Understanding the unexpected: exposing information hidden in noise

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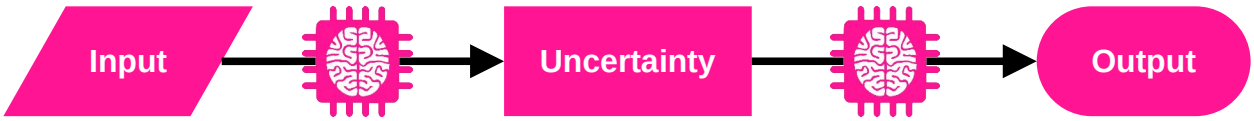
We present a machine learning architecture that computes uncertainty in one target variable to extrapolate a second target variable. We use the architecture to propose two concrete mixes.

The methodology is shown below with the machine learning models depicted by the brain.

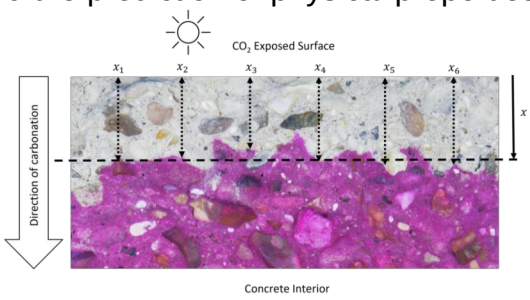


Results

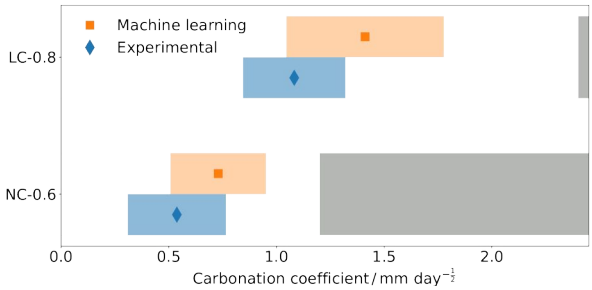
We propose two concrete mixes, for one we seek **low carbonation**, and the other **low environmental impact**.

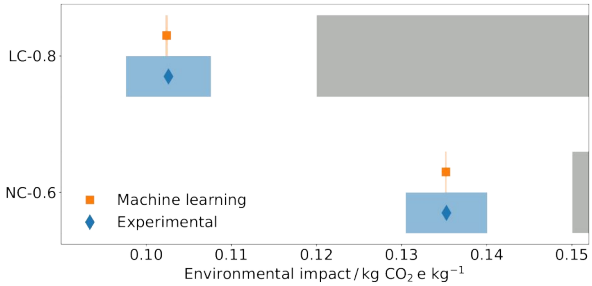
Ingredients	LC 0.8	NC 0.6
Cement [%]	10.5	14.2
Gravel [%]	48.4	48.9
Sand [%]	32.6	28.4
Water [%]	8.5	8.5

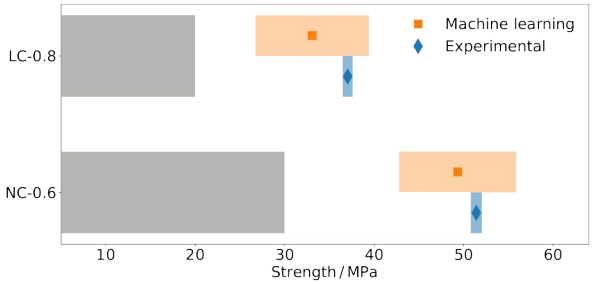
Machine learning can exploit **uncertainty** in carbonation depth to aid the prediction of physical properties



Experimental validation







Future opportunities

My group at University of Cambridge are seek R&D academic collaborators.

Alchemite™ machine learning for handling sparse and noisy data commercialized by Intellegens, https://intellegens.com/.

The generic methodology can be applied to a broad range of areas:

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intellegens
Applied machine learning

Biomolecules
Uncertainty in light absorption
Predicts molecules formed

Autonomous cars
Uncertainty in object distance
Predicts object type

Concrete
Uncertainty in microstructure
Predicts tensile strength