irrelevant** **Spam**

Status: **Pending**

Similar Cases: [w97xg125736t4](#), [s279665714u6](#), [+2347 more](#)

Recommended Decision:

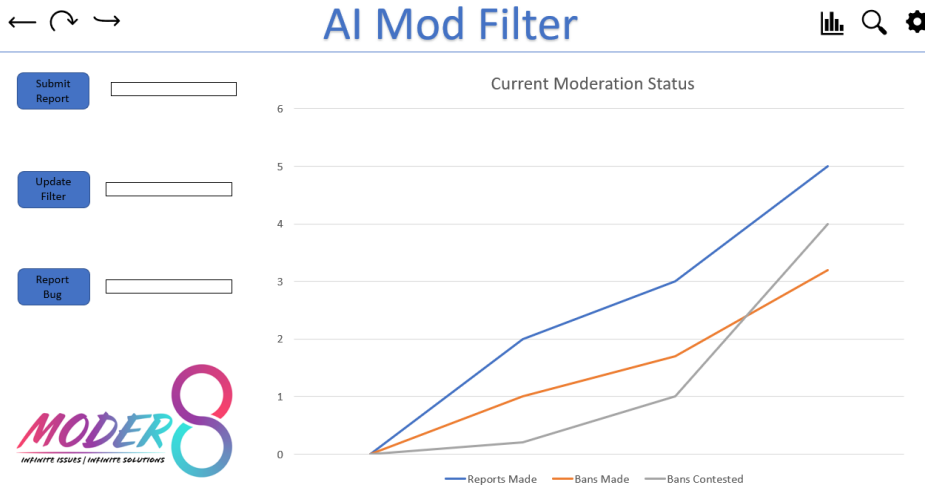
Decision Accuracy: 2349 Total, **3 false**, **2346 actual** (99.87% Accuracy)

Final Decision: **Ignore**

Categorizes and stores similar cases based on keywords. Uses prior cases to generate a 'confidence-level', showing the likelihood that the suggested decision will be successful. This saves the employee a lot of time and removes some of the tedium from the workplace.

Any false positives are sent to a separate division, and adjustments to the algorithm are quickly made in order to combat exploitation and increase system efficiency.

8.3 Advanced AI algorithm that has tighter and more efficient filtering (Sean)



Submit Report

The submit report feature allows a moderator to manually input a link to a profile, group, or post that they have found and submit to the AI for scanning.

Update Filter

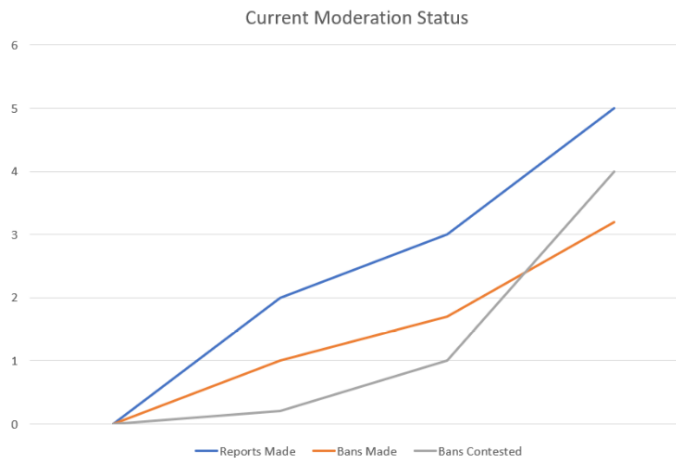
The update filter option is how new criteria is added to the AI moderator. Simply input a keyword, hyperlink, or phrase, and the AI add it to its list of ban worthy offenses.

Report Bug

The report bug feature is how moderators will send any issues to the development team. All that one needs to do is to type out what the bug is or how to replicate it and send it on its way.



The leftmost button is the analysis tab, it brings up a more in-depth view of graphs and charts showing the AI's progress, as well as allowing you to play around with the settings of the currently viewed chart on screen. The middle button is a search feature that allows you to search the AI database for changes made, or submitted posts, as well as viewing the logs related to said posts. The right button is the settings button, it is how the user will customize their UI and how they view the filter page.



This is the current graph onscreen showing live progress of the AI's moderating process, by clicking the analysis tab, you can change the graph onscreen to a different one or change the specifics of the current graph.

