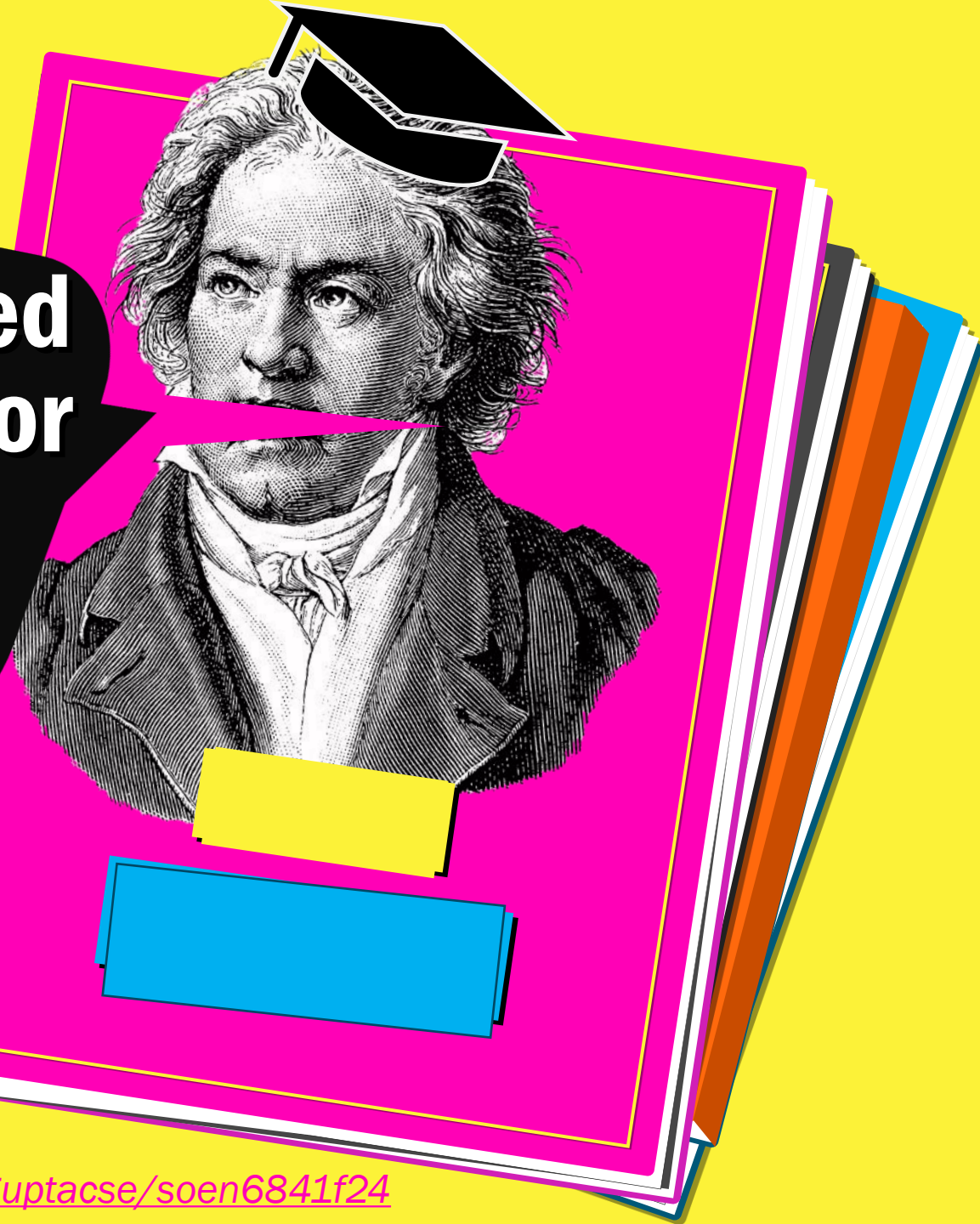# AI-Based Academic Advisor

Group 15

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Github: *https://github.com/Riyaguptacse/soen6841f24*
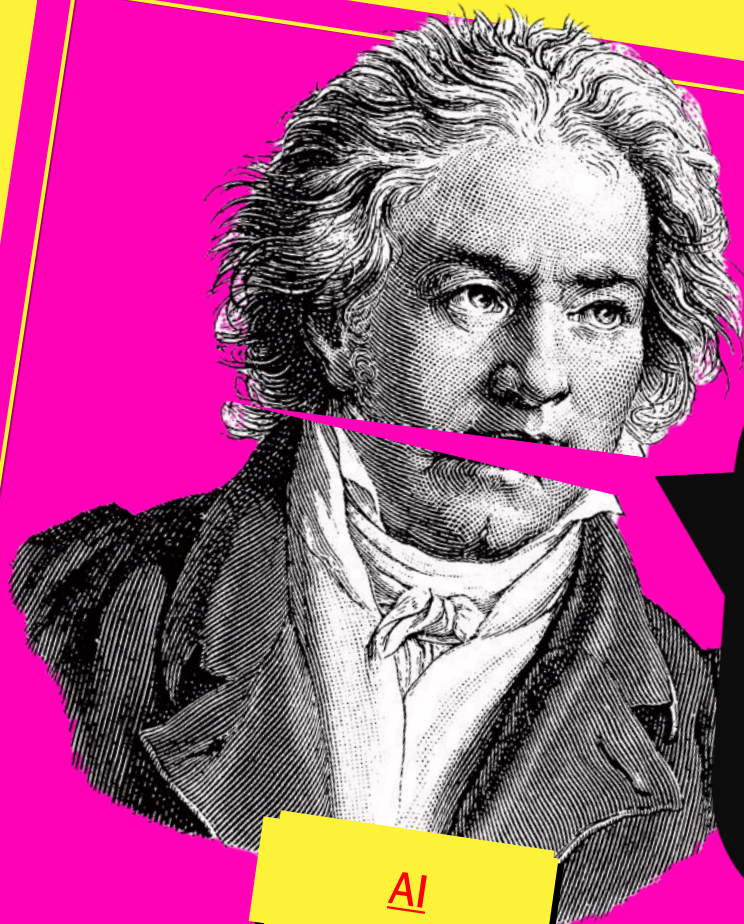
Introduction

DECISION FATIGUE

CHOICE OVERLOAD

We're here to change that!

TEQUILA!

