



Dr. Vishwanath Karad

MIT WORLD PEACE UNIVERSITY | PUNE

TECHNOLOGY, RESEARCH, SOCIAL INNOVATION & PARTNERSHIPS



Smart Campus Safety & Tracking System

Powered by
BLE Beacon & WiFi Gateway



PRESENTED TO
MIT World Peace University,
Kothrud, Pune



PRESENTED BY
Alerto SOS Team

— Tagline:
**“Making MIT Campus
Safer, Smarter & Connected”**



ENHANCED SAFETY



REAL-TIME TRACKING



SMART ATTENDANCE



DATA DRIVEN INSIGHTS



CONNECTED CAMPUS

CURRENT CHALLENGES AT EDUCATIONAL CAMPUSES

Managing students, assets and safety effectively is becoming increasingly challenging with traditional methods.

EXISTING CHALLENGES

-  Student attendance is manual
-  Visitor tracking is difficult
-  Asset movement is not monitored
-  Emergency response time is high
-  Indoor location tracking is unavailable
-  No real-time visibility of students and staff



IMPACT

-  Time Loss
-  Security Risks
-  Administrative Burden
-  Delayed Emergency Response



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Increasing
Operational Cost



Security
Vulnerabilities



Inefficient
Management



Risk to Student
Safety

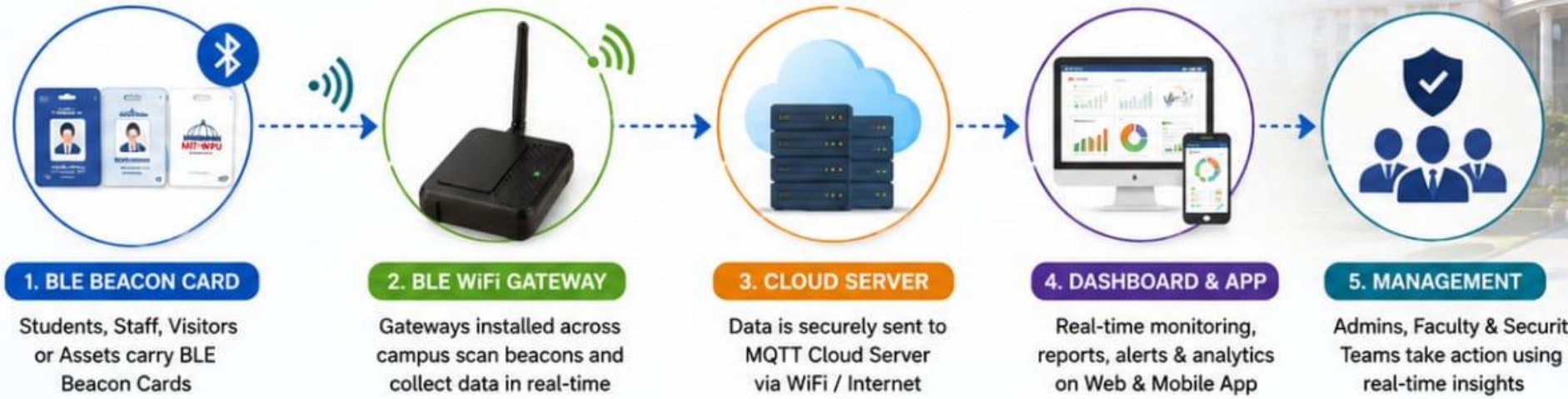


Lack of Data
for Decision Making



SMART BLE TRACKING ECOSYSTEM

A Complete Real-time Tracking & Safety Solution for MIT Kothrud Campus



- WHAT IT ENABLES**
- ✓ Real-time Tracking
 - ✓ Smart Attendance
 - ✓ Emergency Alerts
 - ✓ Indoor Positioning
 - ✓ Asset Tracking
 - ✓ Data-driven Decisions
 - ✓ Enhanced Campus Safety



- ACCURATE**
High accuracy real-time monitoring
- REAL-TIME**
Instant data capture & alerting
- SECURE**
AES Encryption & Secure Cloud Communication
- SCALABLE**
Easy to scale across entire campus
- RELIABLE**
Stable hardware with long battery life
- COST EFFECTIVE**
Low maintenance & high ROI

BLE BEACON SMART ID CARD

Small Card. Big Impact.



