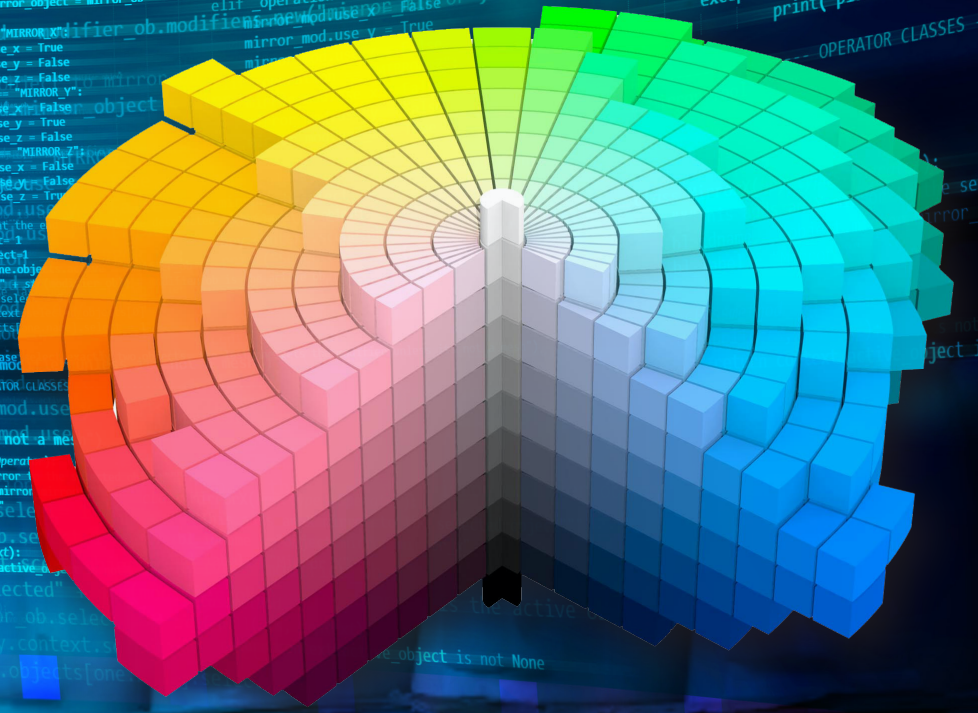# SmartColor....
4Ceramics

smartcolor4ceramics.com

ARTIFICIAL INTELLIGENCE FOR COLOR ADJUSTMENT OPTIMIZATION IN THE CERAMIC INDUSTRY

Partners

MATCERAMICA
Portugal

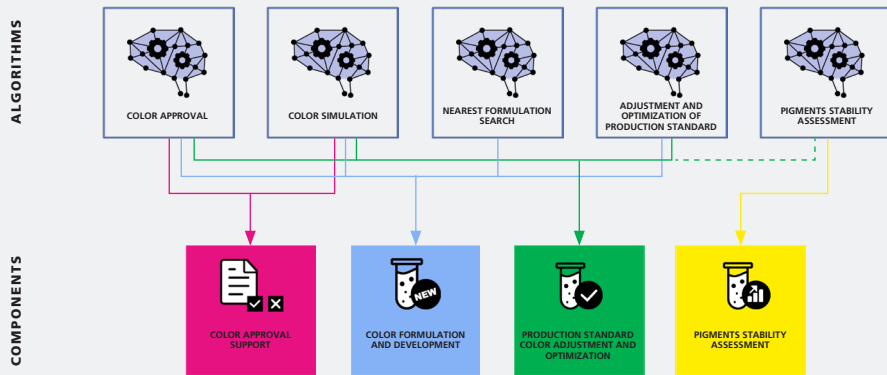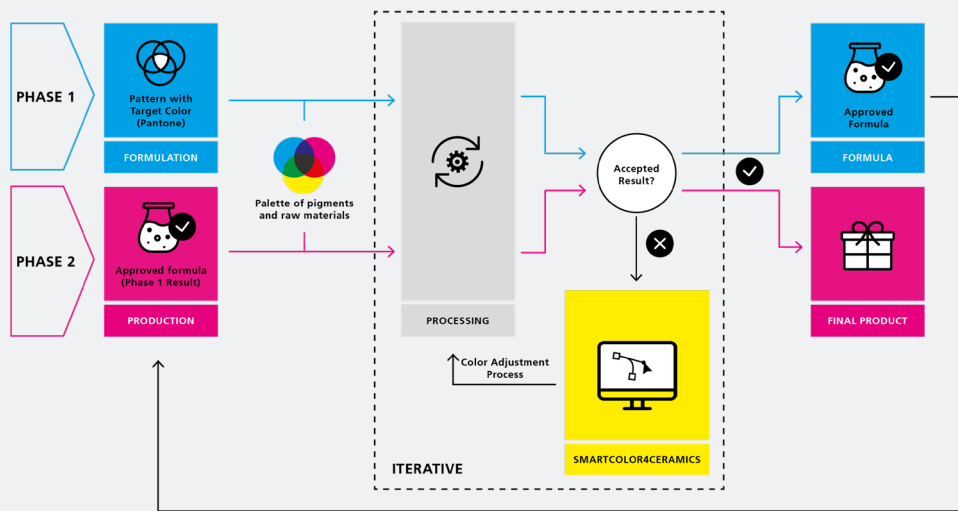**GUISOFT**

