CyberSentinel

Sprint 2 By Team Tech Titans

Agenda

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- Improvements Based on Professor Feedback
- Project Description
- Team Working Agreement

02 User & Product Definition

- Personas
- Minimum Viable Product (MVP)

03 Technology & Implementation

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- Algorithms

04 Project Documentation & Management

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- Product Backlog
- Sprint 2 Backlog

05 Tracking & Evaluation

- Metrics & Progress Tracking
- Sprint 2 Retrospective
- Sprint 3 Planning

06 Demonstrations & Resources

- Project Demo - Sprint 2
- GitHub Repository Link
- Live Application Demo

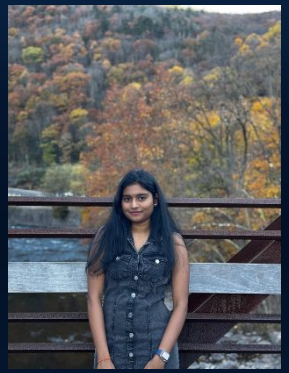
Team Members

Vaishnavi Dasari

Machine learning Engineer

Snehitha Bodiga

Full Stack Developer



Aasritha Bhimisetty

Frontend Developer

Team Members

Abisainath

Backend Developer

Shoib Khan Patan

Backend Developer

Dhanush Kolapalli

Machine Learning Engineer

Team Members

Neelkamal Rana

Full Stack Developer

Improvements

- Core details for MVP
- Removal of Feature Column in US.
- Adding API Slide
- Test Case ID

Project Description

Project Name:	CyberSentinel
Team:	Tech Titans
Project Description:	For individuals and enterprises who need protection against cyber threats, the CyberSentinel platform is a real-time AI-driven cybersecurity solution that detects and prevents phishing attacks, fraudulent transactions, and identity theft using advanced machine learning, behavioral analytics, and cloud-based threat intelligence. Unlike traditional security measures that struggle to detect sophisticated attack vectors, our application employs AI-powered risk assessment, real-time email scrutiny, transactional anomaly detection, and intelligent web link verification—continuously adapting to emerging threats to provide proactive and highly sophisticated cybersecurity defenses.
Benefit Outcomes:	• Real-time detection and prevention of cyber threats, including phishing and fraudulent transactions. • Adaptive learning capabilities to counter evolving attack techniques. • Seamless integration of automation and analytics for efficient and proactive cybersecurity. • User-friendly and intuitive design, making cybersecurity accessible for individuals and businesses.
Github Link:	https://github.com/htmw/2025S-Tech-Titans/wiki

Team Agreement

TEAM AGREEMENT

Communication:

- The team will use **Zoom and WhatsApp** as primary communication channels.
- **Google Docs** will serve as a platform for collaborative document editing, resource sharing, and note-taking during discussions.
- **Weekly Zoom meetings** will be scheduled to review progress, discuss roadblocks, and align on next steps. Additional meetings may be scheduled as needed.
- Team members should inform the group in advance if they are unable to attend a scheduled Zoom meeting.
- Regular updates on task progress are expected, and any challenges or delays should be promptly communicated to the team.
- Active participation is encouraged, with members providing constructive feedback and support when necessary.
- Discussions should be **focused**, with members listening attentively, speaking clearly, and staying on topic to prevent misunderstandings.
- All assigned work must be completed before the deadline. If any difficulties arise, members should reach out for assistance as early as possible to prevent disruptions to the project timeline.

Professionalism:

- Team interactions will be conducted with **mutual respect**, valuing diverse perspectives and contributions.
- Feedback should remain **constructive**, focusing on the project rather than personal attributes.
- If a team member disagrees with a decision, they may request a discussion in the next meeting for reconsideration.
- The team strives to maintain an **inclusive and supportive environment** where all members feel comfortable expressing their ideas.
- Any conflicts should be addressed **respectfully and transparently** within the team. If an agreement cannot be reached internally, the matter will be escalated to the professor for guidance.

Meeting Cadence:

- **Primary Meeting:** Weekly Zoom meeting to discuss progress, challenges, and next steps.
- **Check-ins:** Mid-week asynchronous updates via WhatsApp to ensure task alignment.
- **Ad-hoc Meetings:** Additional meetings scheduled as needed for urgent discussions or blockers.

Team Members:

- **Dasari Vaishnavi**
- **Snehitha Bodiga**
- **Arepalli Abisainath Reddy**
- **Shoaib Khan Patan**
- **Aasritha Bhimisetty**
- **Kolapalli Dhanush**
- **Rana Neelkamal**

Persona

Name: Alex Johnson
Age: 32
Occupation: Software Developer

Alex works at a mid-sized tech company and is well-versed in various technologies. Spends considerable time online, both professionally and personally. Aware of cybersecurity threats but seeks advanced tools to enhance personal security.

Goals:

- Protect personal and professional data from phishing and other cyber threats.
- Stay informed about the latest cybersecurity practices.
- Utilize AI-driven solutions for proactive threat detection.

Challenges:

- Balancing convenience with robust security measures.
- Identifying trustworthy cybersecurity tools amidst numerous options.

Persona

Name: Maria Thompson
Age: 40
Occupation: Project Manager

Manages a team remotely for a marketing firm. Juggles professional responsibilities with parenting two teenagers. Uses multiple devices for work and personal tasks.

Goals:

- Ensure the security of sensitive work-related information.

- Protect family members, especially children, from online threats.

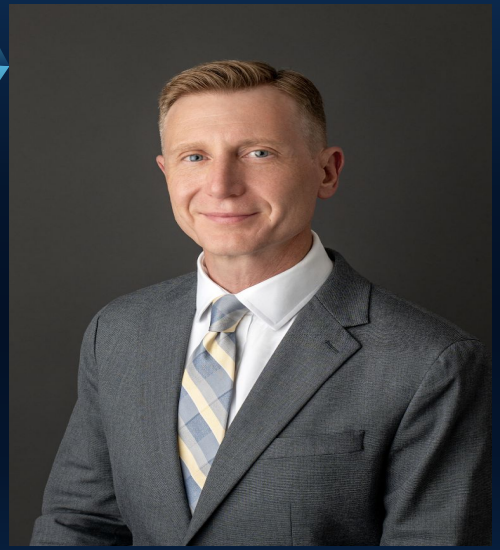
- Maintain a secure digital environment across all devices.

Challenges:

- Limited time to manage and monitor cybersecurity measures.

- Keeping up with evolving cyber threats and ensuring family compliance with best practices.

Persona



Name: David Kim
Age: 45
Occupation: Owner of a local retail store

Runs an online storefront in addition to the physical store. Handles customer data, including payment information. Has basic knowledge of cybersecurity but lacks specialized expertise.

Goals:

- Protect customer data to maintain trust and comply with regulations.

- Prevent financial losses due to cyber attacks.

- Implement cost-effective security solutions without extensive technical knowledge.

Challenges:

- Limited budget for cybersecurity investments.

- Difficulty in assessing which security measures are necessary and effective.

Minimum Viable Product (MVP)

- **Phishing Email Detection**
  Uses NLP models trained on cybersecurity datasets to classify emails as safe or phishing. Helps prevent social engineering attacks by identifying malicious content in real-time.

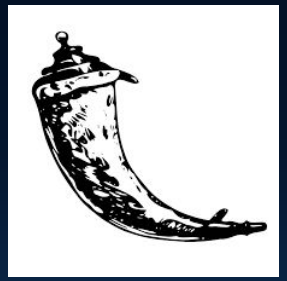
- **Fraudulent Transaction Detection**
  Applies anomaly detection techniques to flag suspicious financial transactions. This component supports real-time monitoring for enterprise-level financial systems.