AI

AI, AI, AI, AI, AI

AI, AI, AI

AI

AI

But, scary fact – Studies show that **too many choices can lead to regret**—even if you make a good decision! One study found that people who had too many options were 20% less satisfied with their choice, leading to what researchers call the "paradox of choice." Imagine signing up for a course, then constantly wondering if you picked the wrong one… for an entire semester! 😱
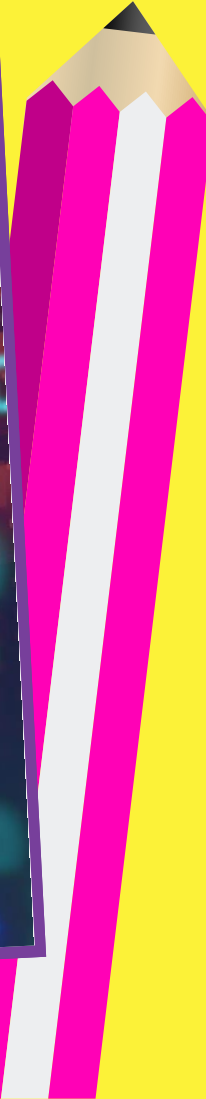
Market Justification

Top Ed-Tech Companies by CBI Mosaic Score

Company	Mosaic Score	Headline
duolingo	940	Duolingo Raises $45M from Google Capital
udemy	930	Udemy raises US$65m to disrupt the future of education
INSTRUCTURE	910	Instructure Raises $40M, Eyes IPO
coursera	890	China is now Coursera's second biggest market
pluralsight hardcore developer training	890	Pluralsight Gets Smarterer in $75M Deal
UDACITY Learn. Think. Do.	880	Google Teams with Udacity to Offer Nanodegrees
descomplica.	880	Brazil's Descomplica Attracts US$7m Growth Capital Led by Amadeus Capital Partners
toppr	870	Online test prep startup Toppr raises Rs 65 cr for expansion
schoology	860	Schoology helps teachers personalize the classroom
simplilearn your pace, your place	860	Simplilearn eyes one more acquisition worth $10M within a year

Target Audience Identification

▶ Primary Target Audience: University students aged 18-25 who are looking for personalized academic and career guidance while trying to find one or many ways to succeed at University.

▶ Demographic Characteristics: Students in higher education institutions (universities and colleges), while this is best for students of all ages, we chose higher education institutions as it helps narrow the market and also gives them an opportunity to follow the career soon after they graduate.

▶ Psychographic Characteristics: Students seeking guidance on balancing academic responsibilities with career planning, particularly those in competitive and technical fields like engineering, IT, and business. But also, students who are creatively focused but lacking in the skills needed and can be helped with a focus in pathways.
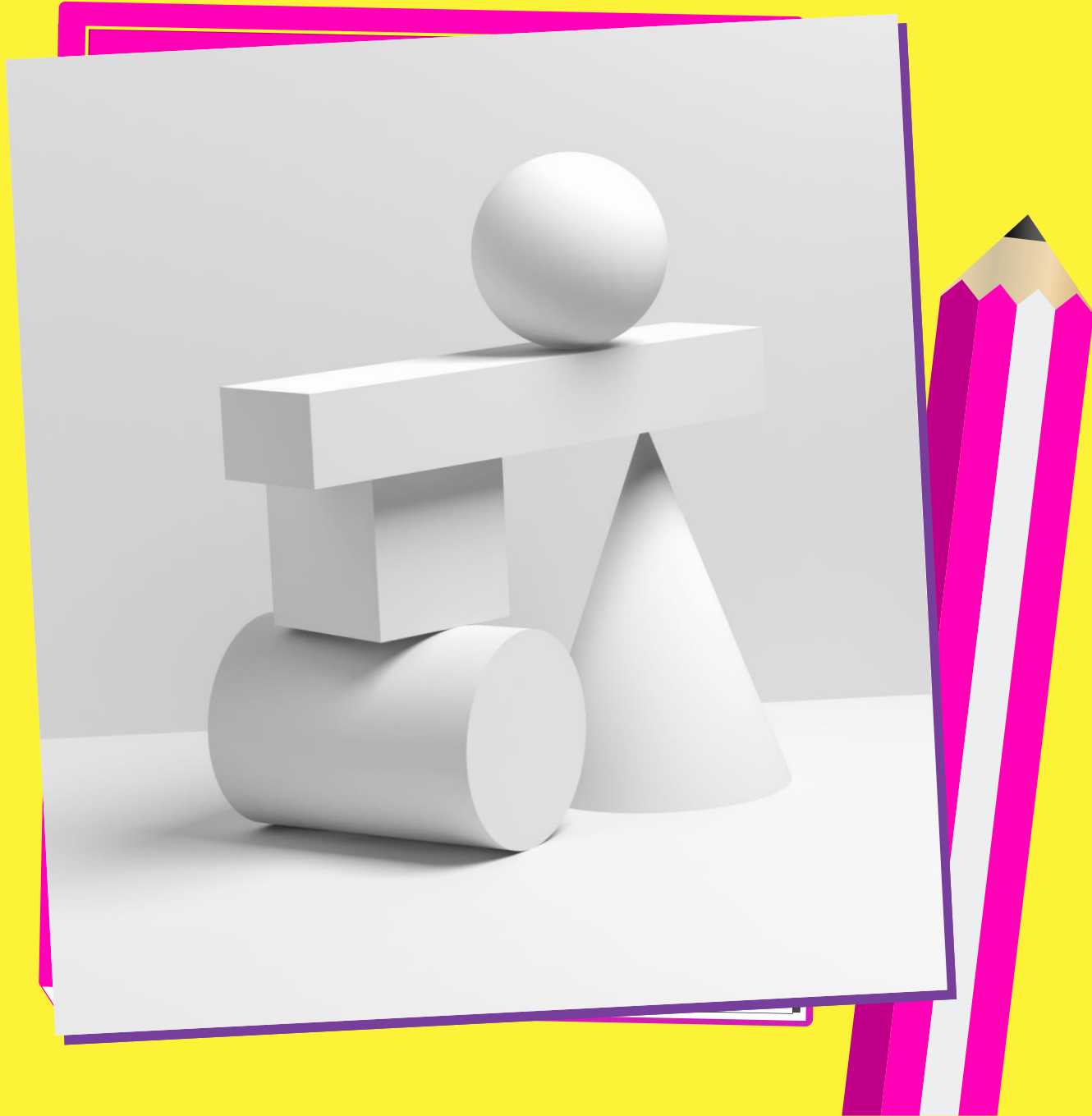
Feasibility and Viability

