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| Title | Machine learning-driven IoT device for women’s safety: a real-time sexual harassment prevention system | | |
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| Abstract |  |
| Sexual harassment is an all-encompassing problem that affects individuals in diverse environments including educational institutions, workplaces, and public areas. Despite increased awareness and advocacy efforts, many women continue to face harassment daily, especially on the Indian sub-continent, with underreporting and impunity exacerbating the problem. As technology advances, there is a growing opportunity to use innovative solutions to address this problem. In recent years, the Internet of Things (IoT) and machine learning have emerged as promising technologies for developing systems that can detect and prevent sexual harassment in real-time. This study presents a novel approach for real-time sexual harassment monitoring using a machine learning-based IoT system. The system incorporates nine force-sensitive resistors strategically embedded in women’s dresses to capture relevant data. It is portable and can be affixed to any type of dressing. If the user wishes to change their attire, the system can be easily removed from the current dress and attached to another dress of choice. This flexibility allows users to adapt the system to suit various clothing preferences and styles. The sensor data are transmitted to the cloud via the NodeMCU, enabling continuous monitoring. In the cloud, a pre-trained machine learning model, specifically the AdaBoost classifier, was employed to classify incoming data in real time. We applied four ML methods: RF with GridSearchCV, Bagging Classifier, XGBoost, and Adaboost Classifier. The AdaBoost classifier performed best with an accuracy of 99.3% using a dataset prepared by our lab, which consists of 1048 instances and was collected from 50 students. If a sexual harassment event is detected, an alert is generated through a mobile application and promptly sent to appropriate authorities for immediate action to save the victim. By integrating wearable sensors, IoT technology, and machine learning, this system offers a proactive and efficient approach, especially in uncertain situations, to detect and address sexual harassment incidents and enhance safety and security in various settings. | |