- **URL Classification**
  Analyzes lexical features of URLs to determine if a web link is malicious or safe. Provides an added layer of protection against phishing websites and drive-by downloads.

- **User Dashboard**
  A centralized interface that displays alerts, threat levels, and risk analysis in real-time. It allows users to monitor cybersecurity threats and take quick preventive action.

Technologies - Development Stack

- **Frontend:** React.js (for simple and interactive UI)
- **Backend:** Flask (lightweight Python-based API)
- **Database:** PostgreSQL (to store detected threat data)
- **Hosting:** AWS (for cloud deployment and scalability)



Technologies – AI & Cybersecurity Tools

- **Machine Learning:** Scikit-learn, PyTorch (for phishing and fraud detection)
- **Security:** OAuth 2.0 (for authentication), OpenCV (for URL analysis)
- **Threat Detection Models:** NLP-based phishing email classification, anomaly detection for fraudulent transactions, and URL classification algorithms

Algorithms

Phishing Email Detection:

Algorithm: BERT (Bidirectional Encoder Representations from Transformers)

- Utilizes a **pre-trained deep learning model** for **text classification**.
- **Captures contextual meaning** of words, improving phishing email detection.
- **Fine-tuned** on phishing email datasets for high accuracy.

Fraudulent Transaction Detection:

Algorithm: Autoencoder with Isolation Forest

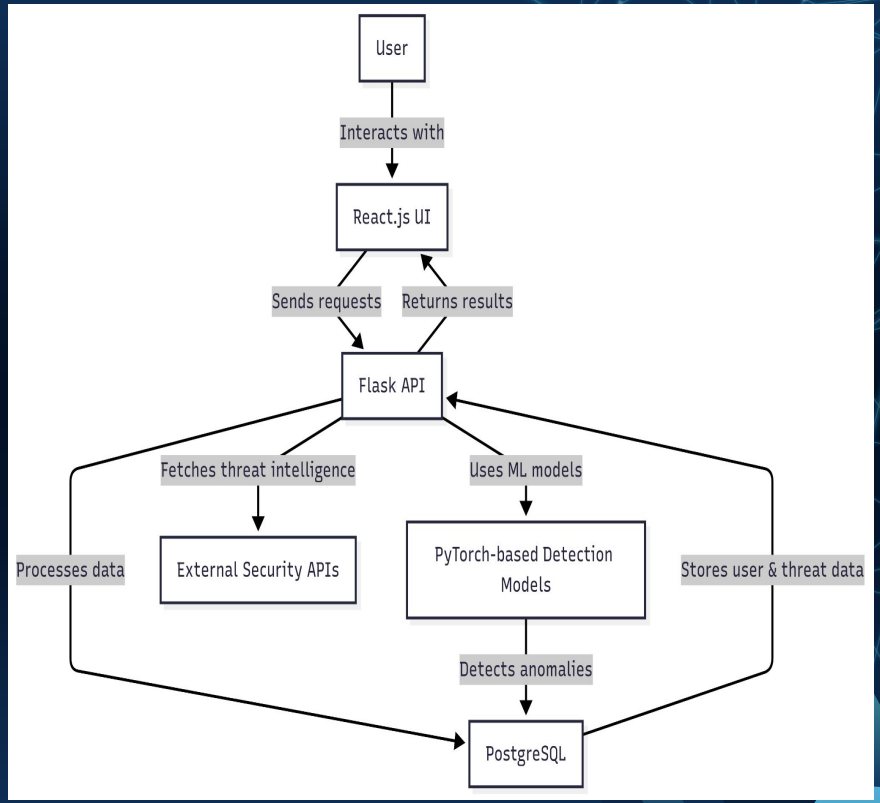
- **Autoencoder** reduces dimensionality and extracts essential transaction features.
- **Isolation Forest** detects anomalies based on learned representations.
- Efficient for **unsupervised learning**, detecting fraud without requiring labeled data.

URL Classification:

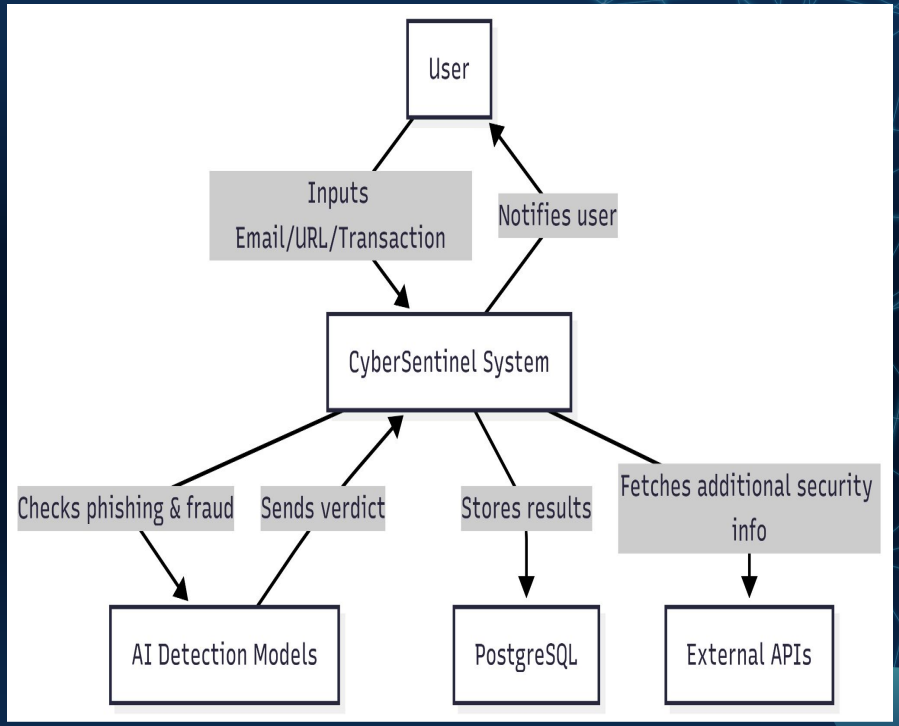
Algorithm: CNN + LSTM (Convolutional Neural Network + Long Short-Term Memory)

- **CNN extracts spatial features** from URL structure.
- **LSTM captures sequential patterns**, improving detection of phishing URLs.
- **Hybrid deep learning model** for better performance over traditional classifiers.

