MINUTES OF MEETING 1

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| **Meeting/Project Name:** | Estimating & Comparing Public Transport Emissions using gtfs2emis | | |
| **Date of Meeting:**  (MM/DD/YYYY) | 03/02/2023 | **Time:** | **11:00 A.M** |
| **Meeting Facilitator:** | Nishi & Hemant | **Project Status** |  |

**The meeting was called to discuss the implementation of General Transit Feed Specification (GTFS) to estimate emissions from public transportation systems.**

1. Discussed the process of collecting GTFS data from transit agencies and converting it into a format suitable for emission estimation.
2. Exploration of the integration of GTFS data with other data sources, such as traffic data, to improve the accuracy of emission estimates.
3. Technical requirements for integrating GTFS with Emission, including data collection and processing.
4. Discussion on the Data Assessment 2

**Meeting Objective**

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| **Attendees** | | |
| **Name** | **Student Id** | **E-mail** |
| Hemant Chowdary | 0788804 | [W0788804@myscc.ca](mailto:W0788804@myscc.ca) |
| Sai Krishna | 0789428 | [W0789428@myscc.ca](mailto:W0788804@myscc.ca) |
| Eswar Kiran Pathuri | 0788366 | [W0788366@myscc.ca](mailto:W0788801@myscc.ca) |
| Nishi Shrivastava | 0770047 | [W0770047@myscc.ca](mailto:W0770047@myscc.ca) |
| Prayas Baliyan | 0790447 | [W0790447@myscc.ca](mailto:W0790447@myscc.ca) |

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| **Project Daily Activities for this week** | |
| **Topics** | **Owner** |
| **Gained Knowledge about MOVES and EMFAC**   * EMFAC is used in California whereas MOVES is use in rest of the US. * The study compared the MOVES and EMFAC models for estimating on-road vehicle emissions of CO2 and CH4 in Los Angeles County, California. The results showed that MOVES produced different emission estimates from EMFAC, with MOVES estimating 40% higher CO2 emissions and nearly double CH4 emissions in 2030 compared to EMFAC. * The differences were due to different underlying assumptions in travel activity data and emission factors, such as a younger vehicle fleet and higher start emissions in MOVES. The CO2 and CH4 emissions estimated by MOVES are considered a draft by the EPA and may change in future releases. * Helped the team with the Project Proposal | Prayas |
| **Gained knowledge on how gtfs2emis model works. First step is Transport model and next is emission model.**   * The transport model () converts a GTFS data feed into a GPS-like table with the spacetime positions and speeds of public transport vehicles. The output of model () is a trajectory data table with the space-time position and speed of each trip segment for every vehicle of the public transport system. * The emission model () estimates the pollutants emitted by each public transport vehicle at each road segment and time of the day.   In the USA, there are 2 emission factor models, one is EMFAC (Emission Factor) model developed by California Air resources Board. Second emission factor model for the United States included in gtfs2emis comes from the Vehicle Emission Simulator (MOVES), developed by Environmental Protection Agency.   * Exported the data to csv for all countries and shared with the team. * Helped the team with the Project Proposal in Introduction & project Execution. | Sai Krishna |
| * Understanding in detail regarding R package of the gtfs2emis package. * Working on the transport\_model() & emission\_model() functions and understanding different parameters. * Studying the data of Brazil, Europe, USA understanding the columns. * Findings are in Europe data we must calculate the EF rate using the 12 parameters manually we will make use of excel. * Understanding the existing research paper <https://osf.io/8m2cy/> * Helped the team with the Project Proposal in problem Statement & Analytics Goals & references. | Hemant Chowdary |
| * Gathered and organized information related to a research project topic and a specific package "gtfs2emis." * The sources were then thoroughly read, and notes were taken for 2 step model (transport and emission Model) to estimate emissions from public transport, summarized the key information and important findings and narrowed down into smaller points. * Explored the data sets for Brazil, Europe, USA(Detroit). * Contributed to the development of the project proposal by providing a problem statement, metrics and references. | Nishi Shrivastava |
| * Came to know what is GTFS2Emission. How GTFS2Emission is going to work as a tool that converts General Transit Feed Specification (GTFS) data into an emission-friendly format for use in transportation planning and analysis. * A two-step methodology is implemented by the gtfs2emis package to estimate emissions from data on public transportation based on paper https://github.com/ipeaGIT/gtfs2emis. The transport model is the initial phase, it is accessed via the transport model () function. * It transforms a GTFS data input into a trajectory data table that contains the space-time positions of every public transportation vehicle, much as GPS records. The emission model, also known as the emission model () function, is the second phase. By integrating the output from the transport model with additional data on fleet characteristics given by the user, and emission factors provided in the gt2emis package, this phase predicts the pollutants produced by each vehicle at each road segment and time of day. | Eswar Kiran Pathuri |

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| **Challenges** |
| 1. How to import the other country data to the R package as the package expects data in a particular format. 2. Understanding the columns of and purpose of each column 3. Understanding the existing research papers how they are approaching the problem and how can we proceed. 4. Understanding the different emissions standards as different countries use different methodology and rate them accordingly. |

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| **Planned Activities for Next Week** |
| 1. All the Team Members will be working on and understanding the Detroit data. 2. All the team members will be working on the EDA part of Detroit. 3. Preparation of the document for the Assessment 2 4. Team will be working in the Toronto data and try to get the emission data out of it. |