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KEY FEATURES

- BLE 5.0 Technology
Stable & Long Range
- Up to 1 Year
Battery Life (CR2032)
- Up to 50 Meter
Broadcast Range
- Compact & Lightweight
Card Design
- AES Encryption
Secure Data Transmission
- Unique ID
for Every Individual / Asset

BLE 5.0
Low Energy
Technology

1 Year
Battery Life

50 Meter
Range



Secure
AES Encrypted
Broadcast

Lightweight
Easy to Carry
Everyday

Unique ID
for People &
Assets

USE CASES AT MIT KOTHRUD



STUDENT ID CARD



STAFF ID CARD



VISITOR PASS



ASSET TAGGING



LAB EQUIPMENT



VEHICLE TRACKING

TECHNICAL HIGHLIGHTS

Bluetooth
BLE 5.0

Range
Up to 50 m

Battery
CR2032

Battery Life
Up to 1 Year

Size
38 x 38 x 7 mm

Weight
10.4 g

Operating Temp.
-20°C to +60°C

ACCURATE
Real-time tracking
with high accuracy

RELIABLE
Stable performance
in all environments

LONG LASTING
Up to 1 year battery
life

EASY TO DEPLOY
Quick setup &
integration

COST EFFECTIVE
Low maintenance
& high ROI

BLE WiFi GATEWAY

The Smart Bridge Between Beacons & Cloud



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GATEWAY FUNCTIONS



Detect Nearby Beacons
Continuously scans BLE signals from ID cards, tags & sensors



Connect to WiFi Network
Uses 2.4GHz WiFi for stable internet connectivity



Send Real-Time Data
Forwards scanned data to MQTT cloud server



Remote Firmware Update
Supports OTA updates for easy maintenance



Secure & Reliable
AES encryption ensures secure data transmission



BLE 4.2
Compatible with all BLE devices



WiFi 2.4GHz
Stable & reliable connectivity



MQTT Protocol
Efficient & lightweight communication



Long Range
Up to 65 meters coverage



OTA Update
Remote firmware upgrade support



Secure
AES hardware encryption



INSTALLATION LOCATIONS



CLASSROOMS



LIBRARY



HOSTELS



LABORATORIES



PARKING AREAS



ADMIN BUILDINGS



Bluetooth
BLE 4.2



WiFi
2.4 GHz



Power Supply
5V DC (USB)



Peak Current
150 mA



Antenna
2.4GHz, 50Ω



Range
0 - 65 meters



Weight
26 g



REAL-TIME MONITORING

Instantly captures and forwards data from multiple BLE devices.



HIGH PERFORMANCE

High sensitivity (-91 dBm) for accurate and reliable data collection.



FLEXIBLE NETWORKING

Works with both Internet and Local Network environments.



EASY DEPLOYMENT

Plug & play installation with simple configuration via mobile app.



FUTURE READY

Scalable solution that grows with your campus needs.



BUILT FOR SAFETY

Enhances campus security and operational efficiency 24x7.

CONNECTED. PROTECTED. EMPOWERED.



BLE BEACON • GATEWAY • ALERTO SOS APP



BLE BEACONS

Real-time location & proximity detection



GATEWAY

Collects data from beacons & sends to cloud platform



ALERTO SOS APP

Instant alerts, live location & quick response

- Instant SOS Alert
- Live Location Sharing
- Safety Assurance
- Real-time Notifications



SMART TRACKING FOR OFFICE / MANAGEMENT STAFF

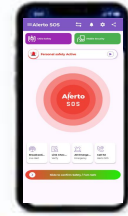
Real-time tracking of staff movement across office areas.
Seamless. Secure. Smarter Management.