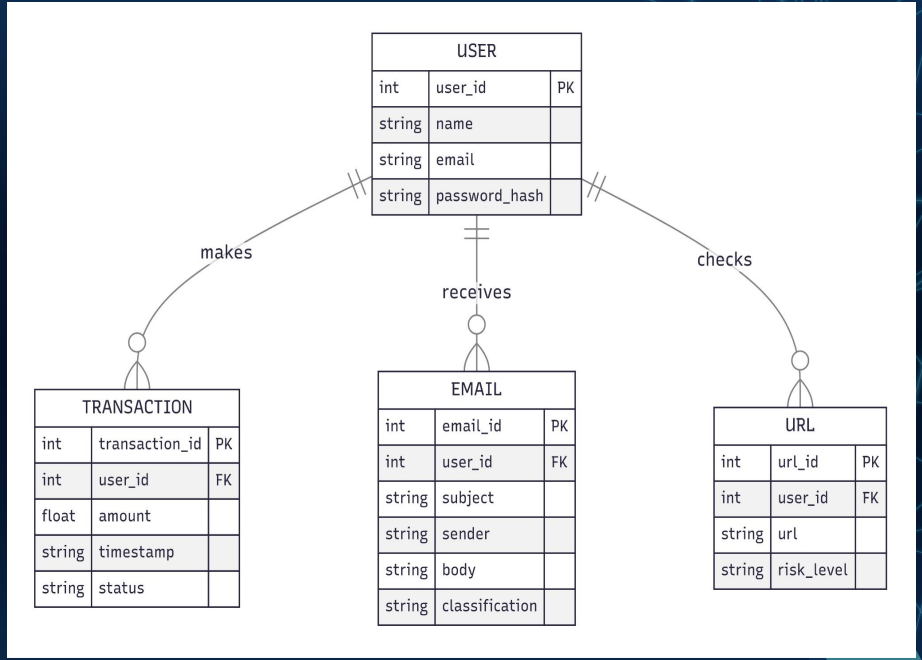
Architecture Diagram



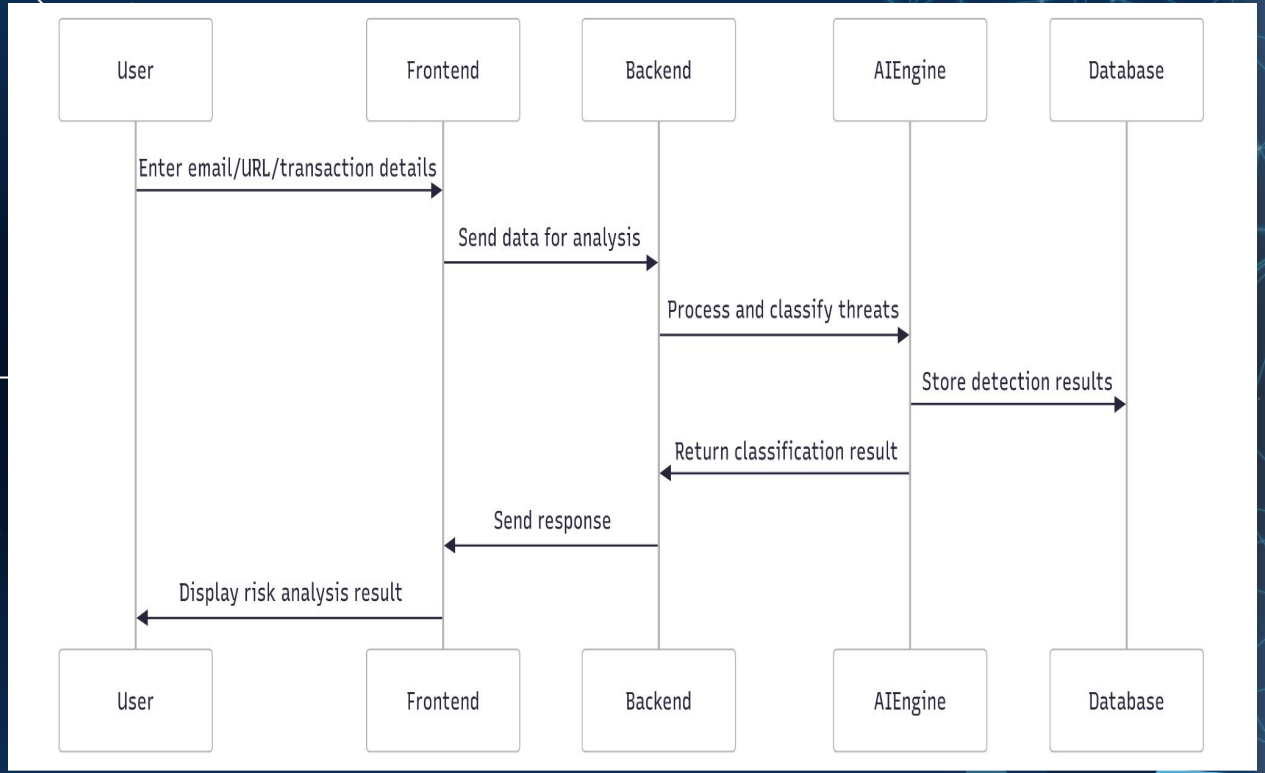
Context Diagram



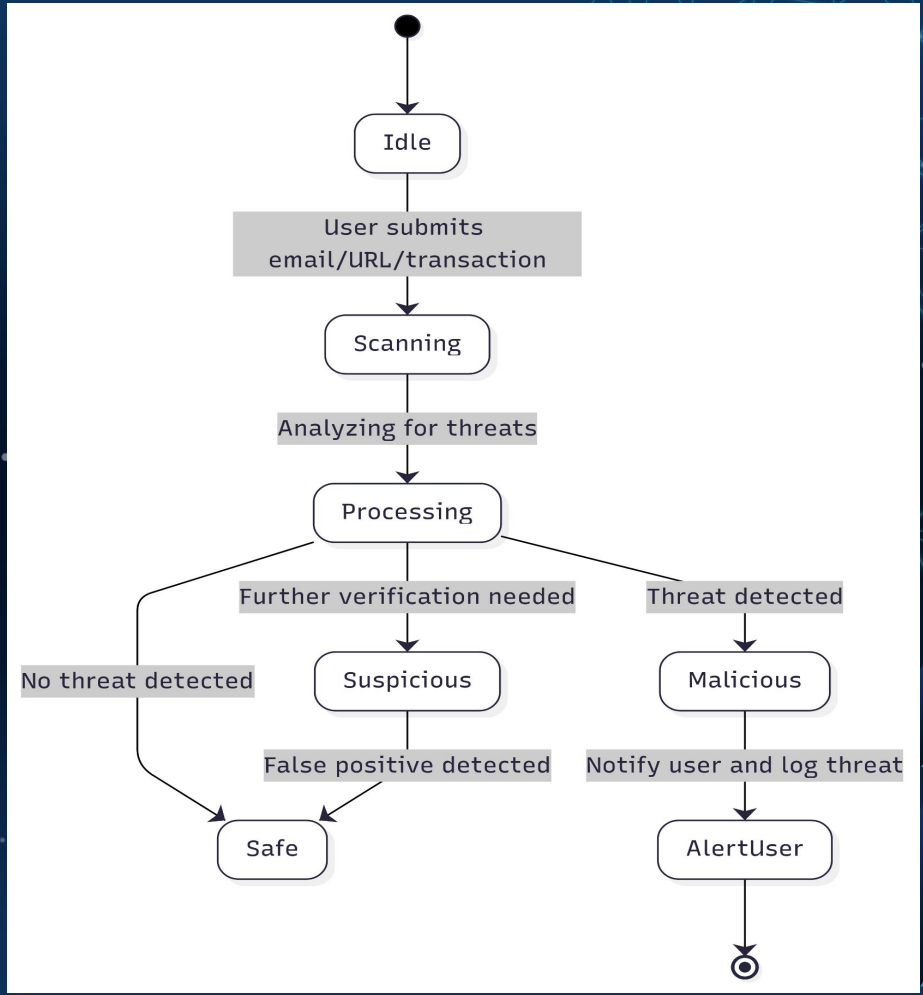
ER Diagram


USER
int user_id PK
string name
string email
string password_hash
makes
receives
checks
TRANSACTION
int transaction_id PK
int user_id FK
float amount
string timestamp
string status
EMAIL
int email_id PK
int user_id FK
string subject
string sender
string body
string classification
URL
int url_id PK
int user_id FK
string url
string risk_level

