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Application of Image Processing and Big Data Science for Flood Label Detection

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Due to the importance of object detection in video analysis and image annotation, it is widely utilized in a number of computer vision tasks such as face recognition, autonomous vehicles, activity recognition, tracking objects and identity verification. Object detection does not only involve classification and identification of objects within images, but also involves localizing and tracing the objects by creating bounding boxes around the objects and labelling them with their respective prediction scores. Here, we leverage and discuss how connected vision systems can be used to embed cameras, image processing, Edge Artificial Intelligence (AI), and data connectivity capabilities for flood label detection. We favored the engineering definition of label detection that a label is a sequence of discrete measurable observations obtained using a capturing device such as web cameras, smart phone, etc. We built a Big Data service of around 1000 images (image annotation service) including the image geolocation information from various flooding events in the Carolinas (USA) with a total of eight different object categories. Our developed platform has several smart AI tools and task configurations that can detect objects' edges or contours which can be manually adjusted with a threshold setting so as to best segment the image. The tool has the ability to train the dataset and predict the labels for large scale datasets which can be used as an object detector to drastically reduce the amount of time spent per object particularly for real-time image-based flood forecasting. This research is funded by the US National Science Foundation (NSF).