Fraunhofer
PORTUGAL

CTCV

Funding entities

AI-POWERED INTEGRATED SOFTWARE SOLUTION TO OPTIMIZE THE ITERATIVE PROCESS OF COLOR (RE)CREATION IN CERAMIC GLAZES

PHASE 1
- Pattern with Target Color (Pantone)
- FORMULATION

PHASE 2
- Approved formula (Phase 1 Result)
- PRODUCTION

Palette of pigments and raw materials

PROCESSING

Accepted Result?

Color Adjustment Process

SMARTCOLOR4CERAMICS

ITERATIVE

- Approved Formula
- FORMULA
- FINAL PRODUCT

ALGORITHMS
- COLOR APPROVAL
- COLOR SIMULATION
- NEAREST FORMULATION SEARCH
- ADJUSTMENT AND OPTIMIZATION OF PRODUCTION STANDARD
- PIGMENTS STABILITY ASSESSMENT

COMPONENTS
- COLOR APPROVAL SUPPORT
- COLOR FORMULATION AND DEVELOPMENT
- PRODUCTION STANDARD COLOR ADJUSTMENT AND OPTIMIZATION
- PIGMENTS STABILITY ASSESSMENT

Motivation

The ceramic industry is a millenary industry, with some production aspects that have the potential for optimization and would significantly impact performance.

One of these issues is color replication in production. Whenever a specific design (more specifically the color) is to be produced, many different parameters influence the final result, from the raw materials and pigments to the used oven and temperature.

Consequently, the desired output is not immediately achieved, taking several trial-and-error repetitions until the target color is finally achieved.

Solution

SmartColor4Ceramics proposes to optimize the process of color (re)creation in glazes for the ceramic industry.

By developing an integrated software solution powered with machine learning algorithms, it is intended to automate the iterative suggestion of the best combination of pigments and production parameters, a subjective and manual task that currently depends exclusively on human expertise. To this end, a specialized database will be crea-

ted for experiences mapping, enriched with data modeling techniques and computational learning. The solution will be tested and validated in a real ceramics production environment.

Outcomes

- Creation of a map of experiments: database on the proportions of pigments and other raw materials, as well as additional production variables, and their correlation with objective results of color validation in the produced sample;
- Automation of the process of evaluating the color obtained, making it less dependent on the expertise of the operator, using instruments such as spectrophotometer or colorimeter;
- Optimization of the mixture/parameters for better results in the formulation of new colors (and, to a lesser extent, in production), in order to reduce the number of adjustment attempts, resulting in waste reduction and gains in time and resources;
- Color stability analysis (through the dispersion of results in the experiment map) for prioritization of more stable colors, in order to minimize defects in production.