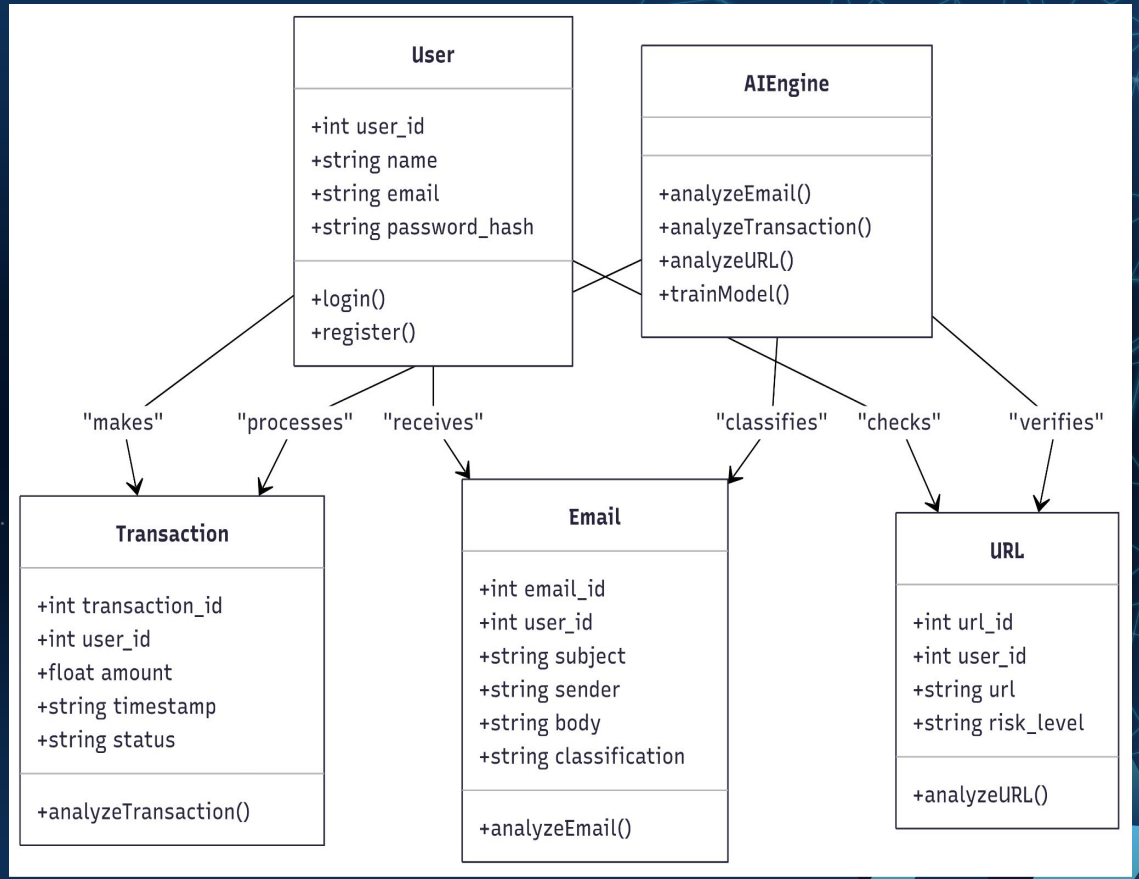
Sequence Diagram



State Diagram



Class Diagram



Product Backlog – User Stories

ID	User Story	Acceptance Criteria	Sprint	Story Points
US_01	As someone monitoring threats, I want a dashboard to view phishing email history so that I can track past threats.	Dashboard displays list of phishing emails with filtering options.	Sprint 1	5
US_02	As an email recipient, I want to filter emails based on risk level so that I can quickly identify dangerous emails.	System allows filtering by safe, suspicious, and phishing categories.	Sprint 1	3
US_03	As a security admin, I want to view statistics on detected threats so that I can analyze system performance.	Dashboard provides statistics on phishing, fraud, and malicious URLs.	Sprint 1	8
US_04	As a platform administrator, I want to manage user roles and permissions so that I can control access levels.	System supports different access levels for users and admins.	Sprint 1	8
US_05	As an individual reviewing suspicious emails, I want to upload an email for phishing detection so that I can know if it's safe.	System classifies email as safe, suspicious, or phishing with an alert.	Sprint 2	8

Product Backlog – User Stories

ID	User Story	Acceptance Criteria	Sprint	Story Points
US_06	As a finance manager, I want to upload transaction data so that I can detect fraudulent activities.	System flags transaction as normal or suspicious with a confidence score.	Sprint 2	13
US_07	As someone browsing the web, I want to check if a URL is malicious so that I can avoid phishing sites.	System checks URL structure and domain reputation, classifying it as safe, suspicious, or malicious.	Sprint 2	5
US_08	As a cautious email reader, I want to verify if a sender email is trustworthy so that I can decide whether to engage with the sender.	System checks sender reputation and displays a trust score.	Sprint 2	8
US_09	As a system user, I want to receive real-time alerts for detected threats so that I can take immediate action.	User receives notifications via email or app for detected threats.	Sprint 3	8
US_10	As a user of the detection system, I want an option to report a false positive classification so that I can help improve detection accuracy.	Users can flag an incorrect detection for review.	Sprint 3	3

Product Backlog – Technical Stories

ID	Technical Story	Acceptance Criteria	Sprint	Story Points
TS_01	Create a dashboard for threat statistics so that admins can monitor system performance.	Dashboard displays data on detected threats.	Sprint 1	8
TS_02	Design a user role management system so that access levels can be controlled efficiently.	Admins can assign permissions to different user roles.	Sprint 1	8
TS_03	Implement OAuth authentication for secure user access so that users can log in securely.	User authentication is secure, and access tokens work correctly.	Sprint 1	5
TS_04	Set up AWS for cloud deployment so that the system can be scalable and accessible.	Backend deployed and accessible via API.	Sprint 1	5
TS_05	Integrate BERT model for phishing email detection so that emails can be classified accurately.	Model achieves at least 90% accuracy on test data.	Sprint 2	8

Product Backlog – Technical Stories

ID	Technical Story	Acceptance Criteria	Sprint	Story Points
TS_06	Implement Autoencoder + Isolation Forest for fraud detection so that anomalies in transactions can be detected.	Model correctly classifies anomalies in dataset.	Sprint 2	13
TS_07	Deploy CNN + LSTM model for URL detection so that phishing websites can be identified.	Model classifies URLs with at least 85% accuracy.	Sprint 2	8
TS_08	Implement email sender verification model so that sender reputation can be assessed.	System provides a sender trust score based on reputation.	Sprint 2	5
TS_09	Develop a notification system for real-time alerts so that users are informed of potential threats.	Users receive accurate notifications for detected threats.	Sprint 3	8
TS_10	Develop a feedback mechanism for false positive reports so that the system can improve over time.	Users can flag and submit incorrect classifications for review.	Sprint 3	3

Sprint 2 Backlog

ID	User Story / Task	Acceptance Criteria	Story Points
US_04	As an admin, I want to manage user roles and permissions so that I can control access levels.	System supports different access levels for users and admins.	8
TS_03	Implement OAuth authentication for secure user access so that users can log in securely.	User authentication is secure, and access tokens work correctly.	5
US_05	As an individual reviewing suspicious emails, I want to upload an email for phishing detection so that I can know if it's safe.	System classifies email as safe, suspicious, or phishing with an alert.	8
US_06	As a finance manager, I want to upload transaction data so that I can detect fraudulent activities.	System flags transaction as normal or suspicious with a confidence score.	13
US_07	As someone browsing the web, I want to check if a URL is malicious so that I can avoid phishing sites.	System checks URL structure and domain reputation, classifying it as safe, suspicious, or malicious.	5

