**SuPave Paving Temperature Analysis App Manual**

This tool allows users to analyze temperature data collected during asphalt paving operations. It identifies cold zones, calculates thermal segregation, stop durations, and visualizes temperature profiles spatially and statistically.

1. **Required Input Format**

Upload an .xlsx file that matches the following structure (as in Pave\_temp\_template.xlsx):

**Required Columns:**

|  |  |
| --- | --- |
| **Column Name** | **Description** |
| Time | Timestamp in format dd/mm/yyyy hh:mm:ss UTC +0000 |
| Moving distance | Paver's cumulative distance in meters |
| Latitude | GPS latitude coordinate |
| Longitude | GPS longitude coordinate |
| Signal type | Type of signal collected (e.g., GPS) |
| Width left | Paving width covered to the left (m) |
| Width right | Paving width covered to the right (m) |
| Numeric widths | Contains one column per paving width (eg 6.5,6.25,….,-6.5) with temperatures in °C |

Ensure:

* All width columns are **floats**, e.g., -2.0, 1.5, etc.
* No missing GPS or timestamp data.

1. **App Inputs**

In the **sidebar**, you can control:

* **Paving Width Threshold (m):**  
  Select the min/max range of paving width to analyze (e.g., -2.0 to 2.0 m).
* **Show Cold Spots (<120°C):**  
  Highlight areas considered too cold for proper compaction.
* **Show Risk Areas (<90% avg temp):**  
  Identify zones at risk of segregation.

1. **Tool output**

**Temperature Heatmap with Stop Lines**

* Visualizes temperature across paving width and distance.
* Dashed (red) lines show stop locations.
* Reports total stop time duration.

**Cold Spots Map:** Highlights regions <120°C over the paving area.

**Risk Spot Map:** Marks zones below 90% of the overall average temperature.

**Thermal Segregation Index (TSI)**

* Shows average temperature variation across the mat.
* Classifies severity: **Low**, **Moderate**, or **High**.

**Differential Range Statistics (DRS)**

* Calculates T10, T90, DRS (°C).
* Includes severity class and a KDE-enhanced histogram.

**Temperature Trends**

* Plot of average row temperature vs. moving distance using Plotly.

**GPS Track Map**

* Interactive map using PyDeck with tooltips.
* Shows paver movement path and data points.

1. **Summary & Export**

* Summary text includes key statistics and input parameters.
* You can **download** the full summary as a .txt report.

**Troubleshooting**

* **File not uploading?** Ensure it's .xlsx and follows the template format.
* **Missing plot?** Check if GPS data or width columns are missing or zero-filled.
* **Crashes on load?** Confirm column headers exactly match expected names (case-sensitive).