**Phase 2 project**

**Project Title: Flood Monitoring and Early Warning**

**Project ID:** proj\_223735\_Team\_5

**College:** Gnanamani College of Technology

**College code:** 6208

**Branch:** B.Tech-Information Technology

**Year:** IIIrd year

**Team Members:**

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**Components Needed :**

**Hardware components –**

* Bolt-IoT wifi module
* Arduino uno
* Breadboard- 400 tie points
* 5mm LED:(Green, Red, Orange) and Buzzer
* 16×2 LCD Display
* LM35 Temperature Sensor
* HC-SR04 Ultrasonic Sensor
* Some Jumper Wires
  + Male to Female Jumper Wires- 15 pcs
  + Male to Male Jumper Wires- 10 pcs
  + Female to Female Jumper Wires- 5 pcs
* 9v Battery and Snap Connector
* USB Cable Type B

**Software components -**

* [Arduino IDE](https://www.arduino.cc/en/software)
* [Python 3.7 IDLE](https://www.python.org/downloads/)
* [Bolt IoT Cloud](https://cloud.boltiot.com/)
* [Bolt IoT Android App](https://play.google.com/store/apps/details?id=com.bolt.com.bolt)
* [Twillo SMS Messaging API](https://www.twilio.com/)
* [Mailgun EMAIL Messaging APISoftware components](https://www.mailgun.com/)

**PHASE 2**

1. **Machine Vision and Image Recognition :**

Use cameras and image recognition to monitor flood conditions and identify potential hazards, like blocked drains or landslides.

**Algorithm :** SIFT (Scale-invariant Feature Transform), PCA (Principal Component Analysis), and LDA (Linear Discriminant Analysis)

1. **Predictive Analytics :**

Implement advanced predictive analytics models to forecast flood severity, allowing for more proactive measures and resource allocation.

**Algorithm :** K-means is a highly popular machine learning algorithm for Predictive analysis

1. **Automatic Emergency Response Systems :**

Connect the IoT system to emergency response systems, enabling automatic dispatch of rescue teams and resources in real-time.

**Algorithm :** Control algorithm forAutomatic Emergency Response System.

1. **Integration with GIS (Geographic Information Systems):**

Integrate GIS data to enhance flood mapping, risk assessment, and response planning.

**Algorithm:** Support vector Machine (SVM) Algorithm

1. **APIs for Developers :**

Provide APIs for developers to build applications or services that can use the flood monitoring data for various purposes.

1. **Resilience Testing :**

Regularly test and improve the resilience of the IoT network to ensure it can withstand extreme weather conditions and potential damage.

**Algorithm :** Deutsch–Jozsa algorithm

1. **Public Awareness Campaigns :**

Conduct educational campaigns to inform the public about the flood monitoring system and how to respond to alerts.