Sprint 2 Backlog

ID	User Story / Task	Acceptance Criteria	Story Points
US_08	As a cautious email reader, I want to verify if a sender email is trustworthy so that I can decide whether to engage with the sender.	System checks sender reputation and displays a trust score.	8
TS_05	Integrate BERT model for phishing email detection so that emails can be classified accurately.	Model achieves at least 90% accuracy on test data.	8
TS_06	Implement Autoencoder + Isolation Forest for fraud detection so that anomalies in transactions can be detected.	Model correctly classifies anomalies in dataset.	13
TS_07	Deploy CNN + LSTM model for URL detection so that phishing websites can be identified.	Model classifies URLs with at least 85% accuracy.	8

Test Cases Sprint 2

Test Case ID	Story ID	Test Case	Expected Outcome	Actual Outcome	Pass/Fail
TC_01	US_04	Verify that admin can assign different roles to users (admin/user).	System successfully saves and applies roles, restricting access based on role type.	Roles not applied correctly; access not restricted.	Fail
TC_02	US_04	Attempt restricted action as a non-admin user.	Access is denied and appropriate error message is shown.	Action allowed for non-admin user.	Fail
TC_03	TS_03	Test OAuth login flow with valid credentials.	User logs in successfully and receives a valid access token.	Login unsuccessful; token not generated.	Fail
TC_04	TS_03	Test OAuth login with invalid credentials.	Login fails and user is prompted with an error message.	No proper error message shown; system crashes.	Fail
TC_05	US_05	Upload a phishing email sample for detection.	System classifies email as "phishing" and shows alert.	Email classified as phishing and alert displayed.	Pass

Test Cases Sprint 2

Test Case ID	Story ID	Test Case	Expected Outcome	Actual Outcome	Pass/Fail
TC_06	US_05	Upload a safe email sample.	System classifies email as "safe" without alerts.	Email correctly classified as safe.	Pass
TC_07	TS_05	Evaluate BERT model accuracy using test dataset.	Model reaches at least 90% classification accuracy.	Achieved 91.3% accuracy on test data.	Pass
TC_08	US_06	Upload a transaction with known fraud pattern.	System flags it as suspicious with high confidence score.	Flagged as suspicious with 92% confidence.	Pass
TC_09	US_06	Upload normal transaction data.	System classifies it as normal with a confidence score.	Classified as normal with 96% confidence.	Pass
TC_10	TS_06	Evaluate fraud detection model on test set.	Anomalies are correctly flagged in the dataset.	Anomalies detected with high accuracy.	Pass

Test Cases Sprint 2

Test Case ID	Story ID	Test Case	Expected Outcome	Actual Outcome	Pass/Fail
TC_11	US_07	Enter a known malicious URL.	System classifies it as "malicious".	URL detected as malicious.	Pass
TC_12	US_07	Enter a safe URL.	System classifies it as "safe".	URL classified as safe.	Pass
TC_13	TS_07	Run URL model on benchmark dataset.	Model classifies with minimum 85% accuracy.	Model achieved 87.5% accuracy.	Pass
TC_14	US_08	Submit sender email for reputation check.	System shows a trust score and message.	Sender trust score displayed correctly.	Pass

Sprint 2 Stories Completed

ID	User Story / Task	Story Points
US_05	As a user, I want to upload an email for phishing detection so that I can know if it's safe.	8
US_06	As a user, I want to upload transaction data so that I can detect fraudulent activities.	13
US_07	As a user, I want to check if a URL is malicious so that I can avoid phishing sites.	5
US_08	As a user, I want to verify if a sender email is trustworthy so that I can decide whether to engage with the sender.	8
TS_05	Integrate BERT model for phishing email detection so that emails can be classified accurately.	8
TS_06	Implement Autoencoder + Isolation Forest for fraud detection so that anomalies in transactions can be detected.	13
TS_07	Deploy CNN + LSTM model for URL detection so that phishing websites can be identified.	8

Sprint 2 Stories Not Completed

ID	User Story / Task	Story Points
US_04	As an admin, I want to manage user roles and permissions so that I can control access levels.	8
TS_03	Implement OAuth authentication for secure user access so that users can log in securely.	5

