

# BIG DATA ANALYTICS IN DISASTER MANAGEMENT

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## INTRODUCTION

One of the most important and beneficial ways of applying Big Data Analytics is in the area of Disaster Management.

Weather data predictions, as in rainfall, combined with topology and urban planning can predict risks of flooding. Street maps and risk areas can be superimposed for visualization. When estate values are applied, investment in safeguards, warning systems, and other safety measures can be made for efficient use of resources in damage reduction and damage control. The aim of this project is to utilize Big Data Analytics and Geo-Informatics technology to determine the location of buildings, flood duration, and damage cost, as part of the planning phase in flooding Disaster Management.

## BIG DATA IN DISASTER MANAGEMENT

**Disaster management** is the creation of plans through which communities reduce vulnerability to hazards and cope with disasters. There are four phases of disaster management; Prevention, Preparedness, Response and Recovery. Big data has potential to help with all of them.

**Big Data** is information assets characterized by high volume, high velocity, and high variety, which require special techniques and analytical methods to collect, pre-process, store, retrieve, analyze, manipulate, and visualize the data in real-time.

- I. Big data in disaster prevention can help anticipate crises or at least reduce the risk that would arise from disaster.
- II. Big data in disaster preparedness can recognize the dangers to provide a sound strategic approach by the respective managers of the disaster.
- III. Big data in disaster response can identify which areas need the most urgent attention from the disaster administrators. With the use of GIS and GPS systems, Big data analysis can assist the right guidance to the public to avoid or move away from hazardous situations.
- IV. When the recovery activation will gradually start, the infrastructure would provide a big data source. The Big Data analysis sharing useful information for recovery procedures about volunteer coordination and logistics during the crisis.

## METHODOLOGY

### 1. DATA COLLECTING

Usage of GPS device to determine the location and DEM (Digital Elevation Model) of a building in a certain area in Pattaya City. Gathering data of building's area, floor and building type interviewing people about flood occurrences in the area

### 2. UTILIZATION OF QGIS

Determining flood duration  
Estimation of flood damages  
Creation of maps for easy visualization of flood duration, location of the buildings and roads.

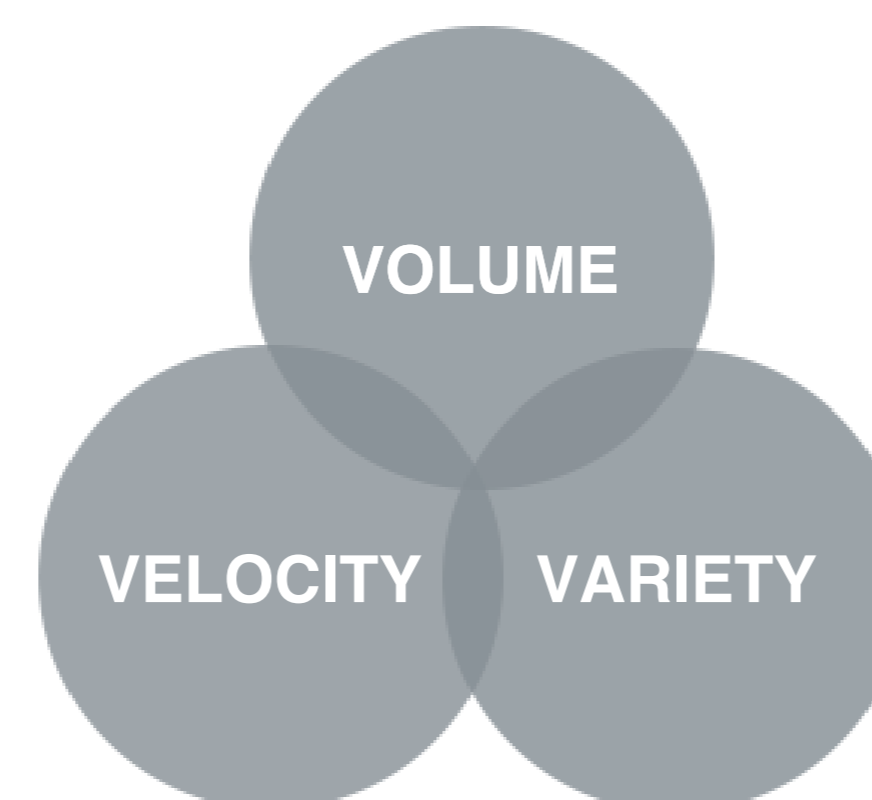
\*QGIS is a cross-platform free and open-source desktop geographic information system (GIS) application that provides data viewing, editing, and analysis.

