

Lab 3: Field Data Collection: Digital and Manual Techniques

Course: Transport Research and Analysis

Student Name(s): _____
Date: _____

Part 0: Pre-Field Safety Checklist (MANDATORY)

Your safety is the highest priority. Before leaving for the field session, you must read and acknowledge that you understand and will follow these safety protocols. **Check each box.**

- ☐ **Situational Awareness:** I will remain aware of my surroundings at all times, including traffic, pedestrians, and potential trip hazards. I will not be distracted by my phone or data sheet.
- ☐ **Location:** I will conduct all observations from a safe, designated location on the sidewalk or public right-of-way. I will **NEVER** stand in the street or impede the flow of pedestrians or vehicles.
- ☐ **Visibility:** I will wear any provided high-visibility safety vests and make myself visible to others.
- ☐ **Teamwork:** I will work with my group to ensure everyone is following safety protocols and looking out for one another.

I have read and understood the safety requirements for this lab.

Signature: _____

Part 1: The Mission & Objectives

The Mission

This lab is a hands-on exercise in collecting two fundamental types of transportation data. You will collect **Lagrangian data** by tracking a single trip using a smartphone GPS logger, and **Eulerian data** by performing a multimodal manual traffic count at a fixed intersection.

Learning Objectives

By the end of this lab, you will be able to:

- Correctly configure and operate a smartphone GPS logger for transportation data collection.

- Execute a systematic, multimodal manual turning movement count according to professional best practices.
- Log, process, and visualize raw field data using a spreadsheet program.
- Critically reflect on the practical challenges and sources of error in field data collection.

My Group's Assigned Roles

Assigned Intersection & Approach: _____

GPS Walker: _____

Lead Counter / Timekeeper: _____

Support Counter(s): _____

Part 2: Setup & Tools

GPS App Installation and Configuration

1. **Take out your smartphone.**
2. **Navigate** to the App Store (iOS) or Google Play Store (Android).
3. **Search** for and **install** the free application Geo Tracker.
4. **Open** the Geo Tracker app.
5. **Allow** the app to access your location when prompted (Allow While Using App).
6. **Navigate** to the app's Settings.
7. **Set** the Tracking interval to 5 seconds.
8. **Set** the Distance filter to 5 meters.
9. **Verify** that the export format is GPX.

Checkpoint

Your GPS logging app is now installed and configured correctly.

Part 3: Guided Workflow

Step 1: FIELD EXECUTION (45 Minutes)

Instructions for GPS Walker

1. **Open** the Geo Tracker app.
2. **Wait** for the app to achieve a good GPS signal lock (the accuracy reading should be less than 10 meters).

3. At the designated start time, press the large **START** button.
4. **Begin** walking the assigned loop route, which should take approximately 20–25 minutes.
5. Upon returning to the starting point, press the **STOP** button.
6. **Find** your saved track in the app's track list.
7. Use the **Share** or **Export** function.
8. **Select** the **GPX** format.
9. **Email** the exported **.gpx** file to all members of your group.

Instructions for Counters

1. **Position** yourselves at a safe vantage point for your assigned intersection approach.
2. **Fill out** the header information on the Tally Sheet below **before** starting.
3. The designated **Timekeeper** will start a 20-minute timer.
4. **Begin counting** all vehicles and pedestrians originating **from your approach only**. Use tally marks in the appropriate boxes.
5. The **Timekeeper** will announce the end of each 5-minute interval. **Draw a line** under your tallies and continue counting in the next block.

Common Pitfall

If a large truck blocks your view (occlusion) or a sudden surge of traffic occurs, do your best. If you are certain you missed vehicles, make a note in the Field Notes section; do not guess or invent data.

Traffic Count Tally Sheet

Intersection: _____ Approach: _____

Date: _____ Start Time: _____ Weather: _____

Recorders: _____

Mode	Left Turns	Thru	Right Turns
0–5 min			
Cars/Vans/SUVs Trucks (Lg. Rigid/Artic.) Buses Bicycles / E-Scooters Pedestrians Crossing			
5–10 min			
Cars/Vans/SUVs Trucks (Lg. Rigid/Artic.) Buses Bicycles / E-Scooters Pedestrians Crossing			
10–15 min			
Cars/Vans/SUVs Trucks (Lg. Rigid/Artic.) Buses Bicycles / E-Scooters Pedestrians Crossing			
15–20 min			
Cars/Vans/SUVs Trucks (Lg. Rigid/Artic.) Buses Bicycles / E-Scooters Pedestrians Crossing			

Field Notes (Record any unusual events, blockages, counting errors, etc.):

Step 2: DATA ANALYSIS (45 Minutes)

Instructions for GPS Data

1. **Open** a web browser on your laptop and navigate to <https://gpx-viewer.com/>.
2. **Find** the .gpx file you received via email.
3. **Drag and drop** the .gpx file onto the website's map area.
4. **Take a screenshot** of the visualized route.

Instructions for Manual Count Data (Spreadsheet)

1. **Open** a new sheet in **Google Sheets** or **Microsoft Excel**.
2. **Create** a table that exactly mirrors the structure of your paper Tally Sheet.

3. **Sum** your tally marks for each box and **enter** the final numbers into the corresponding cells.
4. **Data Quality Check:**
 - In a new column, use the **SUM()** formula to find the total for each 5-minute row.
 - In a new row, use the **SUM()** formula to find the total for each movement column.
 - Sum the “row totals” and sum the “column totals.” These two numbers **MUST** match. If they do not, find and fix your data entry error.
5. **Calculate Peak Hour Factor (PHF):**
 - Find the total number of *vehicles* (Cars+Trucks+Buses+Bikes) for each of the four 5-minute intervals.
 - Identify the maximum of these four values ($V_{\text{max_5min}}$).
 - Find the total vehicle volume for the entire 20-minute count ($V_{\text{total_20min}}$).
 - In a new cell, calculate the PHF using the formula: $\text{PHF} = \frac{V_{\text{total_20min}}}{4 \times V_{\text{max_5min}}}$.
6. **Create Modal Split Chart:**
 - **Select** the column header with your mode names (e.g., Cars/Vans/SUVs, Trucks, etc.) and the row with their final totals.
 - Go to **Insert > Chart** and select a **Column Chart**.
 - **Customize** the chart to include a clear title (e.g., “Modal Split at [Intersection] - [Time]”) and labeled axes.

Checkpoint

You should have a screenshot of your GPS track, a completed spreadsheet with your PHF calculation, and a fully labeled bar chart.

Part 4: Analysis & Reflection

Final Calculated Value:

Peak Hour Factor (PHF): _____

Reflection Questions

1. **GPS Data:** Look at your GPS track screenshot. Identify one specific location where the track deviates from the actual path you walked. What physical feature (e.g., tall building, dense tree canopy) likely caused this “multipath” error?

2. **Manual Data:** Look at your Modal Split chart. What is the dominant mode of transport at this location and time? What was the most difficult practical challenge your group faced while counting (e.g., high volumes, classification, occlusion)?

3. **Synthesis:** Imagine your GPS track showed that the walker's speed dropped to almost zero for 60 seconds at the intersection you surveyed. What specific data from your Tally Sheet (e.g., a high number of conflicting left-turning cars, a large platoon of pedestrians) could you use to build a data-driven explanation for that specific delay?

Final Submission

1. **Assemble your deliverables:** This completed lab manual, your screenshot of the visualized GPS track, and an exported image of your Modal Split Bar Chart.
2. **Submit:** Combine all items into a single PDF file and submit it to the course portal by the specified deadline.