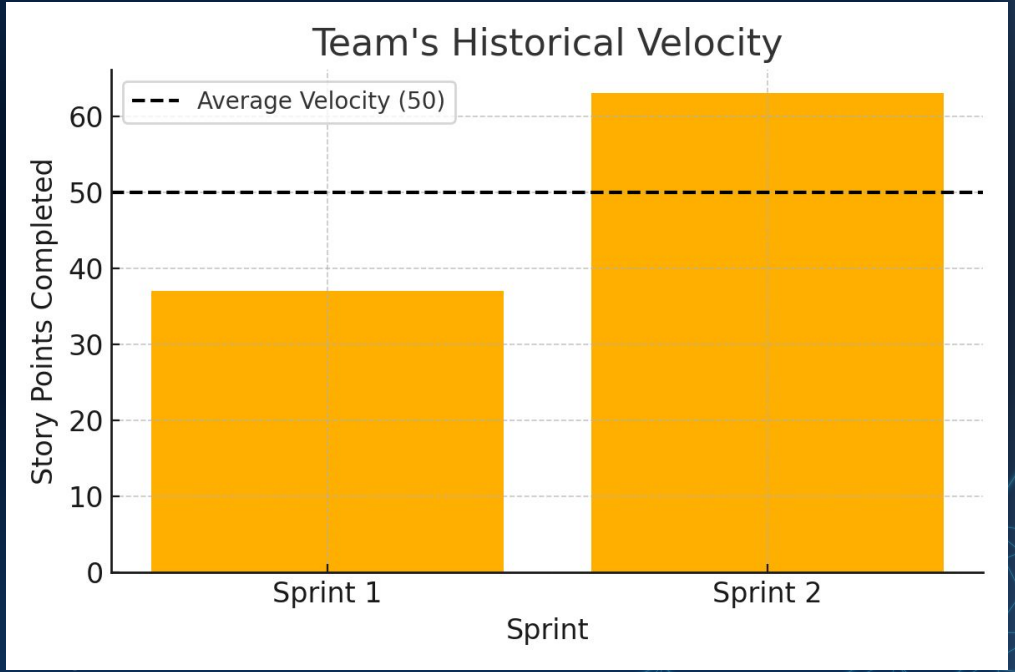
Total Not Completed Story Points: 13

Team Velocity

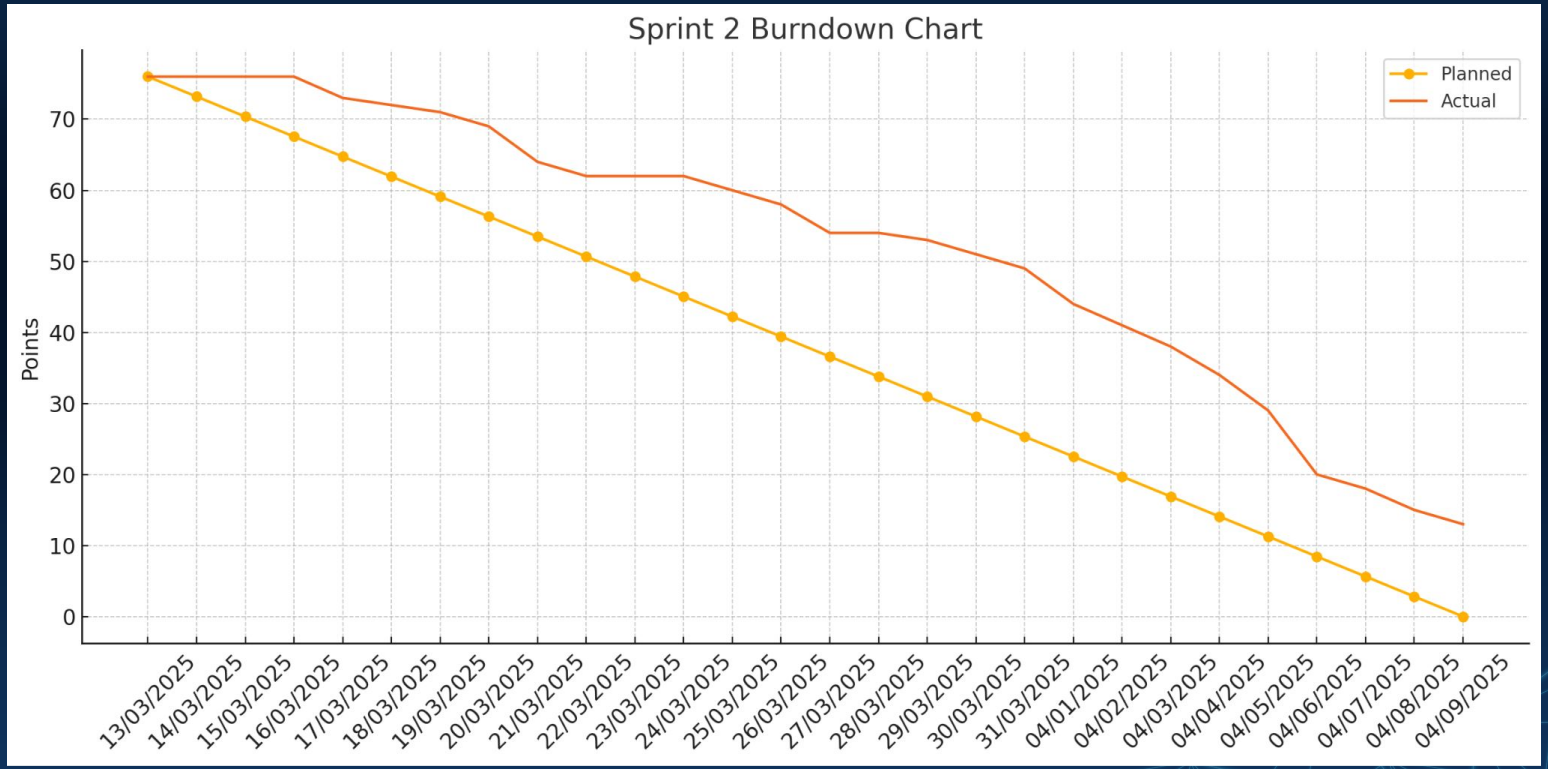
Total Story Points Completed: 63

Team's Historical Velocity

- **Sprint 1 Velocity:** 37 story points
- **Sprint 2 Velocity:** 63 story points
- **Average Velocity:**
  (37 + 63) / 2 = **50 story points**



Burn Down Chart



Completed/Committed Ratio

Sprint 1

Sprint 2

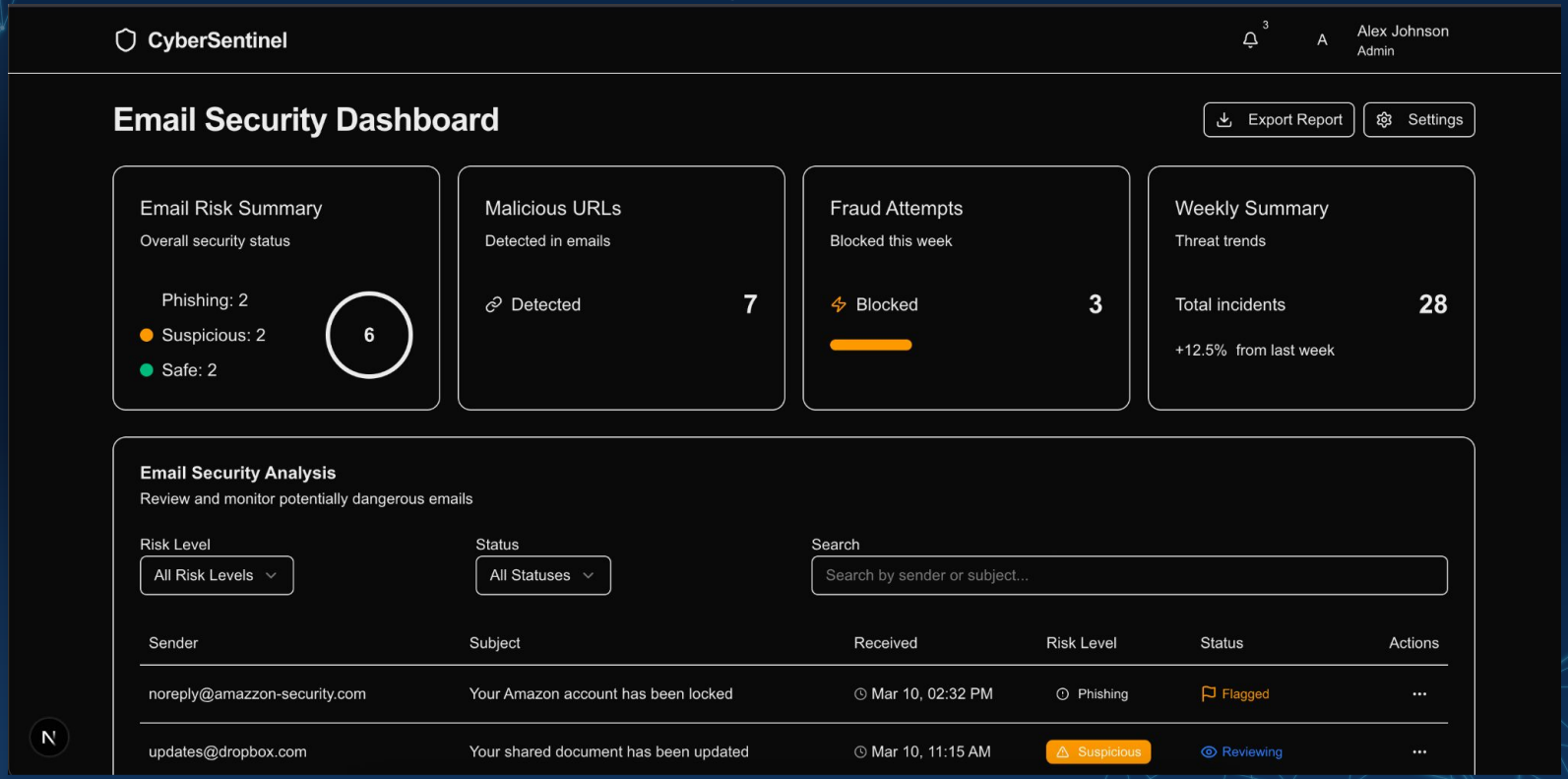
Average Ratio

Retrospective

Sprint 3 Planning

ID	User Story	Acceptance Criteria	Story Points
US_09	As a system user, I want to receive real-time alerts for detected threats so that I can take immediate action.	User receives notifications via email or app for detected threats.	8
US_10	As a user of the detection system, I want an option to report a false positive classification so that I can help improve detection accuracy.	Users can flag an incorrect detection for review.	3
TS_09	Develop a notification system for real-time alerts so that users are informed of potential threats.	Users receive accurate notifications for detected threats.	8
TS_10	Develop a feedback mechanism for false positive reports so that the system can improve over time.	Users can flag and submit incorrect classifications for review.	3
US_04 (Carry forward)	As a platform administrator, I want to manage user roles and permissions so that I can control access levels.	System supports different access levels for users and admins.	8
TS_03 (Carry forward)	Implement OAuth authentication for secure user access so that users can log in securely.	User authentication is secure, and access tokens work correctly.	5

