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Title: LoadSense: Academic Overload Detection System

1. Problem Statement

In semester-based colleges, academic evaluations such as assignments, vivas, quizzes, and group projects are scheduled independently by different instructors without a centralized coordination mechanism. As a result, students frequently experience deadline clustering, where multiple high-impact evaluations fall within the same 5–7-day period.

This issue affects undergraduate students across departments and occurs repeatedly every semester, particularly during midterm and final assessment periods. Students often become aware of overlapping deadlines only a few days in advance, leaving insufficient time for balanced preparation.

The consequences are measurable. Students experience preventable stress, reduced sleep, last-minute submissions, and lower-quality work. Group projects become chaotic as teams rush to meet simultaneous deadlines, increasing internal conflict and unequal contribution. In some cases, students miss submissions despite having adequate subject understanding.

This problem is widely observed in campus environments where late-night study patterns spike during peak academic weeks. The absence of workload visibility tools allows this friction to persist, affecting a large portion of the student population every semester.

2. Proposed Solution

LoadSense is a workload intelligence web application that enables students to anticipate academic overload before it occurs.

Users interact through a dashboard where they input upcoming academic evaluations such as assignments, vivas, and projects. Instead of simply displaying deadlines, the system visualizes workload intensity across upcoming weeks, highlighting potential overload periods using clear visual indicators.

Students receive early alerts when multiple high-impact evaluations are scheduled within a short timeframe. This allows them to begin preparation earlier, distribute effort more effectively, and coordinate better with group members.

Unlike traditional college portals that list deadlines without context, LoadSense focuses on workload awareness. It transforms scattered academic timelines into meaningful signals that help students make informed preparation decisions.

An administrative perspective can also provide insights into workload distribution trends, supporting better academic scheduling practices.

By providing visibility into upcoming academic pressure points, the system helps reduce preventable stress and supports more balanced academic planning.

3. Technical Approach

LoadSense will be developed as a web-based system using the MERN stack.

The interface layer will be built using React, providing a user-friendly dashboard where students can add deadlines and visualize workload distribution.

The logic layer will be implemented using Node.js with Express. Aaryan Karki and Samir Bhandari will design and implement workload analysis logic, including deadline clustering detection and overload scoring based on evaluation weight.

The storage layer will use MongoDB to persist deadlines, course data, and workload indicators. Anish Tamang will manage database design and ensure data persistence.

Amit Pokhrel will develop the frontend interface and user interaction layer.

Deployment will be done through cloud platforms such as Vercel (frontend) and Render/Railway (backend), with MongoDB Atlas ensuring persistent storage. The system will be accessible via a live URL.

4. Team Composition

Our team consists of five members with clearly defined roles aligned to system layers.

- Amit Pokhrel – Frontend Developer (Interface Layer)
- Samir Bhandari – Backend Developer (Logic Layer)
- Aaryan Karki – Backend Developer (Logic Layer)
- Anish Tamang – Database Engineer (Storage Layer)
- Isha Karki – Research & Business Strategy

Aaryan Karki and Samir Bhandari will be responsible for system logic and overload detection algorithms. Anish Tamang will handle database design and persistence. Amit Pokhrel will develop the user interface. Isha Karki will lead research and business analysis.

This distribution ensures full coverage of interface, logic, and storage layers as required and supports efficient collaboration within the development timeline.

5. Feasibility Statement

The proposed system is feasible within the four-day development period due to its focused minimum viable product scope.

The MVP will include deadline input, workload visualization, and clustering detection with overload alerts. If time constraints arise, advanced features such as AI-assisted planning and administrative analytics will be deferred.

The team's familiarity with MERN technologies enables rapid implementation of core functionality.

By prioritizing essential features and limiting scope to workload detection and visualization, we are confident in delivering a complete, deployable system within the hackathon timeline.

6. Business Perspective

LoadSense creates value for higher education institutions by improving visibility into academic workload distribution.

The primary users are students, while the primary paying customers would be colleges and universities seeking to improve academic coordination and student performance outcomes.

The solution can generate value through a subscription-based model offered to institutions on a per-student basis. By reducing deadline clustering and improving preparation visibility, institutions benefit from improved academic outcomes and reduced performance-related stress.

The potential market includes local colleges initially, with opportunities to expand regionally and nationally across semester-based education systems.

The solution is sustainable beyond the hackathon because academic workload coordination is a recurring institutional challenge, making this system applicable across multiple academic environments over time.