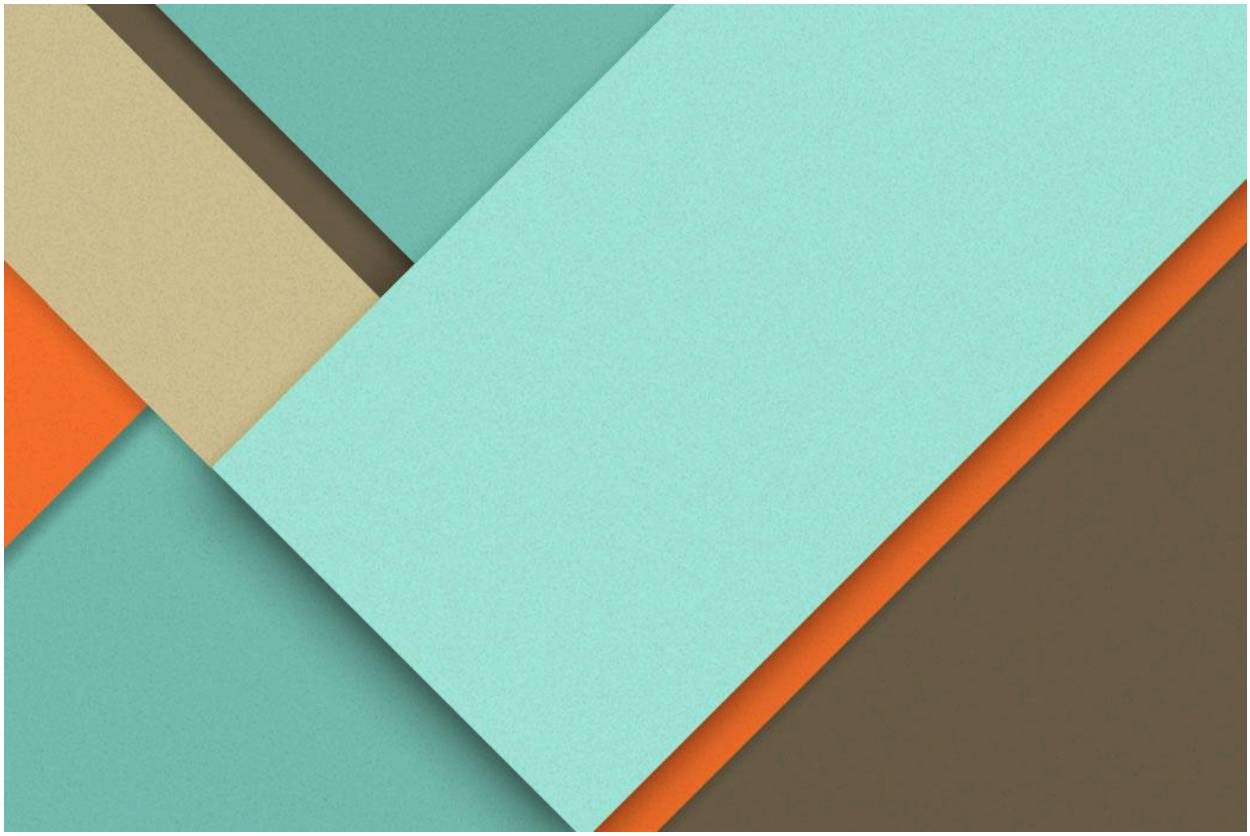


MTD EcoLeveling

02.17.2025

Team 099- BigBallers

Yu Fu

Rahul Reddy

Jay Malavia

Allen Kaile Yuan

Project Summary

The **MTD EcoLeveling** system is meant to inspire and reward the use of public transit on the University of Illinois Urbana-Champaign grounds. The system uses real-time access to bus schedules, routes, and locations to combine a tiered rewards model whereby users rank depending on their bus frequency of use. Users level up to access perks including free rides, priority seating, and seat selection, which inspire more frequent public transportation use. By lowering reliance on individual vehicles and thereby easing campus traffic, this gamified method not only increases the ease of bus travel but also supports environmental sustainability. MTD EcoLeveling encourages staff, professors, and students to choose environmentally friendly, more sustainable transportation choices, therefore helping to lower campus traffic and pollution.

