DIGITAL TRANSFORMATION 2023

IDB

INTRODUCTION

The Inter-American Development Bank (IDB) is the main source of multilateral financing in Latin America and the Caribbean (LAC), with an active portfolio of more than $9 billion for transportation projects.

Through its Transport Division, the IADB supports countries in the region in the development of different modes of transport (land, air, sea) in the different stages of project planning, preparation and evaluation. It also stimulates investments in new and existing infrastructure; contributes to improve the technical and economic regulation of the sector; promotes generation of knowledge and technological modernization and supports policy dialogue between countries and other multilateral organizations. In the context of the current technological revolution, the IADB is supporting LAC countries to explore the potential benefits of adopting new technologies such us artificial intelligence, video detection, internet of things, big data, electrification and automation.

The purpose of this document is to encourage the adoption of those technologies that contribute to achieving more efficient, inclusive and sustainable transport systems in the region. This brochure includes a group of selected projects on the topic.

PAVIMENTA2

Deep Learning tool for digital management of road assets

The process of road maintenance and signal inventory is time and resource intensive, which reduces the responsiveness in the maintenance of road infrastructure. Pavimenta2 uses artificial intelligence to efficiently analyze roads and can be quickly deployed in any country. It was created by IDB teams and is freely available on the bank's open-source platform, Code4Dev and on GitHub, and can be installed on a local server or on cloud infrastructure. It has been used in Argentina, Brazil, Costa Rica, El Salvador, Trinidad and Tobago, and along the Pacific corridor in Central America to analyze more than 30,000 km. In 2023, the tool is expected to be used in Barbados, Ecuador, Peru, Honduras, and the Dominican Republic.

How does it work?

- Data required: videos or images taken by a digital camera attached to a conventional vehicle that travels along roads to be surveyed.
- Processing: Detects, classifies, and measures pavement defects and analyzes vertical road signs.
- Generates inventories, reports and control panels of pavement defects and vertical road signs on surveyed roads.
- It allows geo-referenced visualizations that can be integrated into GIS systems or open-source tools, allowing agencies to prioritize maintenance interventions.
- Deep Learning models are trained with cases from Latin America and the Caribbean, as well as from countries in other regions, so the results are generalizable to any country.

Benefits

It brings wide-ranging benefits like reducing costs and time required for road network analysis, in addition to improving the transparency of the process. With Pavimentados, to analyze 10,000 km, the cost is reduced by a factor of 39, and the time by a factor of 53 compared to other methods.

[Read more]

VíaSegura

Deep Learning driven tool for road safety evaluation

In partnership with the International Road Assessment Program (iRAP), the IDB developed this digital road safety assessment tool.

Through the automated analysis of videos or images captured by digital cameras mounted on conventional vehicles, this tool detects and rates road safety elements such as delineation, lighting, number of lanes, road quality, and others. The initiative focuses on the evaluation of a set of variables used in iRAP's Star Rating methodology. It provides a simple and objective measure of the level of safety for vehicle occupants, motorcyclists, cyclists, and pedestrians. The results are displayed as layers of a GIS system or on dashboards.

How does it work?

- It classifies information and minimizes manual workload.
- Reduces costs and time associated with image labeling and analysis.
- Reduces human intervention, evaluation costs and their associated errors.
- Increases road safety, making the process more efficient and accurate.

With this technology, the time required to identify road safety elements is reduced by 32%, and the cost of this process is reduced by 30%.

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Traffic Analyzer

Big Data and Artificial Intelligence driven tool that contributes to the planning and analysis of urban transportation in the region

This application analyzes large data sets from Waze users reports through statistical and AI models. It integrates data controls and translates them into various queries and enables the visualization, understanding and analysis of vehicular traffic behaviors.

Based on this data, in 2021 a pioneering study "Urban congestion in Latin America and the Caribbean: characteristics, costs and mitigation" was carried out. For the first time, there was an analysis on the characteristics and estimated costs of vehicular congestion in the ten largest metropolitan areas of Latin America and the

Caribbean. The study highlights the most congested areas in each city, and the dynamics of congestion during different yearly, weekly, daily, and hourly time periods. The study concludes with a compendium of adapted and evidence-based policy recommendations to decrease congestion in cities.

