Market Sector:
CONSTRUCTION & INFRASTRUCTURE

Technology Theme:
DATA & INFORMATION SYSTEMS

AACE: AI-ENABLED AUTOMATED COST AND CARBON ESTIMATING

AI DRIVEN COST AND CARBON ESTIMATION FROM BIM MODELS FOR UK CONSTRUCTION PROJECTS

The AACE Consortium have developed a proof of concept extension for automated cost modelling take-offs within CostOS construction cost estimation software.

> The MTC is an unparalleled environment with talented innovators wanting to play a key role in advancing the transformation across the construction industry. This is a fantastic example of how an innovative mindset can lead to solutions that address climate change. Investing in innovation is essential to produce great ideas like this. Innovation and digital integration are critical to reduce carbon and work towards net-zero emissions.
>
> **Kamran Choudhury, Digitalisation Manager, Skanska UK**

THE CHALLENGE

Estimating the cost of construction projects is currently slow and bespoke. The digitalisation of the construction sector through Computer Aided Design (CAD) means that projects are subject to faster design and redesign; while this obviously has a positive impact on the industry, the time-consuming nature of cost surveying makes it slow to react to changing CAD models.

Ultimately, a cost estimate can only ever be as good as the information provided to the Surveyor. They must utilise the information available – combined with their expertise and knowledge – in producing the cost estimate, this in turn can lead to inconsistencies between Surveyors.

CONSORTIUM'S SOLUTION

To meet this challenge the AACE Consortium undertook the following analytical pieces of work:

- A knowledge ontology to map the relationship between the Uniclass2015 object classification and CESMM4 work classification.
- Construction of a web-based visualisation tool to display the relationships of the Uniclass codes and their history and to edit and show pertinent questions to aid in choosing the right CESMM4 code for each BIM element.
- Integration of BIM model data with the information above to facilitate object material identification and bill of quantity generation.

THE OUTCOME

By understanding the analysis, the AACE Consortium was able to create:

- A proof of concept for automated cost modelling take-offs for bridge models within CostOS.
- Best practice guidance on BIM best practices.
- Uniclass2015 mapping to CESMM4 ontology to act as guidance for further Carbon and Cost estimating projects.
- Neural Network development from Nomitech to identify and classify bridge components within a 3D Model.

BENEFITS TO CONSTRUCTION

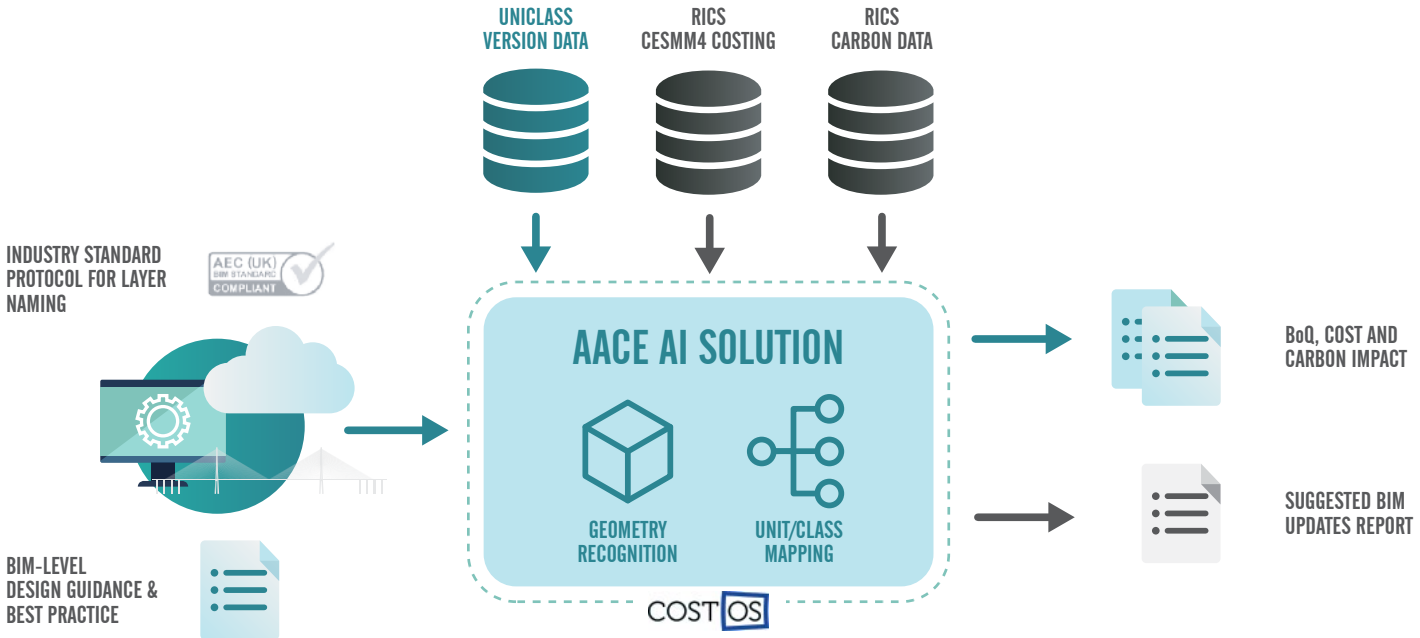
- Reduce time taken to provide a cost estimate on elements of a construction project.
- Carbon and Cost estimation becomes faster, more accurate and more repeatable.
- Support decision making on costing with better access to information, allows for more environment-aware design choices.
- A step towards enabling professional team members access to a cost and carbon estimate during the early stages of the design, allowing designers to tailor the design to minimise cost and/or carbon.

80%

QUANTITIES AUTOMATIC FROM BIM MODELS

70%

REDUCTION IN TIME AND EFFORT



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Manufacturing Technology Centre,
Pilot Way, Ansty Park,
Coventry, CV7 9JU

Tel: +44 (0) 2476 701 600
www.the-mtc.org

mtc Manufacturing Technology Centre