Description

Goal:

The **MTD EcoLeveling** system offers a complete platform whereby users may monitor bus schedules and routes in real-time and be rewarded for using public transit. Users gain points for every bus travel using a leveling system, which advances through ranks and grants benefits as system usage increases. This will produce a competitive but fulfilling experience that supports eco-friendly travel and aids in lessening campus traffic congestion.

Problem It Solves:

On the University of Illinois Urbana Champaign campus, public transit is underused; many staff members and students would rather drive personal cars, which aggravates traffic and pollution. **MTD EcoLeveling** tackles this problem by not only giving a more practical approach to use the bus system but also by rewarding bus travel, making it more enticing than driving alone. It offers a more easily available, ecologically friendly, incentivized substitute for car use. This system could also be deployed in other universities and cities in the future.

Core Features:

1. **Real-Time Bus Schedule and Route Information**: Users will get live schedules and transit locations to more precisely arrange their travels.

2. **Tiered Rewards System**: Using the buses often will let users level up and access benefits including free rides, priority seating, and seat choice ability.
3. **User Profiles and Rankings**: Every user will register to monitor their bus utilization, current rank, points, and accessible incentives. Users of the system will be able to track their development and challenge themselves to level up, therefore fostering a competitive environment.
4. **Environmental Impact Tracker**: The tracker will show users' bus use's traffic and pollution-reducing effect, therefore motivating them to keep using public transport.

Creative Component

The year is 2030. A phenomenon known as "awakening" descends on humanity, leaving those lucky enough with powers unfathomable to the average person. As a student of the U of I, you are overjoyed when you receive news of your awakening. You dream of being the strongest awakener in history, but the reality is not so kind, as you are evaluated as a mere E-rank. As an E-rank hunter, you have great difficulty finding work as an awakened knight before you finally receive a chance as a trainee hunter for the MTD.

However, when all hope is lost, you wake up one morning with a system. The System promises you strength in exchange for completing quests involving various MTD bus routes across Urbana-Champaign. Will you remain weak, or will you take the chance of a millennium to become unparalleled under the heavens? The choice is yours.

A creative component for our application is an interactive, gamified visualization dashboard that dynamically displays users' transit journeys and environmental impact. This dashboard, inspired by the System used by Sung Jin Woo, the main character of Solo Leveling, would merge data to create animated progress bars, detailed level charts, and environmental impact graphs. The technical challenge lies in transforming raw data into intuitive, responsive visualizations recommending optimal routes on an interactive map and engaging users by showcasing their evolving rewards and journey milestones. We intend to make the user the main character of their own story through this app and promote a journey of eco-friendly behavior for each and every user.

Inspiration for MTD EcoLeveling!
https://solo-leveling.fandom.com/wiki/Solo_Leveling_Wiki

Usefulness

Our web application provides comprehensive transit information—such as bus stops, routes, and schedules—while **enabling users to log their trips and earn rewards for eco-friendly travel**. Users can plan trips, view detailed transit data, and track their progress toward earning points. Compared to the Transit app, which focuses on real-time navigation and scheduling, our platform uniquely **gamifies the transit experience**, encouraging and rewarding sustainable travel behaviors.We are using this system to help promote usage of transit, and in the future this leveling system + rewards can enable users to be more inclined to use the application.

Realness

Our primary dataset is the **GTFS static dataset from MTD**, provided as a collection of TXT files in CSV format. It includes:

- fare_products.txt: 5 columns, 9 rows – Captures fare product details.
- timeframes.txt: 4 columns, 340 rows – Details service timeframes.
- agency.txt: 8 columns, 1 row – Contains agency information.
- areas.txt: 2 columns, 2 rows – Lists area data.
- calendar_dates.txt: 3 columns, 13,026 rows – Records service exceptions.
- stop_times.txt: 9 columns, 211,085 rows – Outlines scheduled stops and times.
- shapes.txt: 5 columns, 107,749 rows – Defines route geometries.
- trips.txt: 10 columns, 5,727 rows – Details individual trips including route and service info.
- feed_info.txt: 9 columns, 1 row – Provides feed metadata.
- fare_leg_rules.txt: 8 columns, 5 rows – Specifies fare rules between areas or timeframes.
- stop_areas.txt: 2 columns, 1,941 rows – Associates stops with areas.
- stops.txt: 13 columns, 1,941 rows – Contains comprehensive stop details.
- fare_transfer_rules.txt: 7 columns, 1 row – Outlines transfer rules.

