



DỰ ÁN:

ADDITIVE MANUFACTURING (3D PRINTING) BASED ON DEEP LEARNING

Tổ chức chủ trì: Trường ĐH Công nghệ TP. HCM (HUTECH)

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MÃ SỐ

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Project summary

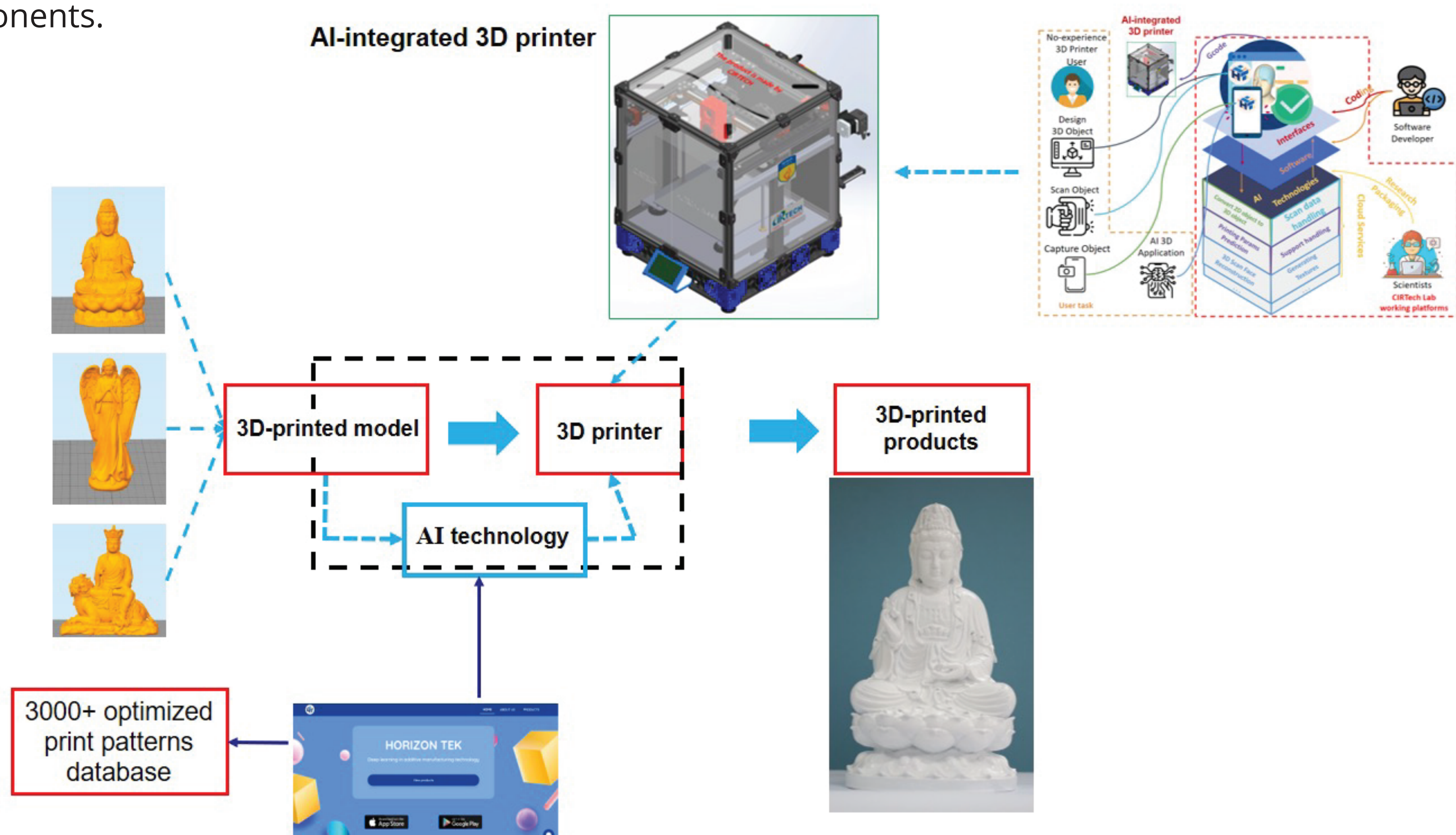
The project focuses on integrating AI technology into 3D printers to improve functionality, efficiency, and user experience. Through the use of AI algorithms, we aim to optimize every stage of the 3D printing process, enabling users to achieve exceptional results with limited expertise. By leveraging deep learning models, data processing, and simulation computing, we enhance design generation, defect detection, and process optimization.

Key Project Features:

- Multi-feature, Multi-layer, Multi-material Design Efficiency: Develop AI algorithms and optimization techniques to streamline and expedite the design process for complex 3D-printed objects.
- Defect Detection and Pre-qualification: Utilize AI-driven approaches, including computer vision and machine learning, to enable real-time defect detection during the 3D printing process.
- AI Configurator for Automated Process Optimization: Develop an AI configurator to streamline 3D printing by automating parameter optimization, simplifying the process for users with limited expertise.
- Comprehensive Instructional Materials and Reviews: Develop a comprehensive guide for 3D printing in Vietnam, offering essential information and best practices to optimize printer usage.

