Group Member Names & SAP IDs		Project title
SAP ID	**Student Name**	**HawkEye**
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48525	**Uzair Hassan**	**Supervisor Signatures**
		Mrs. Uzma Kiran

This form in intended to finalize the project features for each of groups.

FYP FEATURE DETAILS

Application Type	Feature/Sub-feature listing	Requirements

Web/ Mobile	1. **User Portals (CRUD Operations)**
	  - **Admin Dashboard:** Manage students, teachers, and violations.
	  - **Discipline Incharge Dashboard:** Review and confirm detected or reported violations.
	  - **Student App:** View profile, fines, and report violations.
	2. **Role & Rights Management**
	  - Different access levels for Admin, Incharge, and Students.
	3. **Multi-Criteria Search**
	  - Search by student, violation type, date, or department.
	4. **Notifications & Reports**
	  - Real-time alerts, daily summaries, and violation statistics.
		- Web (MERN) and Mobile (Flutter) applications.
		- CRUD for all users and violations.
		- Role-based authentication using Firebase/JWT.
		- MongoDB for records, Firebase for storage & notifications.

AI/ Research based	1. **Facial Recognition**
	  - Identifies students using trained face models.
	2. **Weapon Detection**
	  - Detects firearms or knives using YOLO/TensorFlow.
	3. **Fight Detection**
	  - Recognizes aggressive actions via video frame analysis.
	4. **Auto Violation Logging & Fines**
	  - System records violator details and assigns fines automatically.
		- Uses **TensorFlow, OpenCV, YOLOv8** for detection.
		- Integrated with Node/Express backend.
		- Research based on Computer Vision & Deep Learning.
		- Enhances campus safety through real-time AI monitoring.

Sr. No	Module	User	Feature	Sub-feature	Requirement	Description
1	Authentication	Students, Admin, Teacher	Login	Forgot Password	The system shall validate credentials and allow users to reset their password via email verification.	Enables secure login for students, admins, and teachers.
		Students, Admin, Teacher	Sign Up	Email Verification	The system shall send verification email during registration.	Prevents duplicate or fake accounts.
2	Student Management	Admin	Student Registration	Image Capture	The system shall capture multiple facial images of each student.	Used to train facial recognition model.
		Admin		Model Training	The system shall automatically train and store the student's face model.	Updates AI model upon registration.
		Admin		Profile Management	The system shall store student details (ID, name, department).	Maintains student record linked with AI data.
3	Violation Detection	Admin, System, Discipline-Incharge	Automated Scanning	Dress Code Violation	The system shall detect students not following uniform policy.	Detects improper dress via computer vision.
		Admin, Security, System		Weapon Detection	The system shall identify weapons using object detection models.	Triggers instant alert to admin.
		Admin, Security, System		Fight Detection	The system shall detect physical fights or aggression.	Recognizes aggressive behavior using pose/action recognition.
		System, Admin, System		Identity Recognition	The system shall identify individuals from live camera feed.	Matches detected faces with registered database.
		System, Admin, System		Violation Logging	The system shall log violation type, student ID, timestamp, and image evidence.	Stores all violation data in MongoDB.

4	Violation Reporting	Students	Manual Reporting	Submit Report	The system shall allow students to capture and submit violation evidence.	Students report misconduct via mobile app.
		Students		Cool-down Timer	The system shall enforce 5–10 min cool-down between reports.	Prevents spam and misuse.
		System		Validation	The system shall verify report authenticity via AI and metadata.	Filters false reports before admin review.
		System, Admin		Reward Assignment	The system shall assign reward points for valid reports.	Encourages responsible reporting.
5	Fine and Reward System	System, Admin	Auto Fine	Fine Generation	The system shall automatically assign fines for verified violations.	Penalty based on violation severity.
		Admin		Fine Management	The system shall allow admin to review and modify fines.	Admins can approve or adjust fines.
		Admin, Students	Reward System	Reward Points	The system shall credit reward points to valid reporters.	Rewards students for helpful reports.
6	Dashboards	Admin	Admin Dashboard	Manage Violations	The system shall display all real-time and historical violations.	Admin monitors and filters incidents.
		Admin		User Management	The system shall allow CRUD operations on all users.	Admins can add/edit/remove users.
		Discipline Incharge	Discipline Incharge Dashboard	Review Violations	The system shall allow teachers to verify AI-detected violations.	Incharge can approve or reject flagged cases.
		Discipline Incharge		Reports	The system shall generate summary reports of violations.	Auto-generated weekly/monthly reports.
		Students	Student Dashboard	Personal Record	The system shall display student's own violation history.	Students can view personal fines.
		Students		Reporting Tool	The system shall allow manual report submission.	Students can upload violation evidence.