8.5a Budget Model

QUANTITATIVE COSTS	Year 1 (\$000s)	Year 2 (\$000s)	Year 3 (\$000s)	Total (\$000s)
Non-Recurring Costs				
<i>Hardware</i>				
Servers	N/A			
Data equipment	N/A			\$0.00
<i>Software (custom)</i>				
Purchase	\$50,000,000.00			\$50,000,000.00
<i>Project organizational/support costs</i>				
Planning (upon approval)	\$220,000.00			\$220,000.00
Contract negotiations	\$150,000.00			\$150,000.00
<i>Labor</i>				
Infrastructure	N/A			\$0.00
Development	\$2,500,000.00			\$2,500,000.00
Management	\$730,000.00			\$730,000.00
<i>Other</i>				
Training of employees (pre-implementation)	\$450,000.00			\$450,000.00
Transition costs (parallel systems)	\$250,000.00			\$250,000.00
Post implementation reviews	\$225,000.00			\$225,000.00
Total Non-Recurring Costs	\$54,525,000.00	\$0.00	\$0.00	\$54,525,000.00
Recurring Costs				
<i>Hardware/Software</i>				
Software maintenance and upgrades	\$10,000,000.00	\$10,200,000.00	\$10,404,000.00	\$30,604,000.00
Help Desk support	\$12,500,000.00	\$12,812,500.00	\$13,132,812.50	\$38,445,312.50
<i>Ongoing Additional Labour</i>				
IT staff costs (incl. benefits)	\$2,000,000.00	\$2,040,000.00	\$2,080,800.00	\$6,120,800.00
User training	\$450,000.00	\$459,000.00	\$468,180.00	\$1,377,180.00
<i>Other</i>				
Office leases (tentative)	\$13,500,000.00	\$13,770,000.00	\$14,045,400.00	\$41,315,400.00
Total Recurring Costs	\$38,450,000.00	\$39,281,500.00	\$40,131,192.50	\$117,862,692.50
Total Costs	\$92,975,000.00	\$39,281,500.00	\$40,131,192.50	\$172,387,692.50

8.5b Budget Breakdown

Facebook is one of the biggest companies in the world per market cap and total value. The most effective way to quantify the costs is to split costs between non-recurring costs and recurring costs. Let's begin with non-recurring costs. Facebook already has millions of servers implemented. As our project will just improve an existing auto-moderation system, it will not incur any additional costs for servers, data equipment, and infrastructure, Facebook also makes their own servers so it is near impossible to quantify how many they have or what cost they will be. The software purchase of \$50 million is the price we would charge for the Moder 8 Solution

which is detailed by each individual component and so that we can make a profit from the solution. Labor is the most expensive components in the non-recurring costs because we estimate we will need 20 software developers with an average pay of \$200,000. The project is estimated to be completed over 6 months, but we also added an extra \$500,000 for any contingencies. Management was calculated at \$146,000 (using the BLS median rate) per software manager who would need to be there the whole year for training and any developments (This would include my group and myself totaling 5). In the other category we considered the average hourly wage of employees at \$15 an hour for FB employee moderators. This is how we calculated training employees and user training (in recurring costs). For transition costs and post implementation reviews, we took an estimation of the average prices for these costs in the industry for large companies.

For recurring costs, we will start with the hardware/software prices. For software maintenance and upgrades we took the industry percent of recurring maintenance which is 20% of the purchase price of the Moder 8 Solution. Help desk support was calculated by the median salary of \$25,000 and the ratio of help desk support for moderators which is 30 to 1. We would like to have 10 IT staff members on site each year to help with any major issues that arise. User training was mentioned above in non-recurring costs and we believe it will take 2 hours to implement this training each year. The final, and most expensive component is office leases. This was calculated using 60 sq. ft per person in a major office which is the industry norm. Then we multiplied the estimated number of employees by the square footage per person and the average square foot price for office buildings in the U.S. To calculate year 2 and 3 totals we multiplied the previous costs by 2% which is the average inflation rate. This calculation is tentative if workers are at home due to COVID.

To conclude, Facebook has an immense amount of capital so these numbers should be extremely feasible. They are rough estimates but were calculated using industry averages and the information that Facebook would release. In total Facebook would expect to spend around \$172 million dollars for a 3-year implementation of the Moder 8 solution with more than half being in year 1 at \$92 million. This would be extremely useful for them as it would meet their stakeholder needs and bring back old users or even bring new ones. The goal is to cut down on moderators and filter content more appropriately which could affect the numbers greatly if it is successful.

