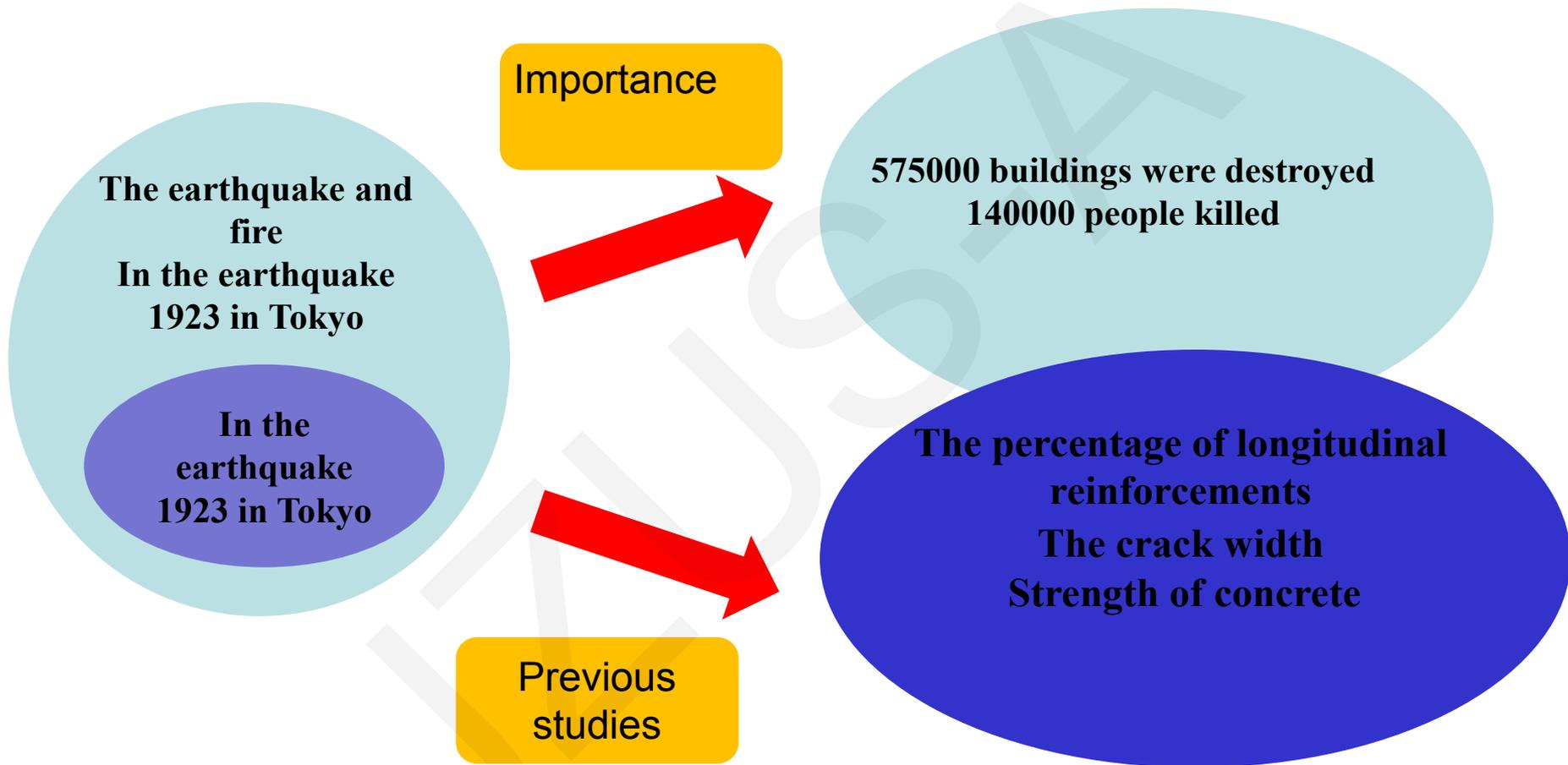


Prediction of the load-carrying capacity of reinforced concrete connections under post-earthquake fire

