Final Year Project Proposal

UniMatch

AI-Powered Group Project Partner Finder

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1. Executive Summary

UniMatch is a web-based platform designed to revolutionize how university students form project teams. Using AI-powered recommendations, the system matches students based on complementary skills, schedule compatibility, and work styles—eliminating the frustration of random team assignments and mismatched collaborations. The platform targets **50,000+ students** across Lahore universities (Superior, UMT, FAST, UET) and offers both educational value and startup potential with freemium monetization.

Key Highlights
✓ Solves real pain point in academic collaboration
✓ MERN stack (industry-standard technology)
✓ AI-powered intelligent matching
✓ Built-in task management and chat
✓ Scalable business model with PKR 7M+ revenue potential

2. Problem Statement

The Challenge

ADP and BSCS students at Superior University and other Lahore institutions face significant challenges in group project formation:

- **Random Team Assignment:** Teachers often assign groups randomly, leading to skill mismatches
- **Friend-Based Selection:** Students pick friends over competent partners, affecting quality
- **Schedule Conflicts:** Teams struggle to find common meeting times
- **Unequal Workload:** Free-riders and unbalanced contributions are common
- **No Systematic Solution:** Current methods (WhatsApp groups, manual coordination) are inefficient

Impact

Metric	Impact
Student Dissatisfaction	60% report dissatisfaction with team formations
Grade Penalty	Average 15-20% grade penalty due to poor dynamics
Time Wasted	5-10 hours per project on coordination issues
Stress Level	High stress and burnout from unreliable teammates

Group projects constitute **40-50% of assessment** in courses like Web Engineering, Software Engineering, Database Systems, and Mobile App Development. Poor team formation directly impacts academic performance and learning outcomes.

3. Objectives

Primary Objectives

1. **Develop an AI-powered matching system** that recommends compatible teammates based on technical skills (React, Node.js, UI/UX), schedule availability, work style preferences, and past performance ratings
2. **Create a centralized platform** for project listing and discovery, team formation and communication, and task management and progress tracking
3. **Improve collaboration outcomes** by reducing team mismatch rate by 70%, increasing student satisfaction scores, and enhancing project quality and grades

Secondary Objectives

4. Build a scalable solution that can expand to 20+ universities across Pakistan
5. Demonstrate technopreneurship skills with viable business model
6. Contribute to educational technology in Pakistani higher education sector

4. Proposed Solution

UniMatch is a comprehensive web application where students create detailed profiles with skills, availability, and preferences, browse project listings posted by teachers or fellow students, receive AI-generated recommendations for compatible teammates, connect and chat with potential partners before finalizing teams, manage projects collaboratively using built-in Kanban boards, and rate teammates post-project to build reputation scores.

How It Works - User Journey

1. **Sign Up:** Register with university email
2. **Build Profile:** Add skills, availability, work style
3. **Find Project:** Browse available projects by course
4. **View Matches:** AI recommends top 3-5 compatible students
5. **Send Request:** Chat with matches, discuss roles
6. **Form Team:** Finalize team composition
7. **Collaborate:** Use task board, track progress
8. **Rate & Review:** Build reputation for future projects

Target Users

Primary: ADP & BSCS students at Superior University (Semesters 3-8)
Secondary: Teachers (project creation, team monitoring)
Tertiary: University administration (analytics, reporting)

5. Key Features

Student Profile System

- University email verification and authentication
- Skills tagging (React, Python, UI/UX, etc.)
- Work style selection (night owl, early bird, deadline-driven)
- Availability calendar integration

Project Listing Board

- Teachers/students post project requirements
- Specify needed skills and team size
- Filter by course, semester, department

AI-Powered Matching Engine

- Analyzes student profiles against project needs
- Returns top 3-5 compatible teammates with reasoning
- Shows schedule overlaps and skill synergies

Team Formation & Communication

- Send/receive team-up requests
- Real-time chat for discussions
- Lock team composition once finalized

Collaborative Task Board

- Kanban-style interface (To-Do, In Progress, Done)
- Assign tasks with deadlines and notifications
- Track individual contributions

Peer Rating System

- Post-project anonymous reviews
- Rate on: Communication, Contribution, Reliability
- Reputation scores displayed on profiles

6. Technology Stack

Component	Technology	Purpose
Frontend	React.js 18+	Component-based UI
	TailwindCSS	Styling framework
Backend	Node.js + Express.js	Server & API
Database	MongoDB Atlas	Cloud NoSQL database
AI	OpenAI GPT-3.5-turbo	Intelligent matching
Real-time	Socket.io	Chat & notifications
Auth	Clerk/Auth0	User authentication
Hosting	Vercel + Render	Free tier deployment

Why MERN Stack?

- **Industry Standard:** Used by top Pakistani companies (Systems Ltd, Arbisoft)
- **Single Language:** JavaScript for both frontend and backend
- **Abundant Resources:** 1000+ tutorials and strong community support
- **Portfolio Value:** Impressive for job applications

7. AI Integration

The AI component uses **OpenAI's GPT-3.5-turbo model** to analyze student profiles and generate intelligent teammate recommendations based on complementary skills, schedule compatibility, work style alignment, and past performance ratings.

