Development of a Novel AI Last-Minute Flood Forecasting and Warning Gadget Using IOT and Deep Learning

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Worldwide, Climate change is increasing both the intensity of rainfall and the resultant flooding risk. Developed countries are addressing the problem by using forecast rainfall by combining satellite data with doppler radar. Radars can produce highly accurate images of the motion of water in clouds enabling software to accurately predict storm intensity. This software can be physics-based models of deep learning-based models such as Metnet by Google that run on supercomputers, which perform each other on different parameters. Unfortunately, this can be prohibitively expensive for developing countries that lack both the economic resources as well as the supporting technological (roads, power, telecommunications, etc.) and human infrastructure (trained workers in construction and maintenance). The last-minute flood warning gadget was created to predict a variety of floods accurately while being affordable for developing and rural communities using different tools such as statistics and machine and deep learning algorithms. In essence, it uses a combination of robotics, the Internet of Things components, and Artificial intelligence models, to collect data and make a flood forecast in real time. For forecasting flash floods caused by prolonged rainfall, a statistical model based on time series and regression was developed. In addition, a ground-based precipitation Nowcasting deep learning model was made by joining an LSTM trained for feature extraction and a semantic segmentation model trained to detect clouds. A wooden framework housing sensors and microcontrollers were used to test the statistical model in real-weather conditions. It can be concluded that the gadget is reliable while being affordable for developing countries and rural communities.

Awards Won:

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