Info:

• Salary of software and IT staff: \$200,000	• FB moderator employee pay: \$15 an hour
• Number of moderators: 15,000 people (estimated)	• Average cost to integrate legacy system: \$250,000
• Average recurring price of maintenance: 20%	• Managers needed: 5 (median Pay 146,000)
• Contract negotiations: \$150,000 due to complexity of contract	• Square foot per person: 60 sq ft. x 15000 = 900,000 square feet needed
• Square foot price: \$15 per sq. foot x 900,000	• Average Inflation rate: 2%
• Median salary of help desk: \$25,000	• Software Purchase Cost: \$50 million

9.1 Software Test Plan (Fred)

9.1.1 Facility, Location, Personnel, Methods, Equipment, Environment, Assumptions.

Facility: The facility will be the existing Facebook facilities which will be located all over the U.S. This is because we are just integrating our software with their existing software.

Location: Some of the major facilities are in Texas and Menlo Park, California. There will not be a need to create another facility as we will just have to add on to their existing servers and software.

Personnel: We will have our software architects working on this software while Facebook software architects will also be assisting and learning.

Methods: The Moder 8 Solution will undergo testing by processing through the GUI. Members of the development team will try to see if the solution is working correctly by attempting to put in posts that should be flagged and deleted. This will trace back to the CSCI requirements and attempt to correct issues reported in the User Stories.

Equipment: The testing will be done at Facebook facilities where they have their servers are located. Since this software is just an update on their system, there will be no additional servers needed.

Environment: Facebook has many different locations, listed above, that will be qualified to use the Moder 8 Solution.

Assumptions:

- The application will not catch certain posts or criteria.
- Software defects, errors, or failure to start the application.
- The testing schedule could be interrupted as laws change regarding social media liability.
- The AI platform might need extra time to learn what to catch on Facebook.
- The Moder 8 Solution might have issues integrating with the legacy software.

9.1.2 Testing Schedule

All testing activities will be divided during the PDR part of the life cycle:

GUI Testing – 10 days

Beta Testing – 20 days

Improvements – 10 days

Final Testing – 15 days

Bug fixes & Additional Requirements – 10 days

By our estimation, we believe that it will take approximately 55 days to complete the testing stage. This is bound to change if laws are updated or if a major issue is found. This time allotment should be enough to implement the Moder 8 Solution.

9.2.1 User Story Cases (Jasmine)

User Case #1

My name is Anna Michaels and I frequently use the Facebook app to keep with family and friends. Sometimes when I see disturbing content, I want to report it and get answers immediately, which is why I used the automatic option.

Automatic reporting:

1. Open Facebook App
2. While scrolling see disturbing content
3. Report the content using the automatic option
4. Decision is sent to reporting center of both the reporter and reported within 24 hours

User Case #2

My name is Brad Connor and while using Facebook I ran into a post where one of my friends had some spam like post. I knew that my friend would not have made these post but just selecting the spam option might not have gotten the harmful content taken down, so I used the manual option.

Manual Reporting:

1. Open Facebook App
2. See content from friend that looks like spam
3. Report content using manual method
4. Write in description box why the content is violating

5. Explanation is sent to content moderators to review
6. Decision is made and sent to the reporting center of both the reporter and reported within a few days.

User Case #3

My name is Margie Davis, and I am a content moderator, and the new interface allows me to better understand the reasoning behind why someone find something violating.

Moderator Review:

1. Receive violating content in the queue
2. The violating content as well as the decision and explanation are shown
3. Suggested decision is displayed
4. Content moderator decides best course of action based on policy
5. Moderator can add additional information to decision
6. Decision is sent to the reporting center for both the reported and reporter

User Case #4

My name is Alan Mclean, and the reporting center shows me what I have reported and what the decisions for those reports were.

Reporting Center:

1. Open FB App
2. Go to reporting center
3. View content that you reported
4. Can use the most recent or all option
5. Click the reported content to see decision and if manual any moderator notes

User Case #5

My name is Laura Wilcox I use the reporting center to see what I have posted that has been reported. It helps me to understand why items were reported, for what reason, and what my repercussions will be.