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Congestiómetro

Big Data-based traffic planning and management tool

As in many other large Latin American cities, Buenos Aires traffic congestion generates significant increases in time and transportation costs for people and goods, and in noise and gas emissions that affect the quality of life and contribute to climate change. To meet these challenges, reliable and up-to-date data are needed to improve the planning and evaluation of urban interventions and real-time traffic management. Unfortunately, traditional techniques to obtain these data are expensive and difficult to implement for large geographic and temporal coverage.

Congestiómetro was developed by the Government of the City of Buenos Aires, with the financial and technical support of the

Transportation Division of the Inter-American Development Bank, which enables the identification and prediction of congestion at various points in the city by processing large amounts of data provided by the Waze app. The system was developed using open-source technology and designed so that it could be adapted and replicated in other cities, avoiding the need for specialized hardware for data management and processing. Thereby allowing it to complement traditional ITS systems and access citywide traffic information.

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CAPTUDATA

Remote monitoring and supervision solution for infrastructure works
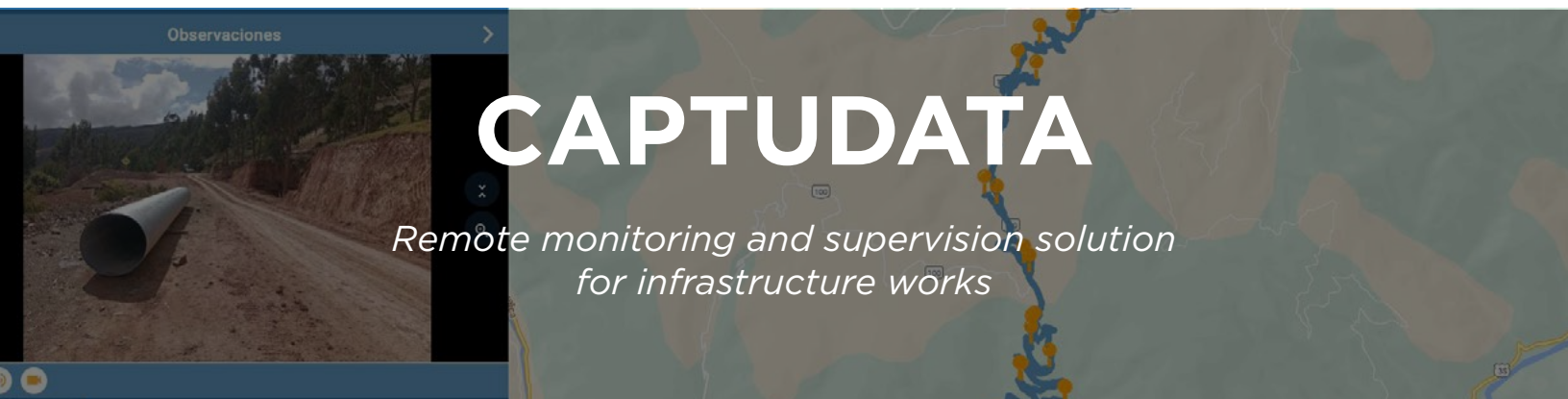
This tool enables the capture of audiovisual information in infrastructure works by means of a mobile application. The information collected and published can be accessed by all users associated with the project. The tool can be used to monitor multiple projects in parallel, with the corresponding executive information. The information collected in the field is immediately georeferenced, synchronized and stored in the cloud, and reports are generated for evaluation and decision making. The technical development was done by the IDB, and the development of the software was done

by StartX Software Consulting. It has been used to monitor infrastructure works in more than 14 countries in the region. For example, in Peru in 2022, the tool was used for rural road improvement works; it was used in eight projects for the improvement and rehabilitation of rural roads, which represents a total of 137 kilometers monitored remotely.

Read more

Driving the Digital Transformation of Transportation in Latin America and the Caribbean

This study measures the state of the digital transformation of transportation in Latin American and Caribbean countries and analyzes the benefits and challenges of this transformation. Based on best practices of leading countries worldwide, it identifies public policy lines of action to establish an institutional architecture and policy framework that encourages digital transformation while minimizing its risks. It counted on the collaboration of the American Association of Port Authorities, the Latin American Air Transport Association (ALTA), the Latin American Civil Aviation Commission, the International Road Transport Union, Intel, Microsoft, and the World Economic Forum.

Read more

Applied Artificial Intelligence in Transportation Course

This course aimed at technical personnel of the region's public sector provides an overview of the field of study of artificial intelligence (AI), as well as some of its current applications in transportation. Through the study of a specific case study of a project developed by the IDB that deploys Machine Learning models, the student will be able to further understand the requirements, development phases and management of a transportation AI project.