Technical and Operational Feasibility

Technical Feasibility:

➤ Technology requirements: AI models (GPT, BERT), NLP, data analytics

➤ Data availability: academic courses, student performance, privacy concerns

➤ Infrastructure: cloud-based solutions (AWS, Google Cloud, Azure)

➤ Expertise: AI developers, data scientists, educational experts

➤ Cloud Service Comparison: Scalability, pricing, and services of AWS, Google Cloud, and Azure

Operational Feasibility

➤ Resource Availability: Data, technology, and personnel must be accessible

➤ Scalability: AI system should support multiple users without compromising performance

➤ User Adoption & Training: Intuitive interface and training for staff/students

➤ Maintenance & Support: Regular updates, monitoring, and troubleshooting

Economic Feasibility

Initial setup vs. operational costs Visual: A stacked bar graph to visually differentiate between one-time investments (software, development, training) vs. recurring costs (hosting, model retraining, support).

➢ Operational Costs: Following launch, expenses will arise for support personnel, hosting, upkeep, and updates. By improving data utilisation and model efficiency, cloud hosting expenses can be kept under control.

➢ Possible ROI: The AI adviser might ease the workload for academic advisors who are human, increasing productivity and freeing them up to concentrate on more complicated issues.

Cost Breakdown Comparison: Initial Setup vs Operational Costs
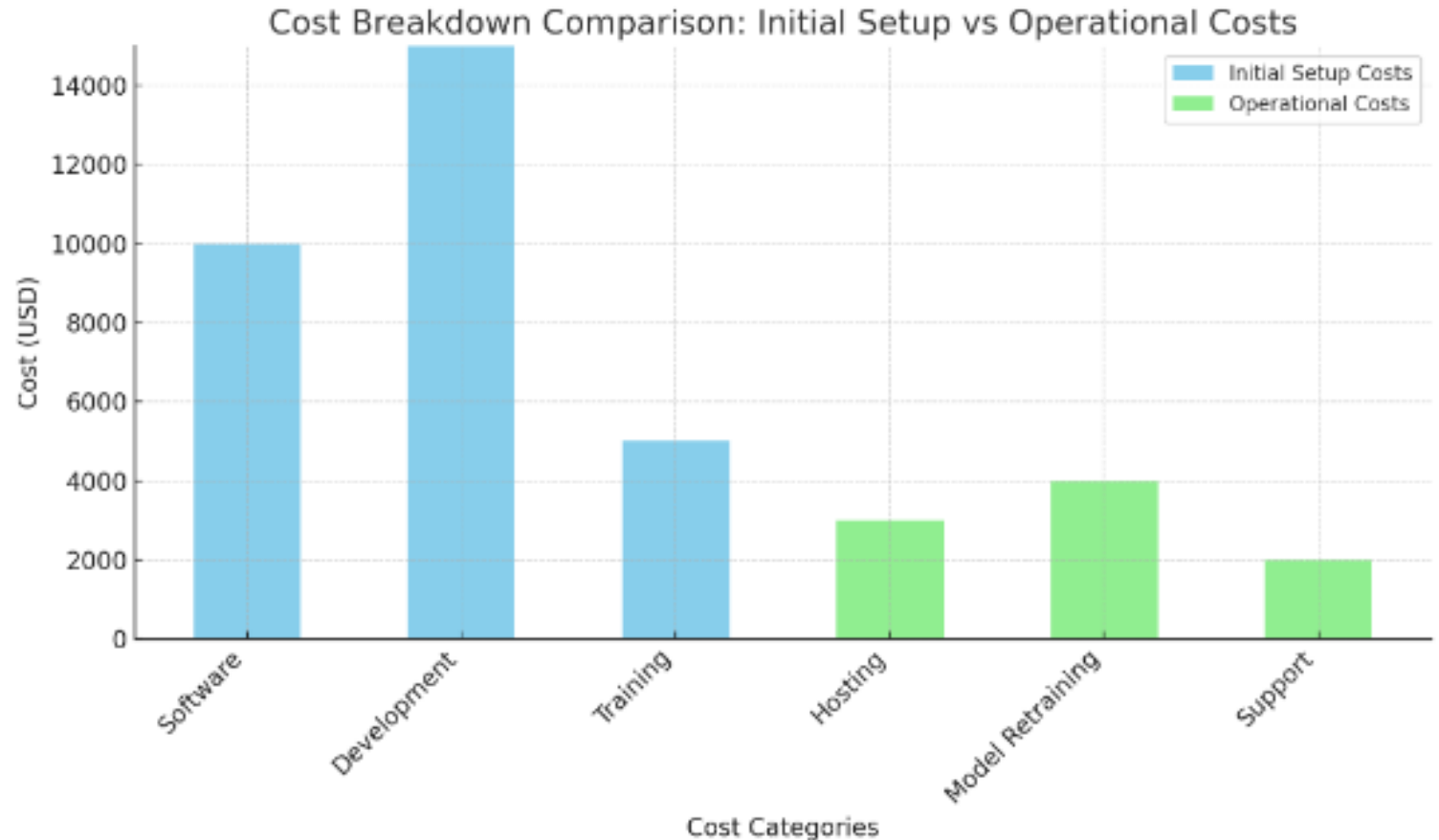
Solution Highlights

Use-Case Scenario

► Course Selection Support: Scenario: A first-year student, Alex, is uncertain about which courses to take for their major in Software Engineering. Interaction: The AI-Based Advisor uses Alex's academic records and career aspirations to suggest courses that align with both their graduation requirements and market-demand skills.

► Career Path Guidance: Scenario: Samantha, a third-year Computer Science student, is interested in AI research but unsure about industry-specific skills. Interaction: The system evaluates Samantha's completed courses and recommends supplementary certifications and relevant AI electives, directing her toward research-based internships.

► Alerts and Tracking: Scenario: Jamie, a second-year student, is struggling to meet GPA requirements for their desired graduation plan. Interaction: The system sends proactive alerts with academic resources, tutoring options, and course recommendations to help Jamie improve their academic standing.

Benefits and Impact

KEY BENEFITS OF AI BASED ACADEMIC ADVISOR

PERSONALIZED GUIDANCE
Tailored course recommendations and career path suggestions based on individual goals and academic records.

DATA DRIVEN INSIGHTS
Access to analytics for monitoring student performance trends, enabling proactive support.