7	Notifications & Alerts	Admin, Discipline-Incharge	Real-Time Alerts	Violation Alerts	The system shall send push notifications for critical events.	Immediate alerts for fights or weapon detection.
		Admin, Teacher		Summary Alerts	The system shall send daily/weekly summary notifications.	Provides overview of recent violations.
8	Analytics & Reports	Admin	Violation Analytics	Statistics	The system shall show graphical stats of violations by category.	Helps identify patterns and repeat offenders.
		Admin		Export Reports	The system shall allow export of reports in PDF/Excel.	Useful for meetings and documentation.
9	Security & Privacy	System	Data Protection	Encryption	The system shall encrypt all facial and personal data.	Ensures data privacy and security.
		All Users		Role-Based Access	The system shall restrict access based on role.	Different permissions for admin, incharge, and students.
		System, Admin		Audit Logs	The system shall maintain logs of all user actions.	Ensures accountability and traceability.
10	Future Enhancements	Admin	Predictive Analysis	Behavior Prediction	The system shall analyze patterns to predict potential violators.	AI-based preventive analysis.
		Admin	ERP Integration	Parent Alerts	The system shall send alerts to parents for serious violations.	Informs parents about student behavior.
		Admin, Security	Voice Alerts	Real-Time Audio Alerts	The system shall trigger voice announcements in emergencies.	Used for on-campus real-time alerts.

Admin Functionalities

Sr. No	Module / Feature	Functionality Description
1	Authentication	Login, Sign up, reset password via email verification
2	Student Management	Register students, capture facial images, train AI face model
3	Violation Management	View, edit, or delete logged violations
4	Violation Detection	Monitor AI-detected violations (dress code, weapons, fights)
5	Fine & Reward System	Review and modify fines, approve or reject violations
6	Dashboards	Access full admin dashboard with all student & violation data
7	Notifications & Alerts	Receive real-time alerts for critical violations
8	Analytics & Reports	View violation statistics, export data (PDF/Excel)
9	User Management	Add/Edit/Delete Students and Teachers
10	Security & Privacy	Manage role-based access and view audit logs
11	Future Enhancements	Predictive behavior analysis, parent alerts, voice notifications

Discipline Incharge / Teacher Functionalities

Sr. No	Module / Feature	Functionality Description
1	Authentication	Login and reset password
2	Violation Review	Review AI-detected or student-reported violations
3	Approve / Reject Violations	Validate flagged incidents before final action
4	Reports	Generate and view weekly/monthly violation reports
5	Notifications	Receive alerts for new or critical violations
6	Analytics	View summarized statistics of student behavior
7	Security & Access	Limited access based on role permissions
8	Future Enhancements	Voice alerts and parent notifications (in collaboration with admin)

Student Functionalities

Sr. No	Module / Feature	Functionality Description
1	Authentication	Login, sign up, and reset password via email verification
2	Profile Management	View personal information and violation history
3	Manual Violation Reporting	Capture and report violations with evidence
4	Cool-down Timer	Restricted time interval between reports to prevent spam
5	Reward Points	Earn reward points for valid reports
6	Fine Management	View fines assigned for verified violations
7	Student Dashboard	Access personal data, fines, and rewards
8	Notifications	Receive notifications regarding fines, reports, and updates
9	Security	Access only personal records via role-based authentication

System / AI Functionalities

Sr. No	Module / Feature	Functionality Description
1	Facial Recognition	Identify students using trained face models
2	Weapon Detection	Detect firearms or knives using YOLO/TensorFlow
3	Fight Detection	Recognize aggressive physical activity
4	Auto Violation Logging	Record violation details automatically (type, ID, time, image)
5	Fine Generation	Assign fines automatically based on violation type
6	Report Validation	Verify authenticity of student-reported incidents
7	Notifications	Trigger real-time alerts for admins and incharges
8	Model Training	Update and retrain face recognition models when new data is added
9	Data Encryption	Securely store facial and personal data
10	Predictive Analysis	Analyze behavior to predict potential future violations