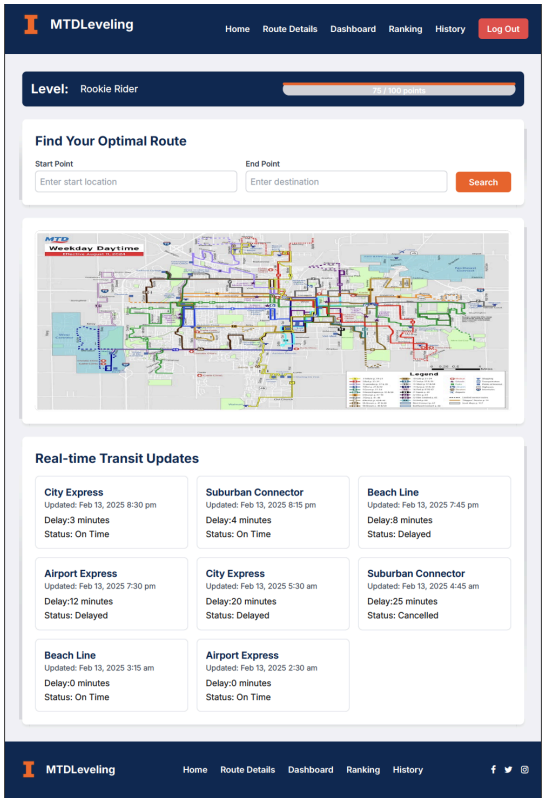
- calendar.txt: 341 rows (header missing) – Intended for regular service schedules.
- routes.txt: 10 columns, 103 rows – Provides route metadata, including names and colors.
- fare_media.txt: 5 rows (header missing) – Captures fare media details.

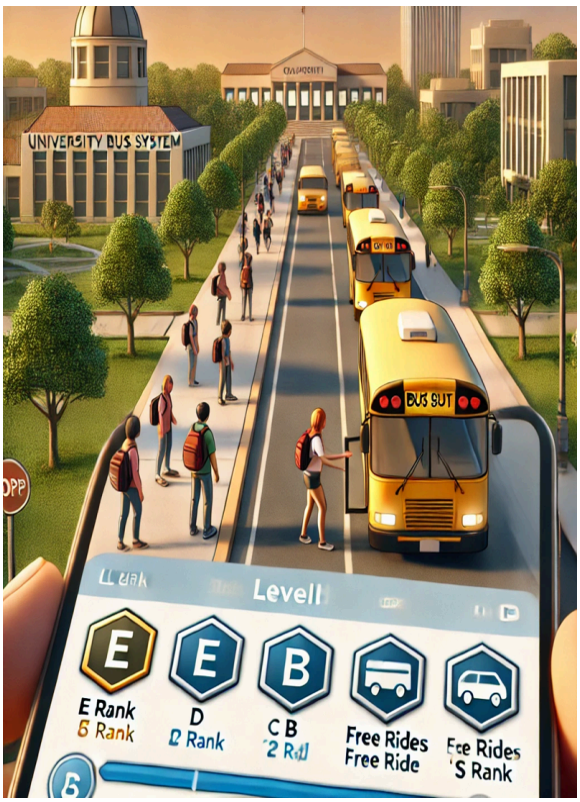
Together, these files offer a comprehensive view of static transit information, covering everything from agency details and service calendars to scheduling, fare rules, and route geometries.

Functionality

Low-fidelity UI Mockup

Our website offers a range of functionalities designed to make transit planning and tracking engaging. Users can **search** for start and end points via an intuitive search bar, **read** recommended bus routes on an interactive map, and log their bus trips. They can **create, update, or delete** trip logs and monitor their progress through a leveling UI bar that displays current level, points, and experience, complete with a catchy level title.





Project Work Distribution:

- **Frontend**
- Allen Kaile Yuan:
  Responsible for designing and implementing the UI based on the low-fidelity mockup.
- Focus on search functionality, interactive map integration, and the leveling UI bar.

- **Backend**
- Rahul Reddy: In charge of database design.
- Yu Fu: Handles data aggregation from GTFS and real-time feeds.
- Jay Malavia: Focuses on developing core backend services including REST API endpoints, business logic, and user authentication.
- ALL: Handles testing, security, and performance optimization of the backend systems, ensuring smooth deployment and maintenance.