Reporting Center:

1. Open FB App
2. Go to reporting center
3. View violating content
4. Review the notes left by the automation system or moderator for why content was taken down
5. Accept decision
6. Repercussions given based on severity or amount of offenses

9.2.2 Software Test Report (Sean)

User Report Feature

If a Facebook user has a problem with a post, they can choose to click the 3 dots at the top right of the post's page. From there they can click the "report this button" which will then prompt a text box asking them the reason for the report. After that, the report will be sent to the Auto mod, which will then choose whether to flag it for manual review, or automatically file the post.

Administrator Login Feature

Logging on to the moderator website or clicking on the app will take the user to the login portal. Here, they will be prompted to enter in their username and password, then click the login button. If the user cannot remember their password, clicking the "forgot your password?" button beneath the login button will take them to the password reset page. If the user can remember their

password and click login, they will be taken to the Moderation home page, from there they can select either auto mod diagnostics, or manual moderation, and be taken to the corresponding page.

Administrator Password Reset Feature

The administrator will be asked to type in the email that is linked to their moderation account. From there the password reset program will send an email with a link to a page that will allow the user to change their account password. The password change page will also send a 2-factor authentication message to the linked accounts phone, to ensure that the person changing the password is the account owner.

Administrator Manual Moderating Feature

Once on this page, the administrator will be presented with a list of reports pending judgement. From there, they can simply click on any of the reports in this list and be taken to a view page of the reported post. After that the moderator can choose whether to ignore the post and mark as a false report, or to pass judgement, anywhere from removal of the post, to banning the account that made the post.

Administrator Auto mod Diagnostics Feature

Here, the administrator will be able to view the reports that are being automatically filed by the auto mod system. They can choose to manually moderate any of these reports, or simply let them go by as the system chooses. They can also update the preferences of the auto mod to allow or block new criteria, and view past report history that has already gone by.

9.3.1 Quality management plan (Nelly)

The quality management plan documents the essential information required to be successfully manage the project quality from development stage to the end product. The goals for quality management of Moderator 8 are to assure:

- Project management process are properly followed.
- Project outputs will meet stated requirements of stakeholders.

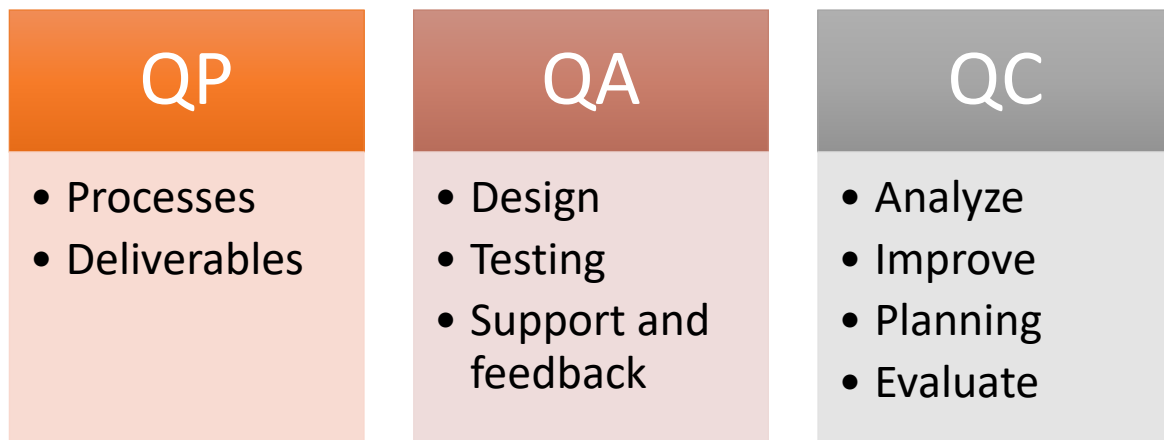
Quality management is performed throughout the project development with the implementation of quality planning, quality assurance, and quality control.

A. Quality planning: determine a plan for quality such as the processes and deliverables.

B. Quality assurance: determine if the project is fulfilling with the organizational policies and procedure.

C. Quality control: measures specific project result against project standards.

Quality Management Plan



Role	Name	Quality Responsibility
Senior Responsible	Alfred Marroquin	Organization strategy
Project Manager	Jared Searle	Develops project plans
Team leader	Jasmine Tompkins	Provides guidance and reports to manager
Team members	Nelly Sarmiento/Sean Volmuth	Delivers the outputs

Quality Assurance

Purpose	Focus	What	Who	When
Satisfactory process, quality standards, and prevent errors.	Project development	Prevent mistakes	Stakeholders and team	During the project development
Improve the current system, compatibility between human moderators and auto moderators	Focus to enhance automated system, implement requirements, and specifications	The developers will have completed all necessary testing and review all details	Lead developer and whole team will support each other to better results	Constant communication, testing and keep updated status

9.3.2 Quality Control (Jared)

The purpose of this chart is to validate the deliverables established by Moder8, the quality standards it sets, the means by which that quality is assured and the rate at which those quality control activities are conducted in order to maximize customer satisfaction and system efficiency.

