SNS COLLEGE OF TECHNOLOGY

Coimbatore-35
An Autonomous Institution

Accredited by NBA – AICTE and Accredited by NAAC – UGC with 'A++' Grade(cycle III)
Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai

DEPARTMENT OF ELECTRONICS & COMMUNICATION ENGINEERING

19ECE306-SMART IOT APPLICATIONS
III YEAR/ V SEMESTER

UNIT 2 –SMART HOME AND ENVIRONMENT APPLICATIONS

TOPIC-3   SMART ENVIRONMENT: SNOW LEVEL MONITORING, LANDSLIDE AND AVALANCHE PREVENTION

SNOW LEVEL MONITORING

Sensor Deployment

Deploy a network of smart sensors to continuously measure snow depth and density across the terrain.

Predictive Analytics

Use advanced algorithms to analyze the data and forecast future snow levels, identifying potential risks.

1   **2**   **3**

Data Aggregation

Collect the sensor data in a central IoT platform to get a comprehensive view of the snow conditions.

LANDSLIDE PREDICTION

Terrain Monitoring

Install smart sensors to track soil moisture, ground movement, and other factors that indicate landslide risk.

Weather Integration

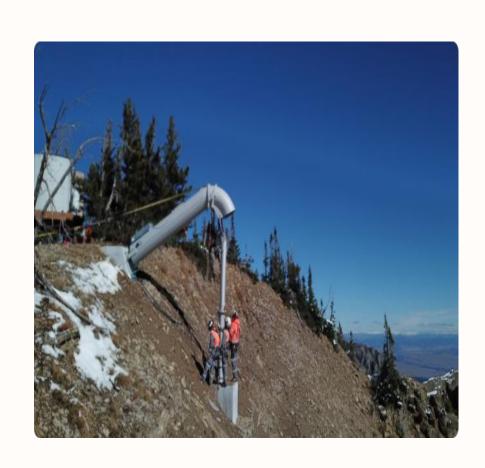Combine terrain data with weather forecasts to develop more accurate landslide prediction models.

Early Warning System

Establish an automated alert system to notify authorities and residents of potential landslide threats.

AVALANCHE PREVENTION

1 Slope Monitoring

Deploy sensors to continuously measure snow stability and accumulation on steep slopes.

2 Avalanche Triggers

Identify potential avalanche triggers, such as heavy snowfall, temperature changes, and human activity.

3 Mitigation Strategies

Implement proactive measures like controlled explosive detonations to release unstable snow before it becomes a hazard.

4 Early Warning

Provide advanced notification to nearby communities and travelers about impending avalanche risks.

IOT TECHNOLOGY INTEGRATION

Sensor Networks

Deploy a dense network of smart sensors to collect real-time data on snow, terrain, and weather conditions.

Data Analytics

Leverage powerful cloud-based analytics platforms to process sensor data and develop predictive models.

Automated Alerts

Establish an integrated system to automatically trigger alerts and notifications based on identified risks.

Remote Monitoring

Enable remote monitoring and control of snow and terrain management systems from a central command center.

ACTIVITY

Case Studies

1

Whistler, Canada

Deployed a network of IoT sensors to monitor snow conditions and trigger avalanche control measures, reducing risk and improving resort safety.

2

Innsbruck, Austria

Integrated smart terrain monitoring with weather forecasting to provide early warnings and facilitate proactive mitigation strategies for landslides.

3

Hokkaido, Japan

Leveraged IoT technology to create a comprehensive snow and avalanche management system, enabling efficient snow removal and increased community resilience.

CHALLENGES AND CONSIDERATIONS

Sensor Reliability | Ensuring consistent, accurate data collection in harsh winter environments

Data Integration | Seamlessly combining sensor data with weather forecasts and other relevant information

Scalability | Deploying and managing large-scale sensor networks across vast mountainous areas

Cybersecurity | Protecting critical infrastructure and systems from cyber threats

Future Trends and Innovations

Autonomous Monitoring

Develop self-adjusting, self-healing sensor networks that can adapt to changing conditions without human intervention.

Predictive AI Models

Leverage advanced machine learning and artificial intelligence to create highly accurate snow and terrain forecasting models.

Drone Surveillance

Utilize autonomous drones equipped with sensors to provide comprehensive, real-time monitoring of remote, inaccessible areas.

ASSESSMNTS

1.what are the future trends and Innovations ?

2. what are the Challenges in Snow level Monitoring ?

3. What is the importance of early detection?

19.07.2024   TOPIC 2 -SMART ENVIRONMENT: FOREST FIRE DETECTION, AIR POLLUTION, SNOW LEVEL MONITORING/ SMART IOT APPLICATIONS/ RAMYA E/ECE

9/15

THANK YOU

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