BLE BEACON
Detects Presence



GATEWAY
Collects & Transmits Data



ALERTO SOS APP
Alerts & Safety



HOW IT WORKS

- Staff carries ID Card / BLE Tag
- BLE Beacons placed in key office areas detect movement
- Gateway collects data & sends to system
- Real-time tracking & reports
- Instant alerts via AlerTo SOS App



KEY BENEFITS

- Track real-time location within office
- Monitor movement across departments & zones
- Ensure staff safety & emergency response
- Attendance & movement reports
- Better productivity & resource management

MOVEMENT CAPTURED. CONTINUOUSLY.



EVERY MOVE TRACKED. EVERY MOMENT CONNECTED. BETTER MANAGEMENT.

STUDENT ATTENDANCE AUTOMATION



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Smart Attendance. No Manual Work. 100% Accurate.

HOW IT WORKS



1. Student Enters Classroom
Student carries BLE Beacon ID Card



2. Gateway Detects Beacon
Nearby Gateway detects the Beacon signal



3. Attendance Marked
Data is sent to Cloud Server automatically



4. Dashboard Updated
Teacher Dashboard shows real-time attendance



BENEFITS



No Proxy Attendance
Accurate identification of every student



Time Saving
No manual calling or entry



Real-Time Attendance
Instant updates on dashboard



100% Accurate
Eliminate human errors



Detailed Reports
Daily, weekly & monthly attendance reports



Easy Integration
Works with existing systems



Better Discipline
Encourages regular and on-time classes



Improved Efficiency
Reduces workload for faculty & staff



Data-Driven Insights
Understand patterns & improve performance



Paperless System
Go green & support sustainable campus



Enhanced Campus Experience
Smarter technology for a better tomorrow

SMART TRACKING SYSTEM FOR SECURITY GUARDS

Real-time Tracking • Duty Management • Gate Coverage • Enhanced Security



KEY FEATURES

- Real-time Tracking**
Track guard in real-time at assigned gate/area
- Duty & Shift Management**
Assign guards to Gate 1 / Gate 2 & manage shifts
- Automatic Area Detection**
System detects which gate guard is present at
- SOS Alerts**
Instant alerts via AlerTo SOS App
- I-Card Integration**
Guard identified with I-Card & BLE Tag
- Reports & Analytics**
Attendance, duty logs & movement reports



GUARD DUTY MANAGEMENT & REAL-TIME TRACKING



HOW IT WORKS

- Guard reports at gate with I-Card & BLE Tag
- BLE Beacon at gate detects guard presence
- Gateway collects data & sends to cloud
- System updates real-time guard location & duty status
- Management gets live visibility & alerts if gate is unstaffed

DUTY ASSIGNMENT SCHEDULE

Guard Name	Shift	Assigned Gate	Time
Ramesh Patel	Morning	Gate 1	06:00 AM – 02:00 PM
Suresh Yadav	Morning	Gate 2	06:00 AM – 02:00 PM
Mahesh Singh	Evening	Gate 1	02:00 PM – 10:00 PM
Amit Kumar	Evening	Gate 2	02:00 PM – 10:00 PM
Vikram Desai	Night	Gate 1	10:00 PM – 06:00 AM
Dinesh More	Night	Gate 2	10:00 PM – 06:00 AM

REAL-TIME DASHBOARD

Live Guard Status

GATE 1

Guard On Duty

Ramesh Patel
Since 08:02 AM

Status: Present

GATE 2

Guard On Duty

Suresh Yadav
Since 08:01 AM

Status: Present

LIVE LOCATION VIEW

ALERTS & NOTIFICATIONS

- Gate Unstaffed Alert
- Guard Not Reported Alert
- SOS Emergency Alert
- Low Battery Alert (BLE Tag)
- Duty Change Notifications

- Ensure 24/7 Gate Coverage
- Prevent Unauthorized Access
- Improve Accountability
- Quick Response to Incidents
- Data-Driven Security Decisions

RIGHT GUARD. RIGHT GATE. RIGHT TIME.
Smarter Tracking. Stronger Security.