IMPROVED RETENTION RATES
By keeping students on track, the AI advisor helps reduce dropout rates, benefiting the university's performance metrics.

CAREER READINESS
Strategic course and certification recommendations aligned with industry trends prepare students for the job market. while, AI handles routine advising interactions, reducing advisor workload and stress.

FOR STUDENTS, ADVISORS, UNIVERSITY ADMINISTRATION

Number of potential courses explored

— Without AI Based Academic Advisor 1   — With AI Based Academic Advisor
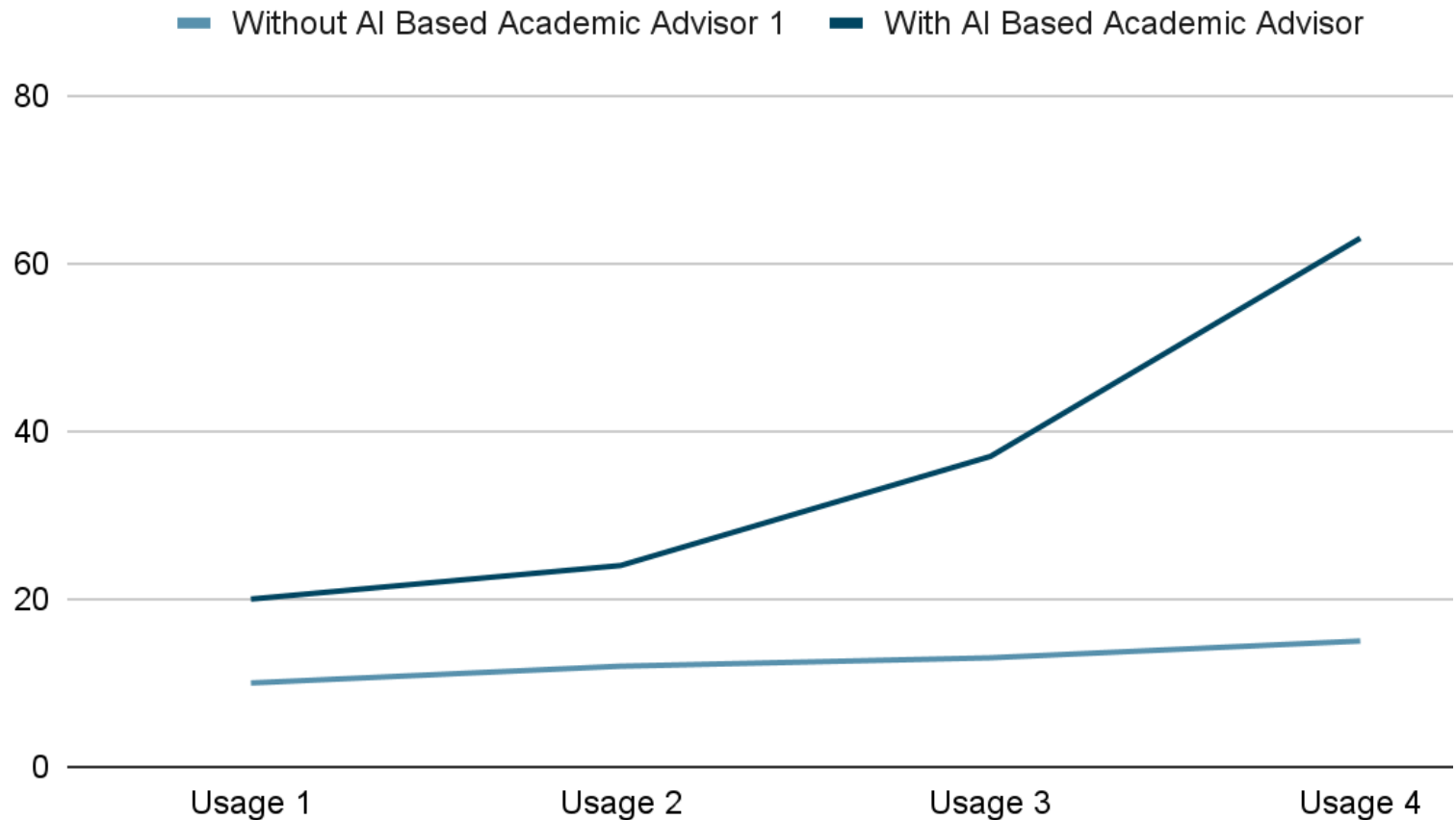
Project Plan Overview

Project Plan (WBS)

Budget: $595,000, **Goal**: AI-driven academic advising system using machine learning and NLP.

1. **Initiation & Structure (7 Days)**
   • Stakeholder interviews and requirements gathering.
   • Create Software Requirements Specifications (SRS).

2. **AI Model Design (6 Weeks)**
   • Develop machine learning algorithms and NLP models for academic recommendations.

