Perancangan model peramalan permintaan bantuan logistik bencana menggunakan pendekatan case-based reasoning dengan dukungan internet of things = Designing demand forecast model of emergency logistic relief using case-based reasoning supported by internet of things

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Abstrak

Peramalan permintaan bantuan logistik merupakan acuan untuk kegiatan distribusi yang optimal pasca gempa bumi. Peramalan permintaan yang akurat dan efisien dapat mencegah habisnya ketersediaan bantuan logistik, mempercepat waktu distribusi, dan menjamin setiap korban gempa bumi memperoleh bantuan logistik yang dibutuhkan, sehingga dapat mengurangi penderitaan dan menyelematkan hidup mereka. Penelitian ini bertujuan untuk merancang model peramalan permintaan bantuan logistik pasca gempa bumi. Pendekatan Case-based Reasoning (CBR) dengan dukungan internet of things (IoT) digunakan pada penelitian ini. Gempa bumi Lombok utara yang terjadi pada tahun 2018 digunakan sebagai kasus target yang akan diramal permintaan bantuan logistiknya.
Hasil peramalan diperoleh berdasarkan kasus gempa bumi yang paling similar dengan kasus target. Similaritas kedua kasus ditentukan berdasarkan enam atribut yaitu: magnitudo, kedalaman gempa bumi, jarak episentrum, jumlah populasi terdampak, durasi tanggap darurat (hari), dan Modified Marcelli Intensity (MMI). Penerapan IoT dapat memberikan nilai atribut secara real time sehingga hasil peramalan diperoleh secara cepat. Hasil peramalan permintaan bantuan logistik menunjukkan MAPE di bawah 20%, sehingga dikategorikan sebagai hasil peramalan yang baik dan akurat.
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The demand forecasting of emergency logistic relief is a premise and basis for optimal emergency distribution after earthquake. Accurate and efficient demand forecast will prevent stock-out, save time, and ensure every victims get the critical supplies to reduce their suffering and save their life. This paper aims to design demand forecasting model of emergency logistic relief after earthquake. Case-based Reasoning (CBR) method supported by Internet of Things (IoT) is applied to develop the model. This paper uses eartquake incident which struck North Lombok regency in 2018 as target case.
The demand forecasting result is obtained based on the historical case that are the most similar to the target case. The similarity is determined by six attributes: earthquake magnitude, depth of hypocenter, epicentrum distance, total affected population, duration of response phase (day), and modified marcelli intensity (MMI). IoT supports the model to acquire real-time attributes value when earthquake occurs so the forecasting result will be obtained quickly. From the target case, the results shows overall forecast error lower than 20% and open the door for conducting emergency logistic relief demand forecast with quantitative and qualitative approach.