After a successful first edition that focused on Central America, the free online course will launch its second edition in Spanish on April 2023.

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Public Transport Origin-Destination Matrix

Destination attribution methodology for the elaboration of public transport origin-destination matrices for the Metropolitan Region of Buenos Aires with data from the SUBE Card of November 2019

Origin-destination (OD) matrices are tools for mobility planning and policy design. With complex urban dynamics and changing mobility patterns, up-to-date, disaggregated data with broad spatial coverage is essential to support this type of tool. Compared to surveys, presently, various sources of mass data (such as those coming from electronic means of payment of urban transportation systems) offer an interesting opportunity to elaborate these matrices with dynamic and low-cost information. This analysis was carried out using anonymized data from electronic card transactions of the integrated public transport system of the Buenos Aires metropolitan area (SUBE). The code is innovative not only because it applies technology for data analysis but also because of its methodological approach to identify, validate, and attribute trip destinations.

The results of this project, the raw data from the SUBE database and the processing scripts used to link stages and trips and imputing destinations are available for use on GitHub and the IDB's open-source platform. This project enabled us to present three publications on topics related to mobility patterns of vulnerable groups and identification of itineraries with the potential to promote active mobility.

[Read more]

EMOVILAC

Regional platform for electric mobility in Latin America and the Caribbean

EMOVILAC is a regional digital platform whose main objective is to promote electric mobility in Latin America and the Caribbean. The platform links public and private sector decision makers in the region to accelerate the deployment of this technology in a sustainable and efficient manner.

As a platform, it interconnects the main actors in electromobility with their local and regional counterparts in a virtual space for dialogue to facilitate the identification and support for project implementation. It also promotes technical training, knowledge exchange and the establishment of multi-sectoral communities of practice around the development of sustainable mobility. Within the platform, the community of practice will be able to find the most relevant news on electromobility in the region, the most updated knowledge, research, projects, and relevant information on public policies on the subject.

The platform is open to the participation of other interested public and private organizations as it aims to articulate various initiatives and projects in the region.

Coming soon

First Autonomous Vehicle Pilot in Latin America

In 2020, the first Autonomous Vehicle (AV) Knowledge Hub in the region was developed in Chile, a project that involved the operation of an autonomous passenger vehicle, the development of an innovation process around autonomous mobility and a series of thematic talks to disseminate knowledge. This experience provided on opportunity to learn in preparation of the local transportation sector for the imminent development of autonomous mobility.

The last-mile service was offered free of charge for a period of three months in a park in the city of Santiago. It was provided in a controlled stretch of 400 meters, mainly for utilitarian trips between the park's access gate and the entrance to its Olympic swimming pool. This project was jointly led by the Inter-American Development Bank (IDB) and the Chilean Ministry of Transport and Telecommunications.

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Latin America Urban Mobility Observatory

A regional public good developed by CAF (Development Bank of Latin America) and the IDB with a network of cities in the region, which seeks to respond to the need for solid, reliable, and updated information on transportation and urban mobility in the region.

The OMU promotes the collection of mobility data in cities, favoring the use of technology and innovative methodologies, to promote evidence-based public policies in line with the main challenges facing urban areas today, such as climate change, socioeconomic inequality, and gender gaps.

The OMU has an interactive data viewer with mobility indicators for the cities that make up the network. Data is structured in a matrix of 20 indicators organized around four thematic axes:

- Universal Access
- Efficiency and Quality
- Safety
- Green Mobility

In the near future, the databases will be open and available for consultation, download and free use.

[Read more]

Integration and Transportation Hub in Mesoamerica

This knowledge hub showcases a single geography's anchor infrastructure and logistics projects, maps main value chains, examines climate change issues, and enables the analysis of other development variables associated with socioeconomic dimensions. This interactive and functional website, known as HIT, provides a repository of information and powerful planning tool for both country officials and IDB specialists. In addition, it allows the visualization and comparison of investments, studies and projects carried out in the Mesoamerican region. It capitalizes on more than a decade of the IDB's work on the knowledge agenda for Central American countries. It aims to be an effective and high-impact support tool for strategic decision making in terms of sector investment. The portal features data visualizers on physical infrastructure; value chains with information on export flows, products and amounts mobilized by each corridor; projects; and demographic information.