3. **System Integration & Back-End (8 Weeks)**
   • Integrate AI with SIS, LMS, and configure cloud storage.
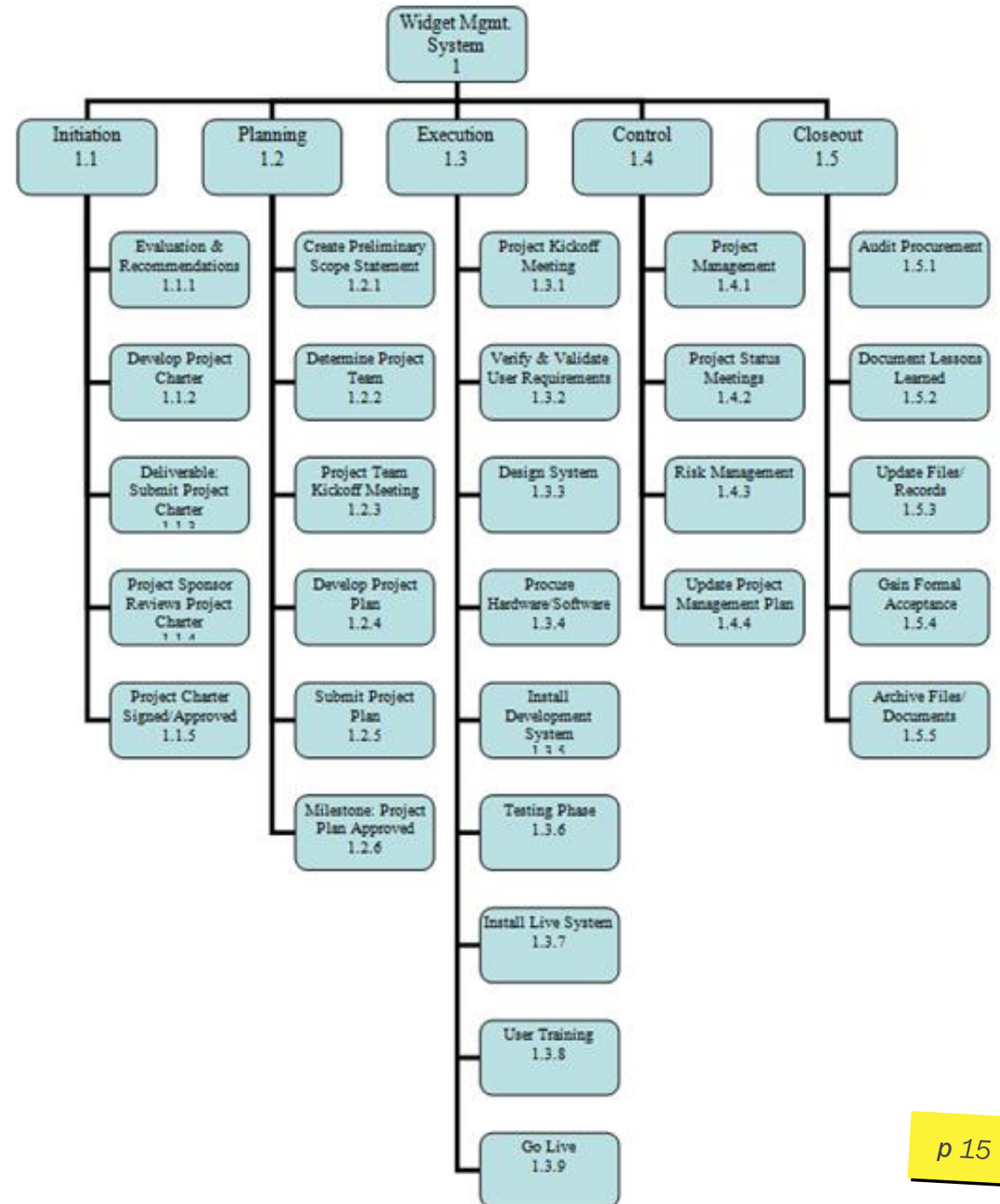
4. **Quality Assurance & Testing (4 Weeks)**
   • Perform regression, functional, and acceptance testing.

5. **Pilot Testing & Training (1 Month)**
   • Launch pilot with real user feedback and prepare training materials.

6. **Full System Launch (February 2025)**

   • Final launch and ongoing support.

Project Timeline

By combining a well-defined WBS with rigorous SLA's the program aims to deliver a reliable, efficient and compliant AI-based academic advisor platform.

1. Requirements analysis: Gathering and Documenting stakeholder needs.

2. AI Model development: Designing, training, and testing the AI model.

3. Backend Development: Integrating the system with existing systems like SIS and LMS.

4. Frontend development: Designing and developing the user interface.

5. Quality Assurance and Testing: Ensuring the system's functionality and reliability.

6. Pilot testing and Feedback: Launching a pilot version and gathering user feedback.

7. Training and Deployment Preparation: Developing training materials and ensuring compliance.

8. Full Deployment and Support: Launching the full system and providing ongoing support.

Phase	Timeline	Description
Phase 1: Requirements Gathering	Nov 1 - Nov 7, 2024	Identify and validate user requirements, finalize SRS.
Phase 2: AI Model and System Design	Nov 8 - Dec 31, 2024	Develop AI models, design system architecture, create UI prototypes, and integrate data.
Phase 3: System Integration and Testing	Jan 1 - Jan 31, 2025	Integrate the system with university databases, perform rigorous testing, and ensure quality standards.
Phase 4: Pilot Rollout	Feb 1 - Feb 15, 2025	Deploy the system to a selected group of students and advisors, collect feedback, and make necessary adjustments.
Phase 5: Full Implementation and Training	Feb 16 - Feb 28, 2025	Deploy the system to all users and provide training to students and academic advisors.