Matching Algorithm Flow

→ **Input:** Project requirements, student profile, candidate pool

→ **Processing:** AI analyzes skill complementarity and schedule overlaps

→ **Output:** Top 3-5 matches with compatibility scores and reasoning

Sample AI Response Example

Match 1: Aliya Khan (92% compatible)
Reasoning: Strong React skills complement your Node.js expertise; overlaps 3 free slots/week.

Match 2: Ahmed Raza (87% compatible)
Reasoning: Database optimization experience fills project gap; similar work ethic.

Cost Efficiency

Metric	Value
Cost per recommendation	~PKR 0.50 ($0.002 USD)
Monthly budget (100 users)	~PKR 50-100
Free tier allowance	$5 = ~2,500 recommendations

8. System Architecture

UniMatch follows a three-tier architecture with clear separation of concerns between presentation, business logic, and data layers.

Architecture Layers

- **Client Layer:** React application with TailwindCSS and Socket.io client
- **Application Layer:** Express.js API with authentication middleware and WebSocket server
- **Data Layer:** MongoDB Atlas, OpenAI API, and Clerk authentication service

Key Database Collections

- **Students:** name, email, skills, availability, ratings
- **Projects:** title, course, required skills, team size, deadline
- **Teams:** project reference, members, tasks
- **Messages:** sender, content, timestamp
- **Ratings:** reviewer, scores, comments

Sample API Endpoints

- `POST /api/auth/register - User registration`
- `GET /api/projects - List projects`
- `GET /api/match/recommendations/:projectId - Get AI matches`
- `POST /api/teams - Create team`
- `POST /api/ratings/:teamId - Submit rating`

9. Project Timeline

The project is planned for **12 weeks (3 months)** divided into four phases with clear deliverables.

Phase 1: Planning & Design (Week 1-2)

- ✓ User research and wireframe creation
- ✓ Database schema and API design

Phase 2: Core Development (Week 3-8)

- ✓ Week 3-4: Authentication & profile system
- ✓ Week 5-6: Project listing & AI matching
- ✓ Week 7-8: Team formation & real-time chat

Phase 3: Advanced Features (Week 9-10)

- ✓ Task board implementation
- ✓ Rating system and notifications

Phase 4: Testing & Deployment (Week 11-12)

- ✓ Testing, bug fixes, deployment
- ✓ Beta testing and documentation

Milestone Deliverables

Milestone	Deliverable	Week
M1	Proposal & wireframes	Week 2
M2	Auth & profiles working	Week 4
M3	AI matching functional	Week 6
M4	Complete MVP deployed	Week 10
M5	Final presentation	Week 12

10. Business Potential

Target Market

University	Students	Potential (5%)
Superior University	15,000	750
UMT	12,000	600
FAST-NUCES	8,000	400
UET Lahore	25,000	1,250
TOTAL	**60,000**	**3,000**

Revenue Streams

- **Freemium:** PKR 500/month premium → 1,000 users = PKR 6M/year
- **University Licensing:** PKR 50,000/year × 3 universities = PKR 150K
- **Sponsored Content:** PKR 10,000/listing × 5/month = PKR 600K/year
- **Advertising:** PKR 30,000/month = PKR 360K/year

Total Projected Revenue (Year 1): PKR 7.11 million (~$25,000 USD)

11. Expected Outcomes

Academic Benefits

- **Improved Team Quality:** 70% reduction in skill mismatches
- **Better Grades:** 15-20% improvement in project scores
- **Time Savings:** 5+ hours saved per project on coordination
- **Faculty Benefits:** Better outcomes and reduced complaints

Technical Skills Development

Students will gain expertise in full-stack MERN development, AI/ML integration, real-time systems, database design, cloud deployment, and UX design—all highly valued in the Pakistani tech industry.

Innovation Contribution

- First-of-its-kind solution for Pakistani universities
- Potential research paper on AI in educational team formation
- Open-source contribution and template for future startups

12. Conclusion

UniMatch addresses a critical gap in Pakistan's higher education system—the lack of systematic, intelligent team formation for group projects. By leveraging modern web technologies and AI, this project delivers:

- ✓ **Real-world impact** for 50,000+ students
- ✓ **Technical innovation** with AI-powered matching
- ✓ **Business viability** with PKR 7M+ revenue potential
- ✓ **Feasibility** within 12-week timeline
- ✓ **Scalability** to national level

This project aligns with Superior University's focus on practical solutions, emerging technologies, and student-centric innovation. We are excited to develop UniMatch and believe it has the potential to transform academic collaboration across Pakistan.

_____	_____
Student Signature	Supervisor Signature
Sharjeel Arshad	Mr. Waqas
Date: _____	Date: _____

Appendix A: Project Cost Breakdown

Item	Cost (PKR)	Duration
Domain (.pk)	1,500	1 year
OpenAI API credits	2,000	3 months
All hosting (free tier)	0	Ongoing
TOTAL	**PKR 3,500**	**Project duration**

Appendix B: Contact Information

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Project Resources:
GitHub Repository: github.com/SharjeelArshad0220/UniMatch (to be created)
Documentation: https://drive.google.com/drive/folders/1ErF1rf90fwh_Q42Kiss6Qf8s6qttZ_QH

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