Project Deliverables	Deliverable Quality Standard	Quality Control Activity	Frequency/ Interval	Responsible by?
Software Design of Moder8	Software design data validates CSCI requirements	Collect requirement validation	Testing and Review of the System	Marroquin Alfred, Project Director

System software is able to accurately and efficiently mark relevant posts	Instances of mismarked posts is minimized	Mismarked posts are sent to programming team for analysis	Regular and emergency updates / patches to algorithm	Software Engineer
System Software remains up-to-date and maintains efficiency	Ensure the satisfaction of the end user with the system	End user testing / feedback	Conduct weekly testing before pushing out new updates	Software Engineer

10.1 System Specification Review

10.1.1 Physical Space:

The physical space required for the Moder 8 Solution will be quite minimal. This is because we will just be working at facilities that are already established by Facebook and implementing the upgrade through their servers. Since they have their own servers, we will not need to worry about space required for that.

10.1.2 Operating system:

The solution will be accessible on any desktop that runs Windows or MAC as the OS. The Moder 8 Solution will not have availability on a phone app because it will need to have direct access to the servers and all the content that is shared on them from Facebook.

10.1.3 Software:

The software used for the Moder 8 solution will include Windows Server 2019 which will be for the application servers that the solution is upgraded onto. JavaScript, C++, and HTML are the code languages that will be used. These languages were selected because they are already in use by Facebook and would be much simpler to integrate on the legacy systems.

10.1.4 Operating, Maintenance, and Training Personnel:

Operation and maintenance will be completed by the contracted engineers and training will be given to the existing employees of Facebook who already moderate the software. There will also be permanent staff that will be on call in case any major or minor issues arise during the contract.

10.2 Make Vs. Buy Decision:

Due to the Moder 8 solution being very specific and requiring knowledge from integration of other Facebook components, it would only be appropriate to make the software in-house. Also, since this software will most likely need to upgrade as Facebook does, it is pivotal to keep continuity between our team and programmer's. There will not be any other components to make or buy as this software will integrate with the legacy system. To conclude, we are essentially making this software, and Facebook will buy it from us. Facebook is the entity who will make the "Buy" decision.

10.2.1 Re-Use of Old System Components:

Since the Moder 8 solution will just upgrade the existing software, we will re-use many, if not all, older components. For example, the system will be running on the same OS that are already in place at these Facebook facilities. Also, the same server's will be used to implement our system so those servers will remain in place. Since we are using the same coding languages

that Facebook already implements, we will not need to change a significant portion of the software that is already integrated with Facebook. This should be a very smooth transition with the older system components remaining in place. The main component being changed is just the software for the solution but as stated, it will use the same coding languages.

10.2.2 Sourcing Decision: In-House and Vendor Developers

As stated above, this implementation will take place in-house due to the specification of the system. Continuity is something that will be key in this process and creating the Moder 8 solution in house will facilitate this. Although we will be working at Facebook's locations to implement this software, the creation will be in-house. The contracted software developers could be considered as procurement, but they will also be working with employees of Facebook to make sure the solution best fits all stakeholder needs. Many of the contractors, if not all, will be retained for the entirety of the contract with Facebook to maintain this continuity.

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Team Meeting Notes

September 18 – We discussed ideas for a system to improve and went ahead with using Facebooks auto moderator system.

September 22 – We Discussed how we would split up the assignment and brainstormed ideas on Microsoft Teams on how we could better improve the Facebook auto moderator System.

October 13 – We distributed the PDR assignment for the team and discussed if we were going to create a new system or update an existing one. We went with updating an existing system but having a new name for it (Moder 8 Solution)

October 26 – We distributed the CDR. Assigning each member one part of the GUI based on stakeholder needs. One individual was given the financial breakdown.

November 11 – We discussed the TRR and assigned each member a part.

November 18 – We discussed the SSR and IRR and divided them equally among each team member to reach the desired due dates