Gantt Chart
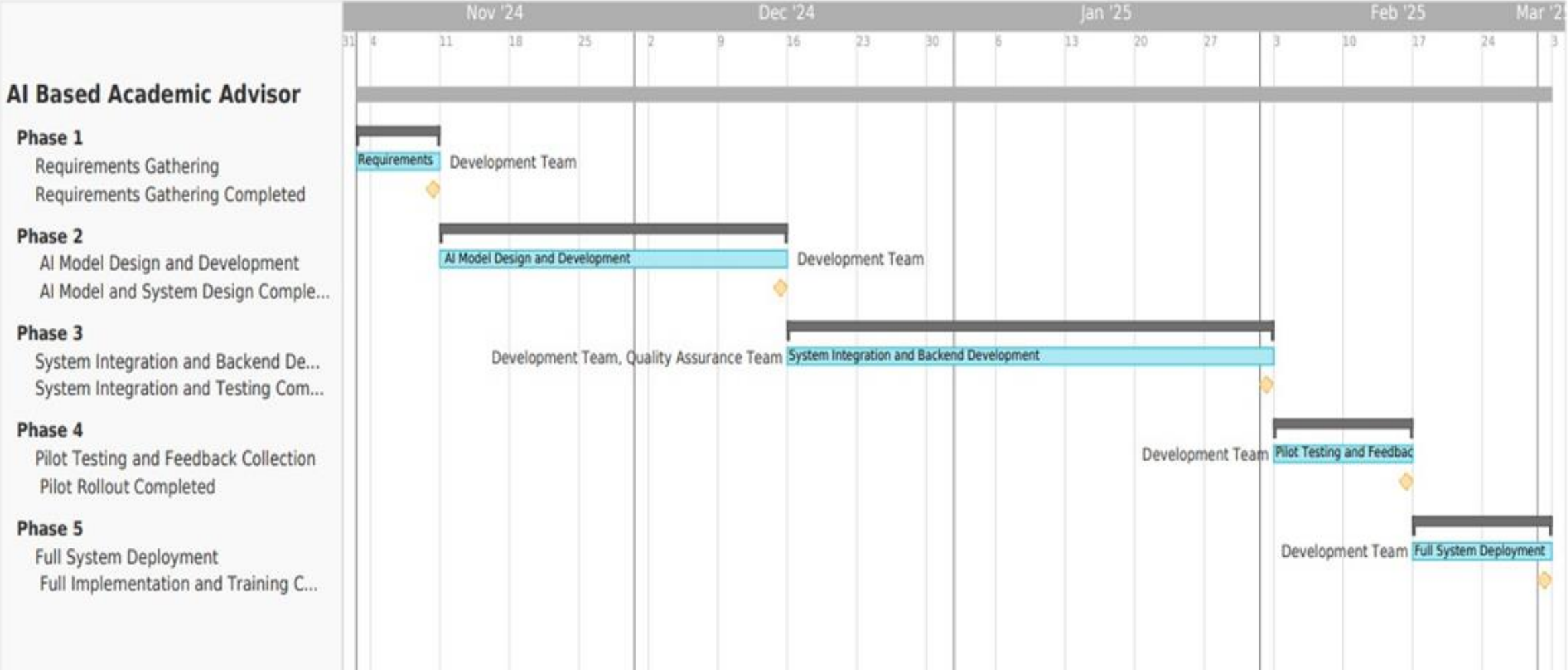
Risk Management Overview

Risk Identification

This plan aims to identify, analyze, and develop mitigation strategies for the associated risks while developing and deploying an AI-based academic advisor. Mitigations shall focus on reducing challenges and uncertainties for smooth project execution and successful outcomes.

► **Example risks:**

► Algorithm inefficiency can lead to poor predictions.

► Budget overruns due to unexpected software requirements.

| Risk Category	Description
Technical Risks	Technological, algorithmic selection, and data quality challenges.
Operational Risks	Issues arising from project management, staffing, and collaboration.
Economic Risks	Financial constraints, budget overruns, and resource limitations.
Project-Specific Risks	Potential delays in project milestones and scope creep.

Risk Impact Analysis

Assessment Parameters:

•Impact Level: High, Medium, Low.

•Likelihood: High, Medium, Low.

•Priority: High, Medium, Low.

Example Insights:

1."Data Quality and Availability" is a high priority due to its critical impact and likelihood.

2."Model Interpretability" is a low priority as it poses minimal risk to project success.

Risk Impact Analysis
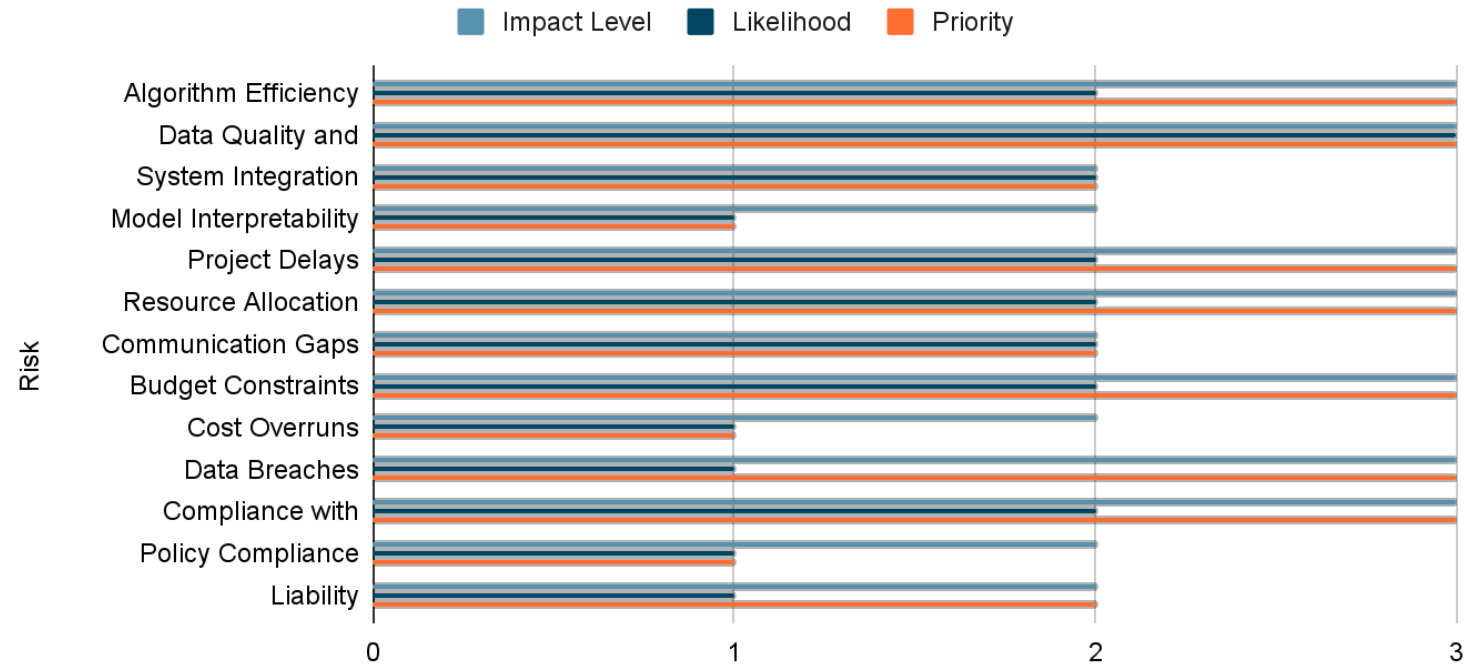
Risk Mitigation Strategies

1. **Algorithm Inefficiency:** Extensive testing and iterative updates.

2. **Data Privacy Risks:** Implement encryption, anonymization, and auditing.

3. **Resource Availability:** Cross-train team members and schedule buffers.

4. **Budget Overrun:** Establish emergency reserves and reallocate resources.