Application Screenshots



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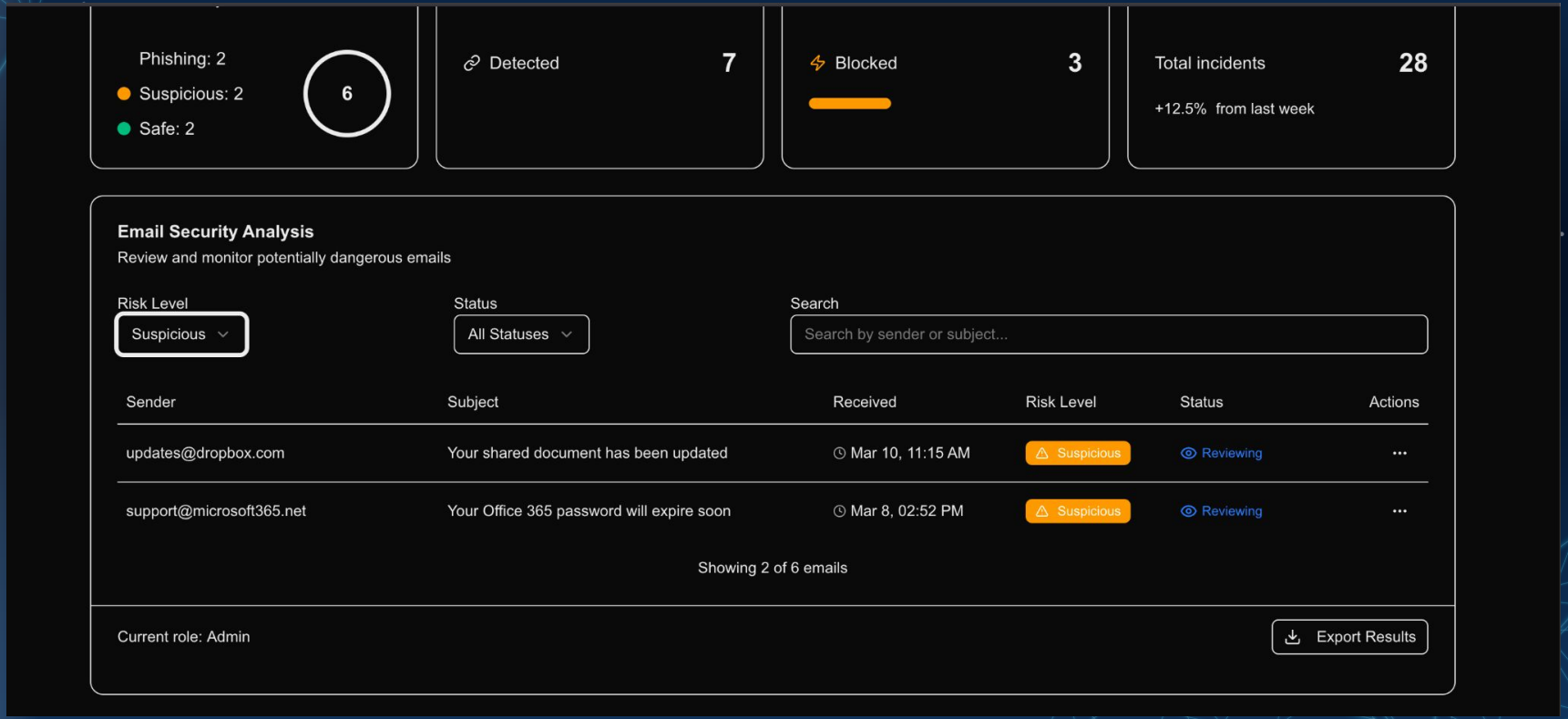

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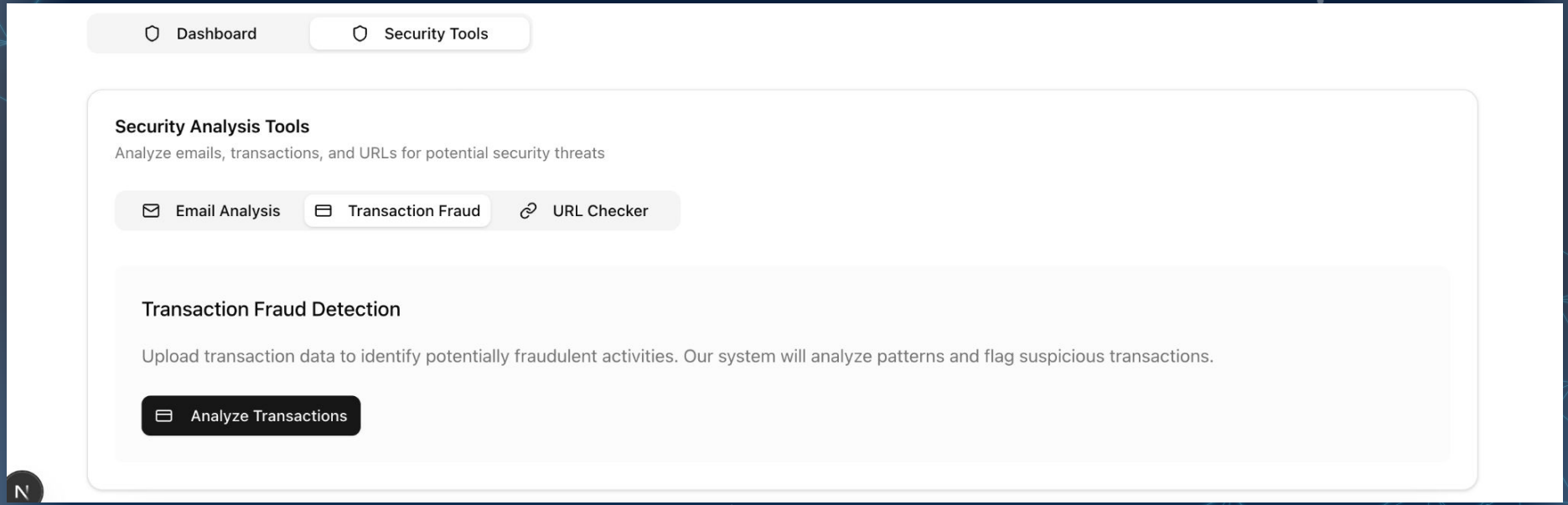

