AI-ML-Driven Opportunity Nudging Platform for Bocconi Students

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Core Idea

The proposed product is an AI-based tool to help Bocconi students discover actionable and personalized academic, professional, and extracurricular opportunities tailored to their skills, interests, experiences, and potential resume gaps. Students provide structured information about skills, interests, and experiences, while the University provides academic data such as grades, program participation, and course enrollments.

The AI system analyzes these inputs to identify gaps in a student's profile and generates recommendations, redirecting students toward relevant courses, internships, networking events, associations, and other resources. Each opportunity is categorized and weighted according to the student's recorded and self-assessed abilities. The platform primarily targets undergraduates, particularly freshmen, but is designed for all students seeking practical guidance.

Motivation and Problem Statement

University students, especially freshmen, often struggle to identify opportunities aligned with their skills, interests, and career aspirations. Translating academic and extracurricular achievements into actionable steps is challenging. While Bocconi provides career services, these resources are often static, staff-intensive, and difficult to navigate for students unable to assess or weight their own skills. Students frequently must manually research courses, internships, and networking events.

This AI solution empowers students by providing tools to pursue academic and career goals efficiently. AI can process heterogeneous structured data from students and the University, detect potential gaps in skills or experiences, and generate personalized, prioritized recommendations. The system finds and categorizes opportunities according to relevance and student profile, enabling informed decisions quickly and efficiently.

Value Proposition

The platform delivers multiple benefits to the University and broader ecosystem. For students, it simplifies academic navigation, reduces anxiety by highlighting actionable next

steps, and promotes inclusivity. High-performing students are nudged toward advanced opportunities, while underperforming students are guided to fill gaps in knowledge or skills. This ensures equitable access to personal development pathways for every student.

For Bocconi, the platform increases cost efficiency and scalability of traditional counseling, which relies heavily on one-to-one meetings. Current tools, such as Jobgate, are not tailored to individual needs. Beyond the University, the platform addresses skill mismatches in the labor market, providing employers with a more aligned and diverse talent pool. Automation reduces manual processes, improving both accuracy and speed. Students benefit from real-time updates and empowerment, while the University enhances operational efficiency and alignment with societal and labor market needs.

Conceptual Pipeline / System Architecture

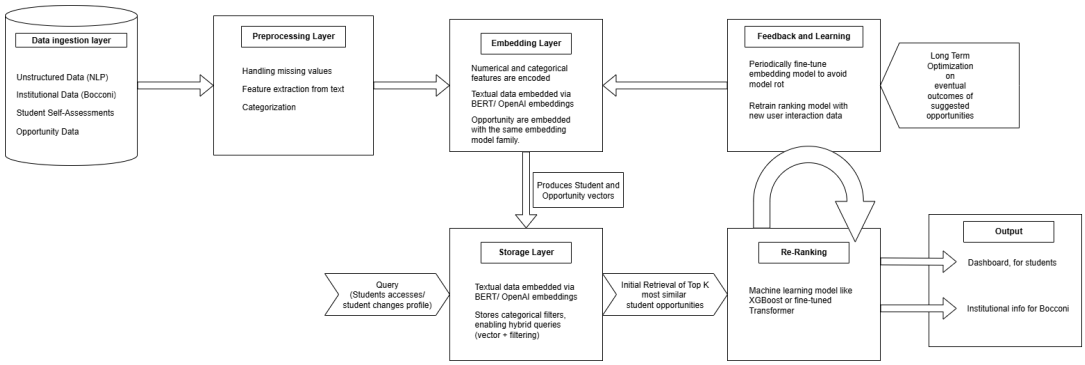

Figure 1: Conceptual AI pipeline for student-opportunity matching

The pipeline begins with data ingestion: institutional data from Bocconi and self-assessments from students. Unstructured data, such as CVs or LinkedIn profiles, is processed using NLP. Features are preprocessed (normalization, missing value handling, encoding). Pre-trained embedding models (OpenAI embeddings or Sentence-BERT) transform each student into a vector labeled "type: student", concatenating text embeddings with numerical/categorical features. Opportunities provided by Bocconi or partners undergo a similar process, producing vectors labeled "type: opportunity" in the same semantic space (Initially we utilize a shared embedding model, if in the future we can gather more feedback data, we could train two separate encoder models, after building positive/negative student-opportunity pairs).

Vectors are stored in a vector database (e.g., Pinecone, Weaviate, Milvus). Retrieval occurs in a "RAG style", and is split into two steps: first, the student vector is queried to find top-K opportunities; second, a machine learning model (e.g., XGBoost), trained on historical feedback, adjusts rankings. Outputs are presented on a dashboard, with anonymized feedback returned to the University.

Privacy considerations include storing vectors separately from student IDs, using pseudonymization, encryption, and optionally local embedding models for sensitive data. Cost estimates: API embeddings (0.11€/1M tokens), vector DB management (50–100€), local Sentence-BERT hosting (500–1500€), or cloud GPU (0.50–1€/h).