► **Contingency Plans:**

1. Address skill shortages with temporary consultants.

2. Lower non-critical expenditures during budget constraints.
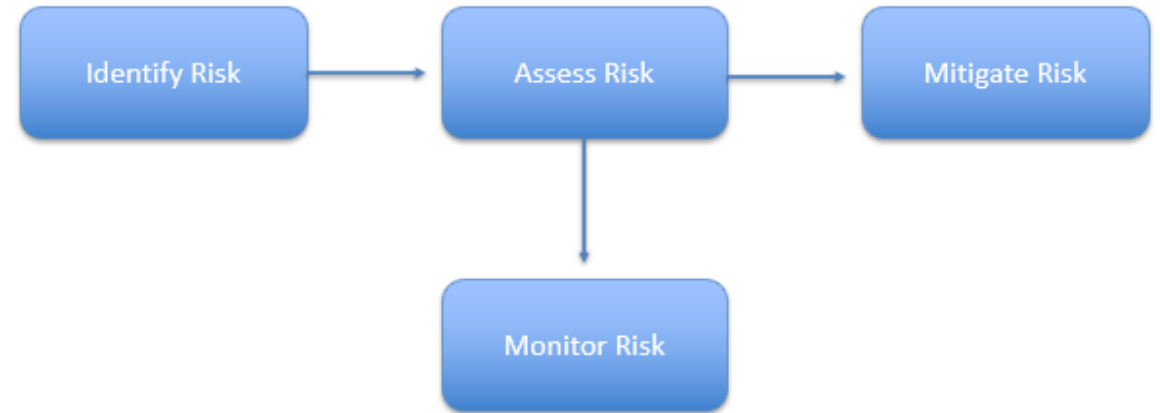
Budget Overview

Budgeting and Resource Costing

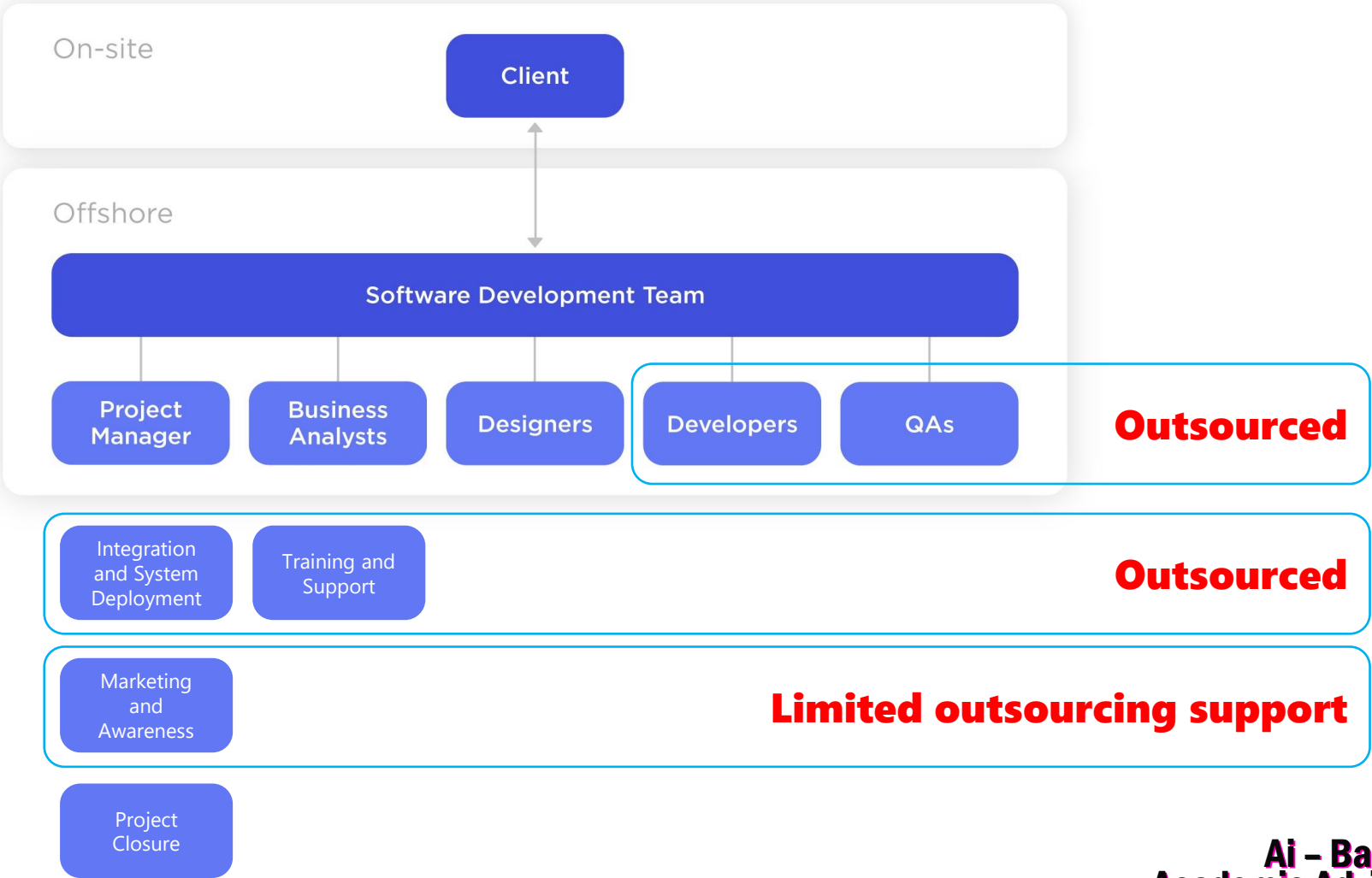➤ We used a modified Delphi Method for resource estimation, drawing from research conducted on credible and legitimate sources. This involved consulting recognized industry standards and effort benchmarks from authoritative websites and publications. Through iterative refinement of these inputs, we arrived at consensus-based estimates for the required resources and effort.

➤ We have strategically decided to outsource the software development process, focusing on critical phases of the project lifecycle that require specialized expertise, particularly in areas such as AI and machine learning. This decision stems from our recognition of having minimal to very limited in-house knowledge in these advanced fields. To ensure the success of the project and to achieve the desired quality standards, we identified the need to engage expert personnel to take charge of the construction phase and contribute to other key areas where our internal capabilities are insufficient.

❖ By outsourcing to experienced professionals, we aim to mitigate risks associated with skill gaps, accelerate the development timeline, and ensure the integration of cutting-edge technologies into the project. This approach not only enhances the technical quality of the deliverables but also allows our team to focus on core competencies, such as project planning, oversight, and coordination, ensuring a balanced and efficient workflow throughout the software development lifecycle.

Budgeting and Resource Costing

TEAM STRUCTURE

On-site

Client

Offshore

Software Development Team

| Project Manager | Business Analysts | Designers | Developers | QAs |

Outsourced

Integration and System Deployment

Training and Support

Outsourced

Marketing and Awareness

Limited outsourcing support

Project Closure

Budgeting and Resource Costing

I. Development and Outsourcing Costs
   A. AI Model Development [2 – 3 data scientists / ML engineers] [$120,000]
      This cost covers the design, development, and training of custom machine learning algorithms for personalized academic advising. Outsourcing rates for AI development can range from $50 to $150 per hour【source: Clutch】. A project of this scope, requiring approximately 1,200-1,500 hours, falls within the $100,000 to $150,000 range.