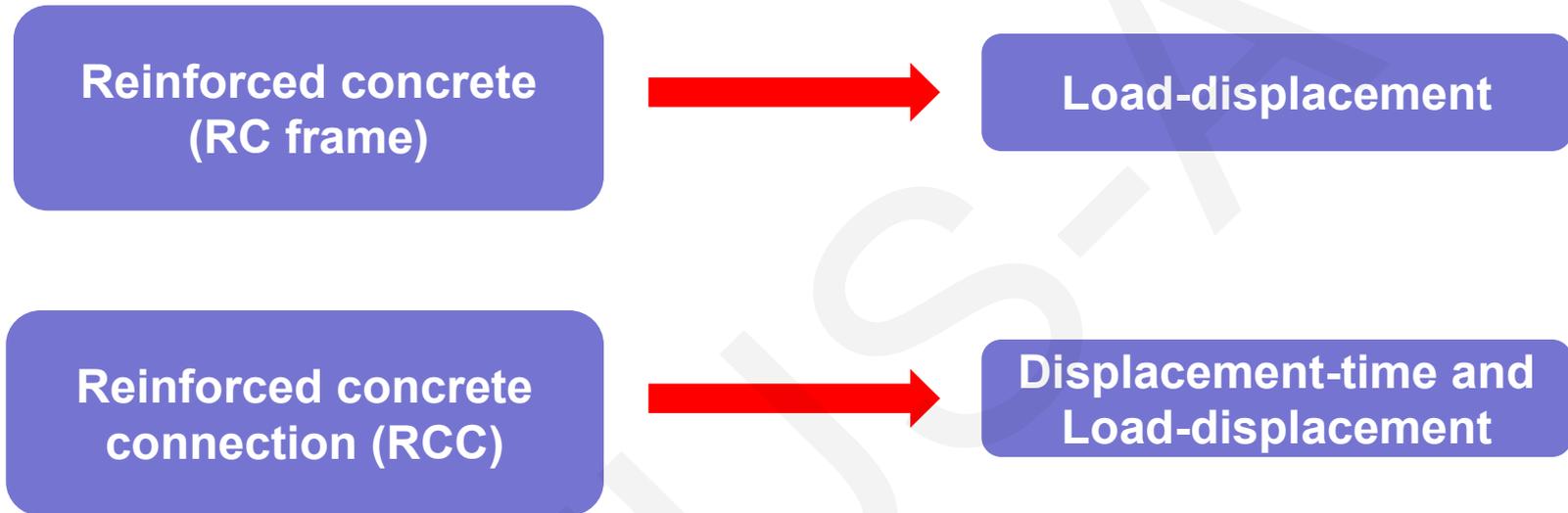
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Fire after an earthquake



Verification with two studies



The developed Finite element model

■ 132 FE models were developed with various variables

Variables

- (a) Beam depth
- (b) The ratio of the compressive force to the compressive strength of the column
- (c) Compressive strength of concrete
- (d) The ratio of longitudinal bars of the column
- (e) The ratio of longitudinal bars of the beam
- (f) The ratio of longitudinal bars of connection; (g) the ratio of beam depth to column depth
- (g) The bonded index of column bars
- (h) The applied temperature.

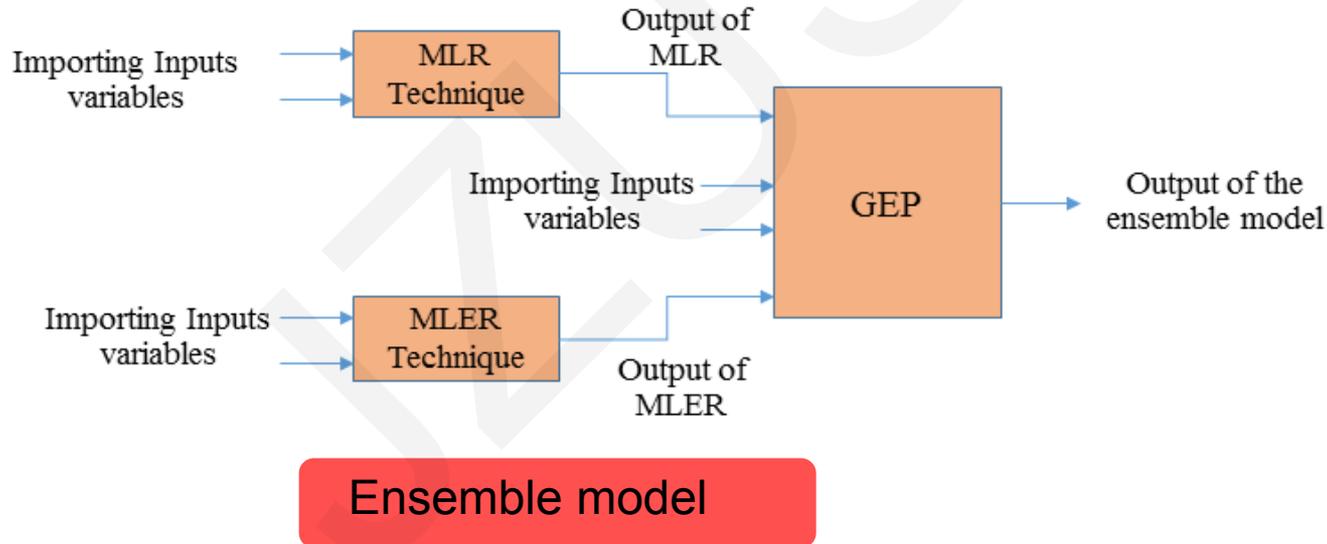
Output

- (a) The load carrying capacity
- (b) Damage

Prediction models

■ Models:

- Multi linear regression (MLR)
- Multi Ln equation regression (MLnER)
- Gene expression programming (GEP)
- Ensemble model



Conclusions

- Increasing the temperature from 25 ° C to 600 and 1000 ° C caused more than a 25% and 75% reduction, respectively, in the load-carrying capacity of the RCC.
- The most effective parameter for improving the fire resistance of the RCC was the RLC. Increasing the longitudinal reinforcement bars of a column (RLC) from 1 to 8% increased the load-carrying capacity of the RCC at different temperatures by 234.8-492.9%.
- Increasing the compressive strength of concrete increased the remaining load-carrying capacity of the RCC under post earthquake fire (PEF) slightly. This effect was more significant at higher temperatures, at which the mechanical properties of steel decrease rapidly.
- The ensemble model was selected as the best model for predicting the remaining load-carrying capacity of the RCC under PEF.