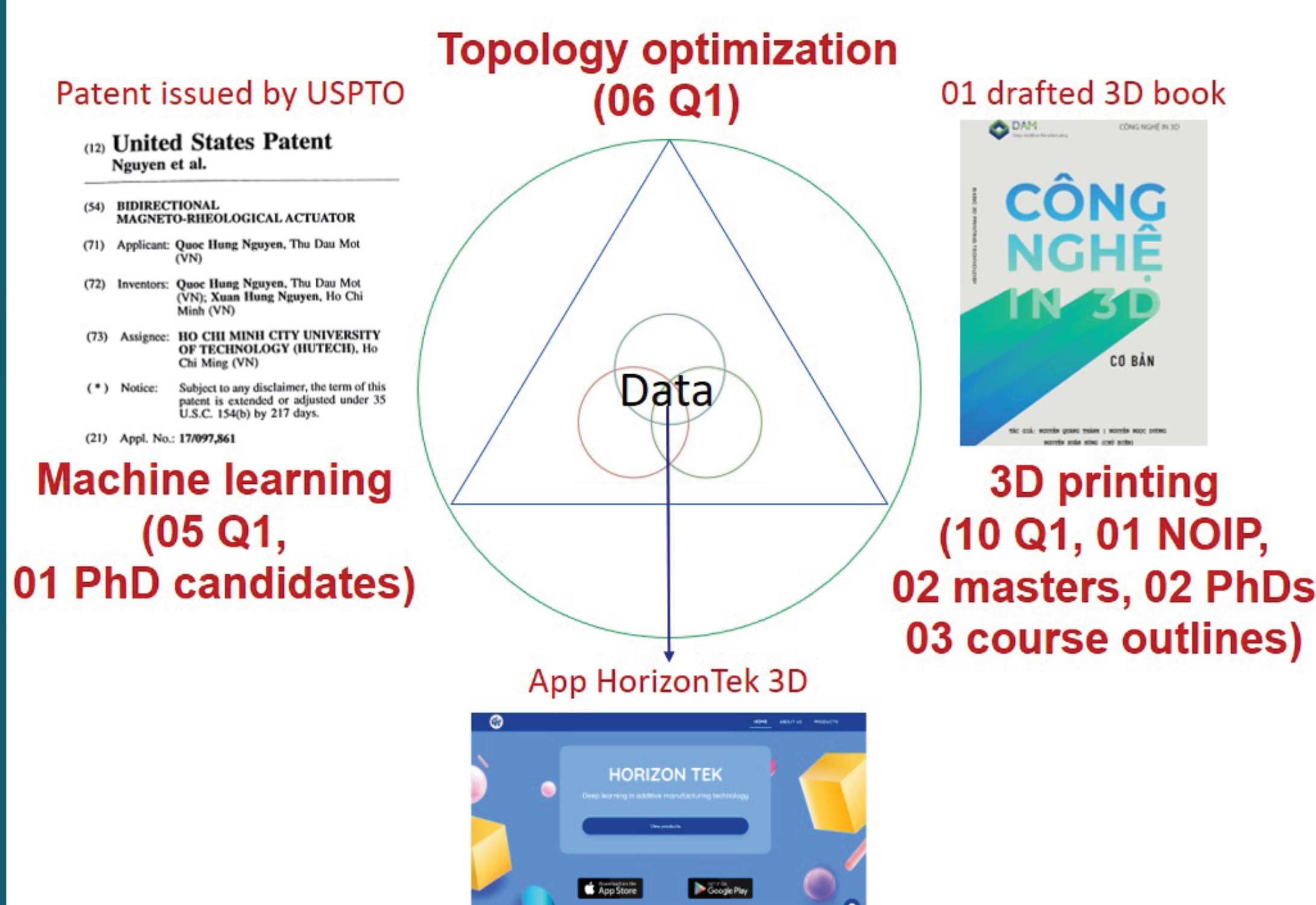
Scope of Project:

- Investigate the suitability of hollow structures and 3D-printed fiber composites for various printing materials.
- Explore optimal profiles of structural topology applied in engineering.
- Study optimization algorithms and deep learning applications in the context of 3D printing.
- Research alternative and reinforcing media solutions to enhance the strength and durability of 3D printed components.



PROJECT HIGHLIGHTS

Compared to the initial registration results (10 international articles ranked Q1, 01 accepted patent application, 01 pilot application program, 01 training program), the project has achieved outstanding results in various areas:



Science:

- Published 21 articles ranked Q1 in reputable international journals.
- Granted a patent by the US Intellectual Property Office (USPTO).
- Published 01 application program for 3D printing.
- Built up 3000+ optimized print patterns database.
- Completion of a draft book on 3D printing.
- Accepted 01 patent application by National Office of Intellectual Property of Vietnam (NOIP).

