American International University-Bangladesh (AIUB)

Department of Computer Science

Faculty of Science & Technology (FST)

Cyberbullying detection, reporting and solution system.

A Software Engineering Project Submitted By

Semester: Summer 24-25		**Section: L**	**Group Number: 03**	
SN	Student Name	Student ID	Contribution (CO3+CO4)	**Individual Marks**
1	GHOSH, TUTUL	23-50879-1		
2	SHAIBAL SARKAR DIP	23-50867-1		
3	GAZI MUSHFIQ MUHTASIM	23-50642-1		
4	ABDUL AL-ABRAR SHAHRIYAR	23-50648-1		

Model selection

Model selection

As a software company, to develop our project, we can choose the SCRUM development method.

Scrum is an Agile framework that supports continuous stakeholder feedback, time-boxed sprints, and iterative development. Scrum breaks down work into small, manageable units called sprints (typically 2□4 weeks), rather than completing the project in a strict, linear order. This enables teams to prioritize features dynamically and react swiftly to changes. Collaboration and accountability are ensured by the cross-functional nature of Scrum teams, which include positions such as Product Owner, Scrum Master, and Development Team.

Applicability to Our system:

Dynamic and Evolving Requirements: This project involves AI and NLP-based cyberbullying detection, mental health support integration, dashboards for multiple user roles, and security compliance. Requirements may evolve based on testing AI accuracy, user behaviour, or regulatory needs, making Scrum's flexibility ideal.

Rapid Prototyping and Feedback: Mental health professionals, students, and administrators are all key stakeholders. Scrum's sprint reviews allow frequent demonstrations, ensuring early validation of AI models, chatbot performance, and UX features.

Innovation-Heavy Development: Features like sentiment analysis, AI detection, and gamified awareness hubs require experimentation, which Scrum supports through research spikes and backlog reprioritization.

Cross-Functional Teamwork: The solution involves AI/ML engineers, backend developers, UX designers, security experts, and mental health consultants. Scrum's collaborative structure ensures effective communication and transparency.

Focus on Incremental Value: High-priority features like user reporting, dashboards, and chat-based mental health support can be released early as an MVP, gaining user trust while refining advanced AI modules in later sprints.

Comparison with other development models:

- **Waterfall Model:** Waterfall model is highly structured and works best for fixed, well-understood requirements. Our project has evolving AI/NLP needs, multi-role dashboards, and compliance adjustments. Waterfall's lack of flexibility, change of requirements, and late testing would delay issue detection and limit adaptability.
- **V-Model:** As V-Model is an extension of waterfall model, it shares the waterfall's rigidity. Although it emphasizes testing at each phase, our project is an AI-driven platform, where requirements will evolve with user data and AI performance. V-Model would create bottlenecks and excessive rework.

- **Prototype Model:** Prototyping offers early feedback but lacks Scrum's structured backlog management and iterative planning. It can cause scope creep without providing the sprint-based delivery cadence that our complex system requires.
- **RAD (Rapid Application Development):** RAD focuses on speed and low code tools, which is unsuitable for our AI-heavy, research-driven systems requiring robust security and testing. It works for simpler UI-centric projects but not for mission-critical AI features.
- **XP (Extreme Programming):** XP is great for code-heavy systems, but it needs constant on-site customer involvement, pair programming, and a narrow scope. Our system involves multiple roles, compliance, and research spikes, making XP too rigid for non-code aspects like AI research and UX.
- **DSDM (Dynamic Systems Development Method):** DSDM emphasizes fixed-time, fixed-budget delivery with significant stakeholder involvement, which is impractical for our research-driven, multi-stakeholder project. Our primary focus on NLP requires extensive research time. Additionally, our project addresses sensitive aspects like mood tracking for cyberbullying victims—needs that cannot be adequately met within DSDM's rigid timeboxed framework.
- **FDD (Feature-Driven Development):** FDD works best for large enterprise teams with predictable feature sets. Since our project requires innovation, experimentation, and continuous refinement, Scrum's flexibility offers a more suitable approach.

Advantages of Scrum for This Project

- **Adaptability:** Requirements evolve organically through feedback from students, schools, mental health professionals, and AI performance data.
- **Early Value Delivery:** A minimum viable product can be deployed quickly, providing core reporting functions, dashboards, and educational content while AI modules undergo refinement.
- **Stakeholder Engagement:** Regular sprint reviews foster active participation from administrators, educators, and counsellors throughout the development process.
- **Team Autonomy:** Cross-functional teams work both independently and collaboratively—an ideal arrangement for a sophisticated AI project.
- **Risk Management:** Regular iterations mitigate risk by enabling early testing and enhancement of AI detection accuracy and security protocols.

Disadvantages of Scrum

- **Requires Discipline:** Scrum requires consistent adherence to regular ceremonies like daily scrum meetings, sprint meetings, and more, which can be challenging for teams without prior Agile experience.

- **Less Documentation:** The emphasis on working software over comprehensive documentation may necessitate additional effort to meet compliance requirements.

Project Roles and Responsibilities

- **Product Owner**
  - Defines the overall vision and goals of our system.
  - Ensures alignment with stakeholders needs, including students, parents, educators, and mental health professionals.
  - Collaborates with the development team to set sprint goals and clarify deliverables for each iteration.
- **Scrum Master**
  - Facilitates Scrum practices and ensures adherence to Scrum principles throughout development.
  - Removes obstacles or blockers faced by the development team, such as delays in AI dataset availability or regulatory approvals.
  - Organizes sprint planning, daily standups, reviews, and retrospectives to maintain smooth workflow and communication.
- **Development Team**
  - Responsible for coding, testing, and integrating system modules, including AI/NLP-based cyberbullying detection, role-based dashboards, and secure reporting systems.
  - Builds user interfaces for mobile and web applications with a focus on accessibility and security.
  - Implements backend services, databases, encryption methods, and analytics features.
  - Conducts continuous integration and iterative testing to ensure quality and performance.
- **Customer/Stakeholders**
  - Includes students, teachers, parents, counsellors, and administrators who provide feedback on system usability, accuracy of AI detection, and effectiveness of mental health support tools.
  - Participates in user acceptance testing (UAT) to validate system performance.
- **Management**
  - Oversees overall project progress, allocates resources, and makes strategic decisions regarding scope and priorities.

- Supports stakeholder engagement and ensures the sustainability of the system post-deployment.

- **Quality Assurance (QA) Team**
  - Designs and executes unit testing, integration testing, security testing, and UAT.
  - Validates features such as report submission, AI detection accuracy, chat-based mental health support, and awareness content delivery.
  - Ensures the system meets functional, security, and performance requirements.
- **User Experience (UX) Designer**
  - Designs intuitive, accessible, and age-appropriate interfaces for both web and mobile apps.
  - Focuses on creating a seamless user journey for sensitive actions like reporting bullying and accessing emotional support.
  - Conducts usability testing to improve the design, engagement, and trustworthiness of the platform.
- **Support and Maintenance Team**
  - Provides ongoing user support, troubleshooting, and technical assistance via integrated live chat and helpdesk.
  - Monitors AI models, retrains NLP algorithms to adapt to evolving language patterns, and updates features based on user feedback.
  - Handles bug fixes, system downtime management, and regular security patching to ensure a reliable platform.