EMERGENCY SOS & STUDENT SAFETY

Instant Alert. Accurate Location. Faster Response.



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EMERGENCY FLOW

- 1 Student Presses SOS**
Student presses SOS button on Beacon ID Card / SOS Device
- 2 Gateway Receives Alert**
Nearest BLE Gateway receives the SOS signal instantly
- 3 Alert Sent to Cloud**
Gateway forwards alert with location data to Cloud Server
- 4 Location Identified**
System identifies exact location using multiple Gateways
- 5 Security Team Notified**
Instant alert sent to Security Team & Admin Dashboard
- 6 Emergency Response**
Security Team reaches the student quickly

REAL-TIME LOCATION TRACKING & ALERT SYSTEM



KEY BENEFITS

- Faster Response**
Reduce response time in emergencies
- Accurate Location**
Pinpoint location for quick assistance
- Enhanced Safety**
Ensure student safety 24x7 on campus
- Instant Alerts**
Real-time notifications to security & admin
- Peace of Mind**
Parents & management stay worry-free

USE CASES

- Medical Emergencies
- Accidents & Injuries
- Harassment or Threats
- Fire or Evacuation
- Any Critical Situations

INSTANT ALERT
SOS alert reaches security within seconds

REAL-TIME TRACKING
Live location updates on dashboard & mobile app

MULTI-GATEWAY ACCURACY
Multiple gateways ensure high accuracy location detection

CLOUD INTEGRATION
Reliable data transmission to cloud server

SECURE & RELIABLE
AES encryption ensures secure data communication

ASSET TRACKING SOLUTION

Track Every Asset. Anytime. Anywhere.

Using BLE Beacon Tags & WiFi Gateways for Real-time Asset Visibility



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ASSETS WE CAN TRACK

- COMPUTERS & LAPTOPS**
Track IT assets in real-time
- PROJECTORS**
Monitor location & usage
- LABORATORY EQUIPMENT**
Secure valuable lab assets
- LIBRARY ASSETS**
Track books, laptops, equipment
- CAMPUS VEHICLES**
Monitor vehicles & movement
- FURNITURE & FIXTURES**
Track classrooms & office assets
- ANY OTHER VALUABLE ASSET**
Custom tracking for all assets

HOW IT WORKS



DASHBOARD FEATURES

- Live Location Tracking
- Asset Status
- Movement History
- Low Battery Alerts
- Geofence Alerts
- Reports & Analytics
- Search & Filter
- Export Data

REAL-TIME TRACKING INFORMATION

	Asset ID	PRJ-1023	
	Type	Projector	
	Assigned To	Mechanical Dept.	
	Status	Online	
	Location	R&D Lab - 2nd Floor	
	Last Seen	10 May 2024, 10:30 AM	
	Battery	78%	

KEY BENEFITS

- REDUCE LOSS & THEFT**
Monitor valuable assets and prevent misplacement
- IMPROVE UTILIZATION**
Optimize asset usage across departments
- SAVE TIME & COST**
Quick search & easy asset management
- INSTANT ALERTS**
Get notified for movement, battery & geofence alerts
- BETTER DECISIONS**
Data-driven insights for better planning
- ENHANCED SECURITY**
Secure & reliable tracking of all valuable assets

INDOOR POSITIONING SYSTEM

Real-Time Location. Accurate Tracking. Smarter Campus.