Training:

- Supported the training of 2 master's students, 2 PhD students, and 1 PhD candidate who will defend their thesis in September 2023.
- Completion of 03-course outlines.

Technology Transfer:

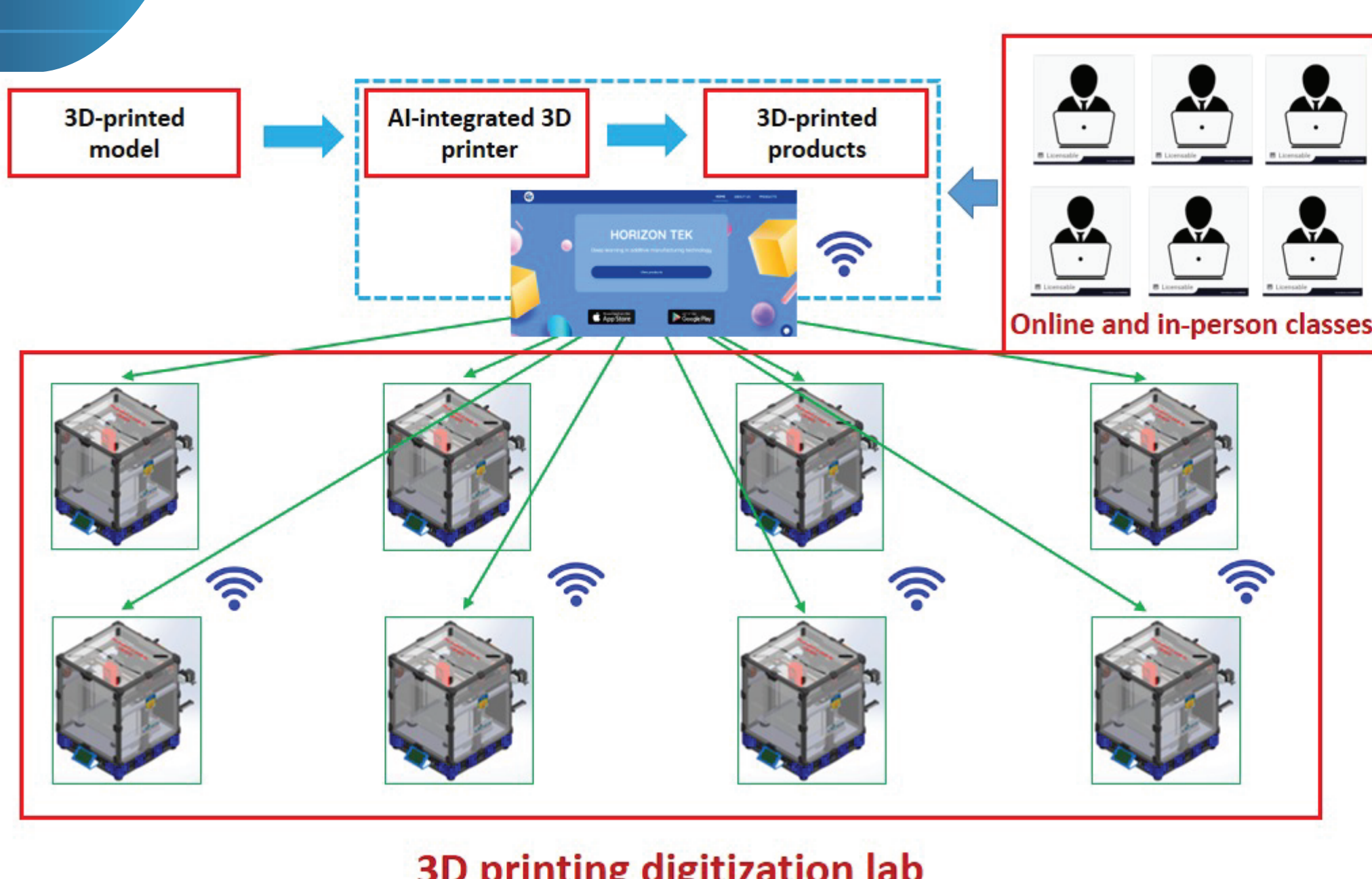
- Collaborating with Busdaco Science and Technology Company on research, simulation, testing, and optimization of design, materials, and 3D-printed molds for coastal protection and landslide prevention in Ca Mau coastal area.

PROJECT FIGURE

The next step in this project is to build a virtual lab where users can utilize the 3D printing app to transmit design instructions wirelessly to AI-integrated 3D printers.

This lab will cater to both online and in-person classes, providing a flexible and collaborative environment for learners.

With a database of over 3000 optimized print patterns (still being updated), real-time monitoring, and seamless connectivity, the virtual lab revolutionizes the learning experience and empowers users to explore the possibilities of 3D printing.



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