## AREA STUDY

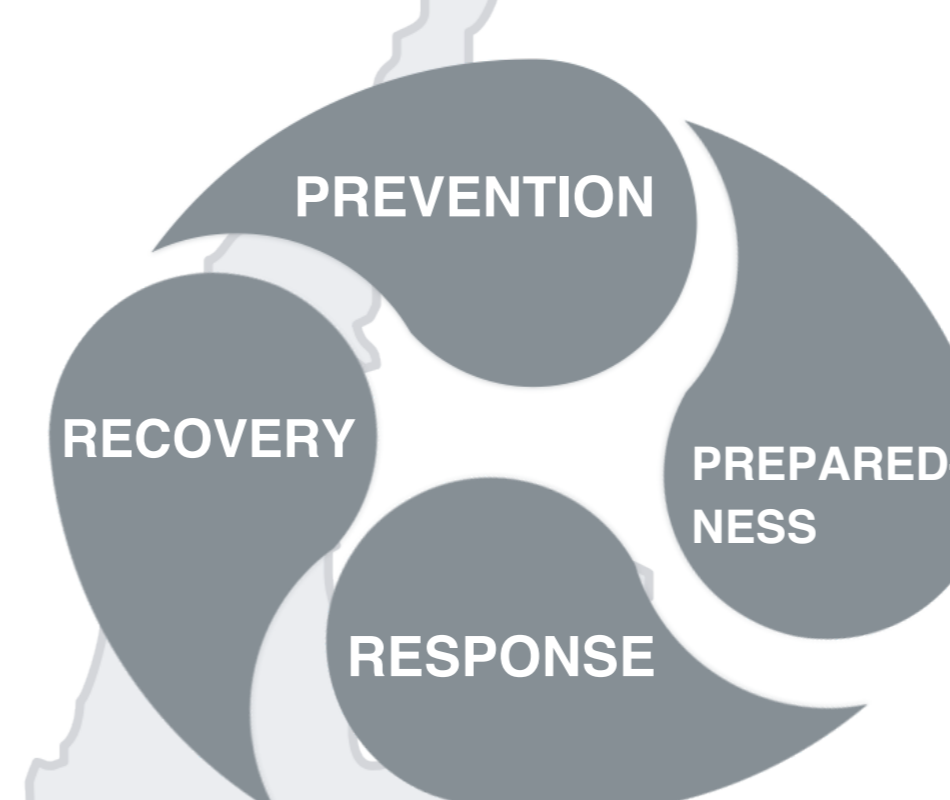
Pattaya City,  
Chonburi



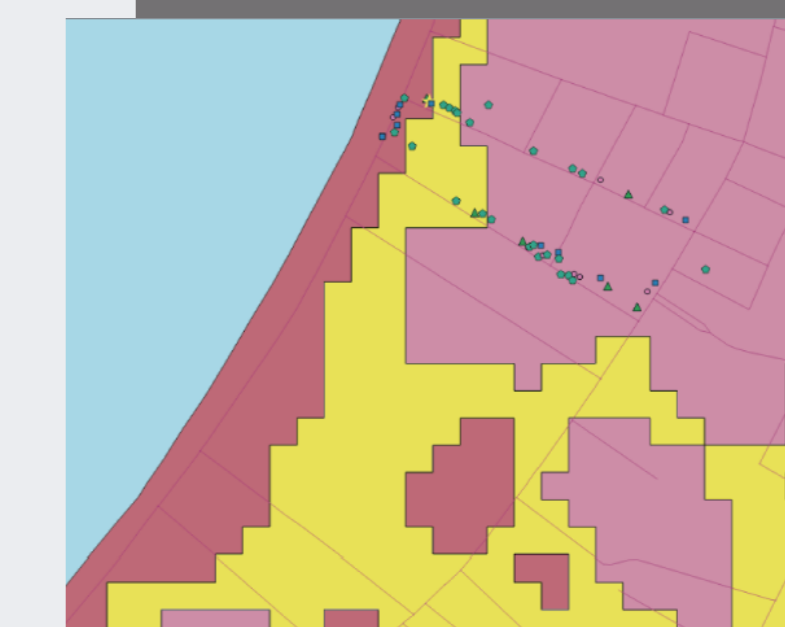
### 3V'S OF BIG DATA



### PHASES OF DISASTER MANAGEMENT



## RESULT



FLOOD DURATION VISUALIZATION MAP

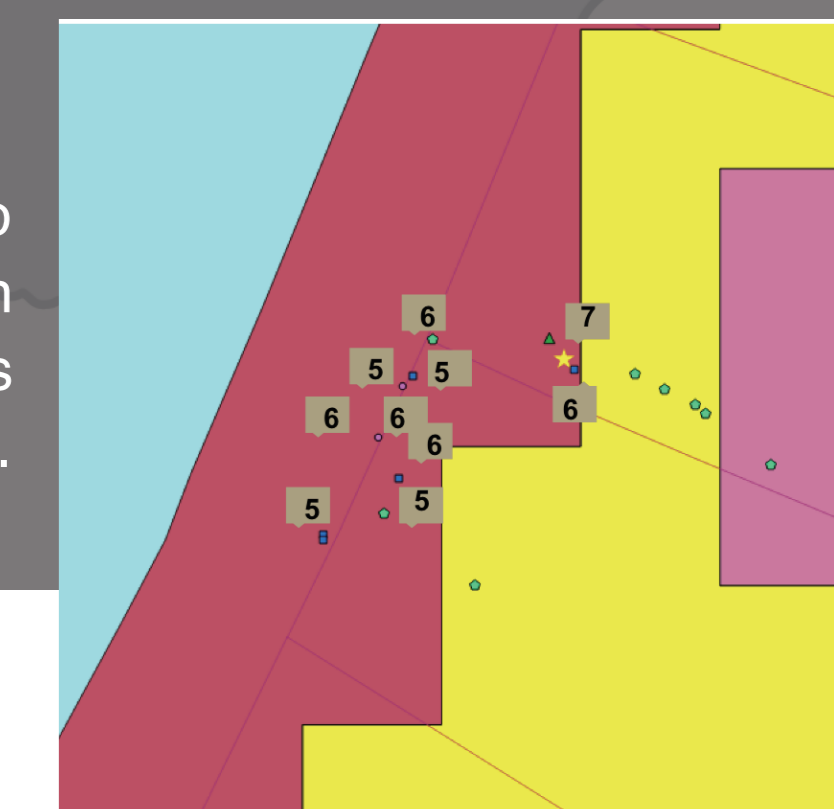
The graph shows the flooded area in central Pattaya. Colours show roughly the duration of the flooding.

RED - 7 day flood duration

YELLOW - 5 day flood duration

PINK - 3 day flood duration

The buildings most prone to flooding are in the area with the lowest elevation, and this area is located closest to the beach.



## CONCLUSION

In this project, the usefulness of the analysis of Big Data management in disasters was presented. The usage of Geo Information Systems to handle Big Data to determine the flood duration, location of the houses, Digital Elevation Model and estimated cost damage in case a flood occurred was also outlined. It may not be possible to prevent disasters from occurring, but damage assessment will be facilitated if society is prepared for them.