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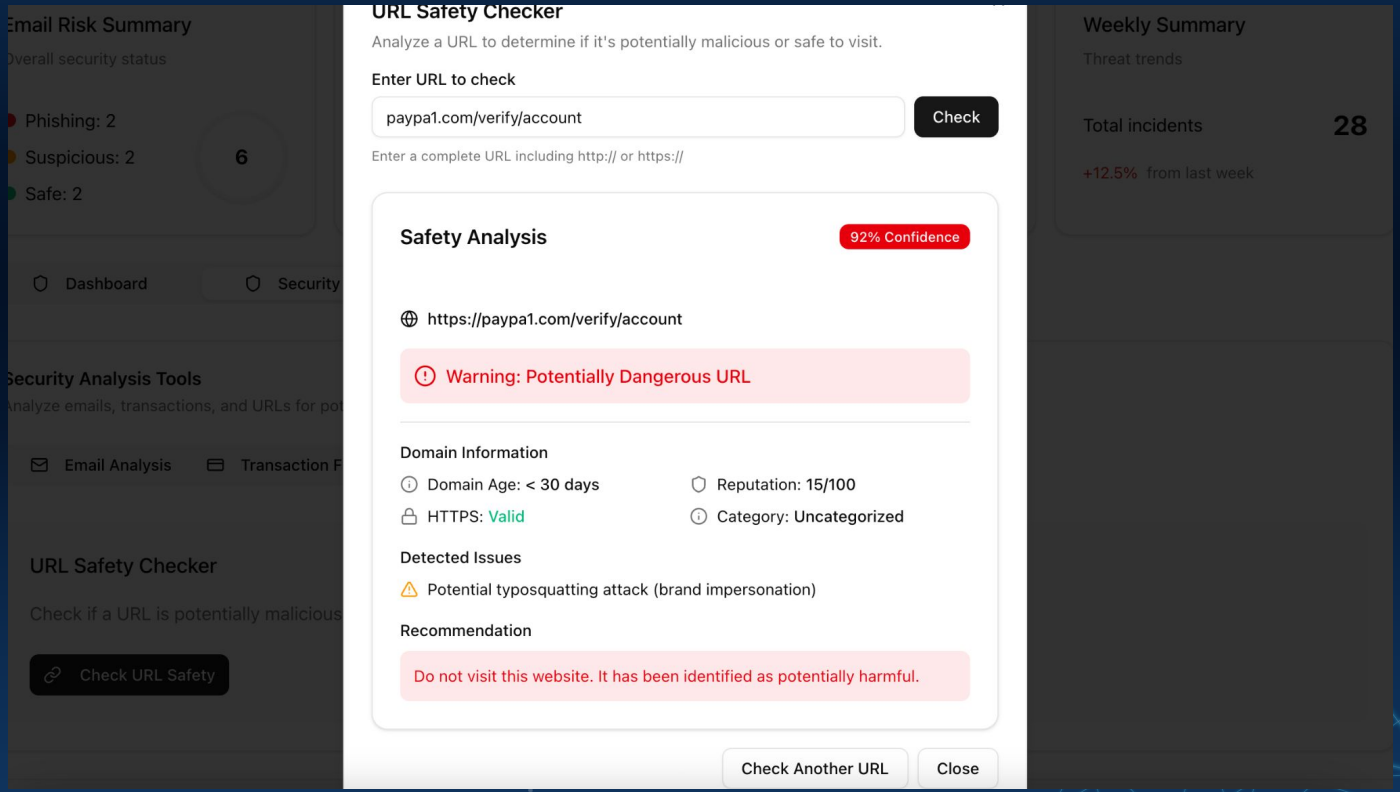
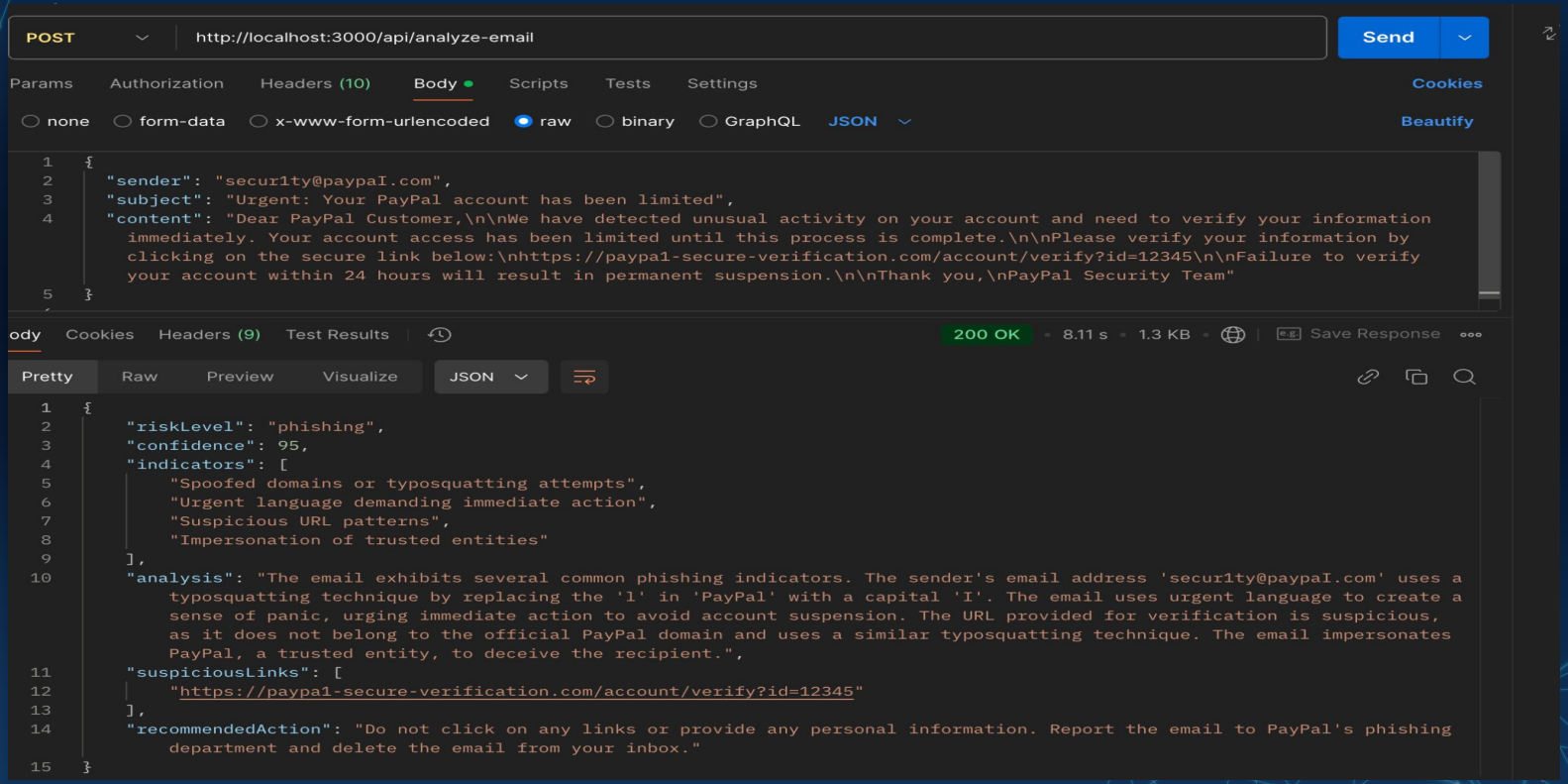


API Screenshots



Github Wikipage Link

https://github.com/htmw/2025S-Tech-Titans/wiki

Application Demo

Thank You