   B. Software Development [4 – 5 software developers] [$100,000]
      This includes frontend and backend development for the web/mobile interfaces and system integration. Software development outsourcing typically costs between $40 to $100 per hour【source: Accelerance】. The project scope estimates around 1,200 hours for development.

II. Integration and System Deployment
   A. Integration with University Systems [1 – 2 integration specialists] [$50,000]
      This budget covers API development, data pipeline creation, and integration with existing university systems. Specialized integration work can be outsourced at rates between $60 to $120 per hour【source: GoodFirms】.

   B. Cloud Infra and Hosting [$50,000]
      The cost for cloud infrastructure management for a year, including AWS or Google Cloud hosting.

III. Testing and Quality Assurance
   A. QA Testing [2 – 3 QA Testers] [$25,000]
      Functional, regression, and user acceptance testing are included. QA outsourcing typically ranges from $30 to $50 per hour, with around 500-600 hours estimated for thorough testing.

   B. Pilot Program [$10,000]
      Conducting a pilot test with a controlled user group and collecting feedback for adjustments.

IV. Training and Support
   A. Training for Advisors and Students [$15,000]
   B. On-going Technical Support [1 – 2 support staff] [$40,000]
      Covers the cost for a year of technical support and maintenance post-launch. Typical support outsourcing ranges from $30,000 to $50,000 annually【source: Upwork】.

V. Marketing and Awareness
   A. Promotion to Advisors and Students [$20,000]

VI. Compliance
   A. Data Privacy Compliance [$15,000]

VII. Contingency
   A. Contingency Budget [$50,000]
      Reserved for unforeseen expenses, calculated as approximately 10-15% of the project budget.

Summary of resource estimation

|		
I.	Development and Outsourcing Costs	$220,000
II.	Integration and System Deployment	100,000
III.	Testing and Quality Assurance	35,000
IV.	Training and Support	55,000
V.	Marketing and Awareness	20,000
VI.	Compliance	15,000
VII.	Contingency	50,000
VIII.	Project Management	100,000
Total Budget		$595,000

Ai – Based
Academic Advisor

Conclusion

Our AI-based Academic Advisor addresses a critical need in education, offering tailored solutions for students and institutions.
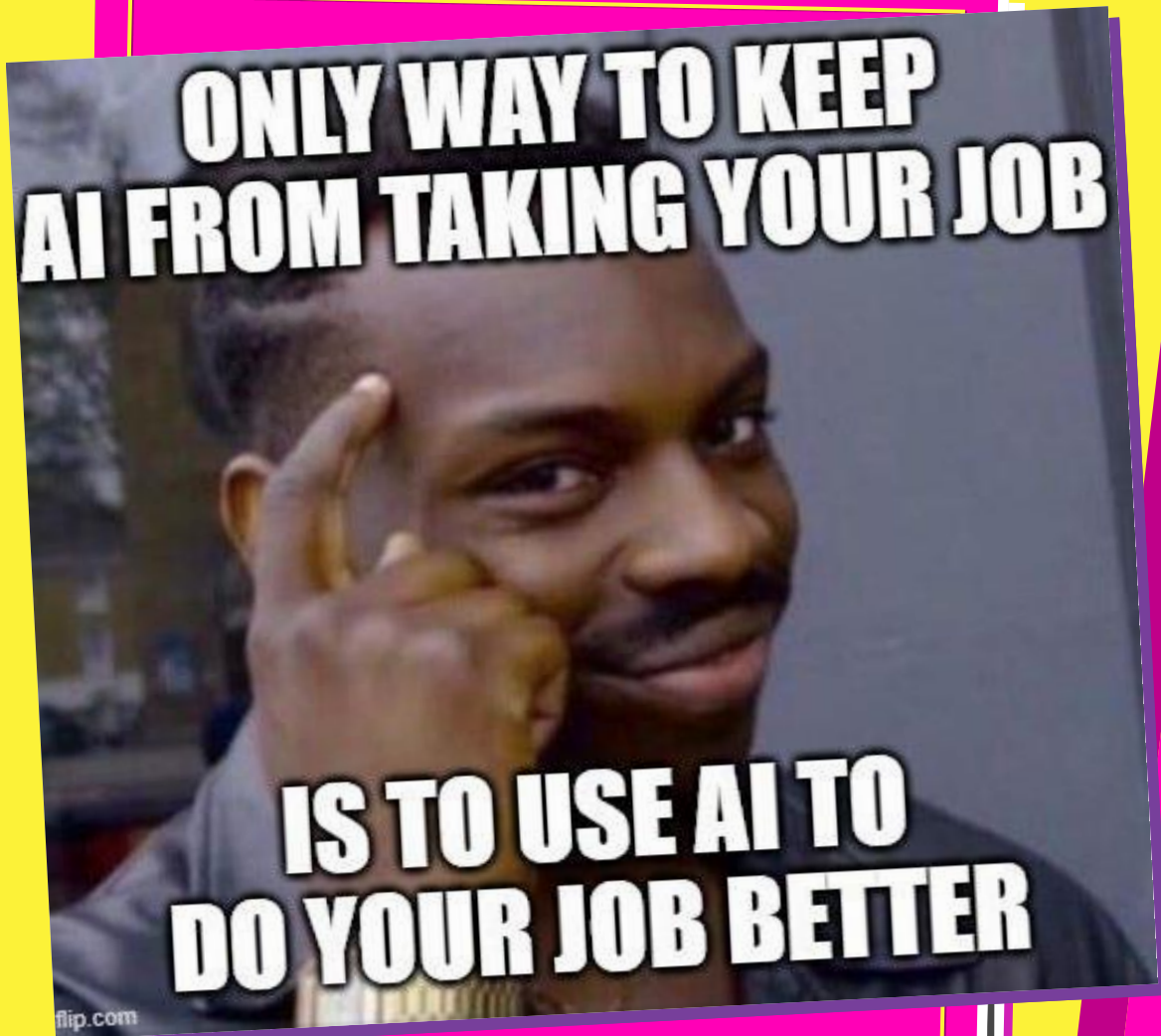
Tailored
Education
Qualitative
Understanding
Individualized
Learning
Assistance

OUR MISSION STATEMENT

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Thank You

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Any Questions?