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HOW IT WORKS

- 1 Multiple Gateways**
Minimum 3 Gateways installed in the area
- 2 Beacon Signal Detection**
Gateways detect BLE beacon signals
- 3 Distance Calculation**
Signal strength (RSSI) is used to estimate distance
- 4 Triangulation**
System calculates exact position using triangulation
- 5 Live Position Display**
Real-time location shown on dashboard & mobile app

ARCHITECTURE



USE CASES

- Student Tracking**
Track student movement across campus
- Emergency Rescue**
Locate students quickly during emergencies
- Visitor Guidance**
Help visitors navigate inside buildings
- Asset Tracking**
Track assets in real-time within indoor areas
- Footfall Analytics**
Analyze footfall & optimize resource utilization

KEY FEATURES



High Accuracy
1–3 Meter Accuracy



Real-Time Tracking
Live location updates with minimal delay



Scalable Solution
Supports large areas & multiple floors



Low Power
Optimized for long battery life



Secure & Reliable
AES encryption for data security



Easy Integration
Seamless integration with existing systems

REPORTING & ANALYTICS SYSTEM



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Real Data. Smart Insights. Better Decisions.

DATA SOURCES



STUDENT DATA

Attendance, academics, exams, activities & more



IOT DEVICES

Beacons, gateways, sensors & indoor positioning data



SAFETY & SECURITY

SOS alerts, access control, incidents & visitor logs



ADMIN SYSTEMS

HR, finance, library, transport & facility management

FROM DATA TO DECISIONS



REPORTS & VISUALIZATIONS



ATTENDANCE REPORT

Daily, weekly & monthly attendance summaries



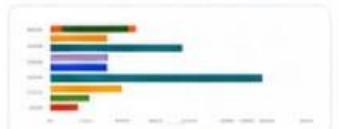
SAFETY REPORT

Incident analysis, SOS alerts & response time



ASSET UTILIZATION

Asset usage, movement & maintenance reports



KEY INSIGHTS



Identify trends & improve performance



Predict issues & prevent incidents



Optimize resources & reduce costs



Enhance student experience & campus safety



Data-driven decisions for future growth

KEY BENEFITS



REAL-TIME VISIBILITY

Live dashboards for instant monitoring



DATA-DRIVEN DECISIONS

Accurate insights for better planning



IMPROVED EFFICIENCY

Automate reporting & save valuable time



COST OPTIMIZATION

Optimize resources & reduce wastage



ENHANCED SAFETY

Proactive monitoring & quick response



CONTINUOUS IMPROVEMENT

Measure, analyze & improve continuously

COST BENEFIT & ROI MAXIMIZING VALUE FOR MIT

Smart Investment. Measurable Impact. Sustainable Future.



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KEY BENEFITS TO MIT

- ATTENDANCE AUTOMATION**
Save significant time & manpower by automating attendance tracking and reporting.
- REDUCED ASSET LOSSES**
Real-time asset tracking reduces loss, improves utilization and asset lifecycle management.
- FASTER EMERGENCY RESPONSE**
Instant SOS alerts and real-time location help in quick action and save crucial time.
- IMPROVED CAMPUS SECURITY**
24/7 monitoring, access control and geo-fencing enhance overall campus safety.
- BETTER STUDENT SATISFACTION**
Smart services and safety features improve student experience and satisfaction.
- SMART CAMPUS ACCREDITATION SUPPORT**
Supports NAAC, NBA and other accreditation requirements with data and smart systems.

EXPECTED ROI & IMPACT



- ### LONG TERM VALUE
- Future-ready infrastructure
 - Scalable & sustainable solution
 - Continuous innovation & upgrades
 - Stronger brand & reputation

INVEST TODAY FOR A SMARTER, SAFER & EFFICIENT TOMORROW

- Smarter Campus Better Decisions
- Safer Environment Stronger Security
- Lower Costs Higher Savings
- Better Performance Greater Impact
- Empowered Community Inspired Future

* ROI period may vary based on deployment scale and customized requirements.



Thank You



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