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Industrial Attachment

(CSE 420)

Industry Visit Report: Dhaka Mass Transit Company Limited (DMTCL)

Submitted to,

Tahmina Yeasmin Lima

Lecturer, Department of CSE, UITS

Submitted by,

Name	ID
Ifftekher Hossain Mrida	2125051111
Tanim Hasan Ovi	2125051112
Safayet Ahmed	2125051061
MD. Bappy	2125051080

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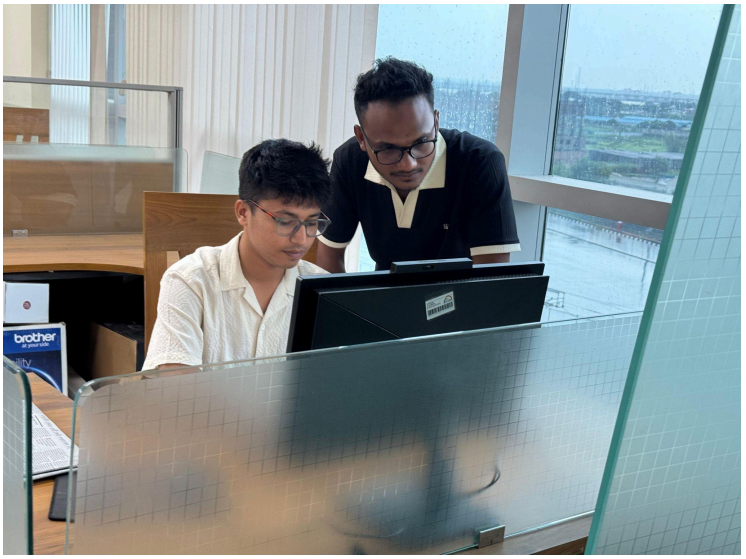
Introduction

As part of our academic program, we had the opportunity to visit **Dhaka Mass Transit Company Limited (DMTCL)**, the organization responsible for developing and operating the metro rail system in Dhaka. During the visit, we were guided by **G. M. Monjur Morshed Mridha**, a programmer at DMTCL, who provided us with an extensive understanding of the role of software systems and technology in the daily operations of the metro system. The visit aimed to give us firsthand insights into how programming and data management are crucial for the efficiency and sustainability of the metro services. This report outlines our observations and the knowledge we gained from this informative industry visit.

Name	G. M. Monjur Morshed Mridha	Mobile	
Designation	Programmer	Phone (Office)	02-55669000
Office	Dhaka Mass Transit Company Limited	Intercom	6006020
E-mail	programmer@dmtcl.gov.bd	Phone (Res)	
		Fax	

Photos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Company Overview

Dhaka Mass Transit Company Limited (DMTCL) is a state-owned company responsible for developing and operating the metro rail network in Dhaka. The company's primary objective is to provide modern, efficient, and safe transportation services to alleviate the severe traffic congestion in Dhaka.

DMTCL oversees the development of various metro lines, including MRT Line 6, which is the first operational metro line in the country. The company is also working on additional lines, such as MRT Line 1 and MRT Line 5, as part of its long-term plan to expand the metro network across Dhaka.

Company Environment

The headquarters of DMTCL is located in Dhaka, with a professional and modern working environment that supports various teams, including engineering, IT, and operations. The office is well-equipped to handle the complex tasks involved in planning, implementing, and managing a metro rail system.

Throughout our visit, we observed a collaborative and efficient work culture where different teams work together to overcome challenges in urban transportation, technology, and infrastructure development.

Current Activities of DMTCL

DMTCL is focusing on the integration of advanced software systems and technology solutions to improve the operations of the metro rail system. Some of the key CSE-related activities include:

1. **Development of Smart Ticketing System**:
   DMTCL is developing an advanced smart card-based ticketing system that integrates software development, payment gateways, and data management to provide passengers with a seamless, cashless travel experience.

2. **Real-Time Train Monitoring System**:
   The company utilizes real-time train tracking systems that incorporate GPS technology and data processing software to monitor train positions, manage delays, and ensure that trains are operating on time.

3. **Database Management and Data Analytics**:
   DMTCL collects vast amounts of data, such as passenger information and operational metrics. The company uses database management systems to store, analyze, and process this data to improve services, optimize schedules, and manage train traffic efficiently.

4. **AI and Machine Learning for Predictive Maintenance**:
   DMTCL is exploring the use of AI and machine learning to predict the maintenance needs of trains and tracks. These technologies help detect potential failures before they happen, allowing for proactive maintenance and reducing operational disruptions.

5. **Cybersecurity and Data Protection**:
   As part of its commitment to protecting passenger data and ensuring the security of its systems, DMTCL is strengthening its cybersecurity measures. This includes the development of encryption protocols, secure data storage, and regular security audits to safeguard against cyber threats.

6. **Integration of Universal Ticketing System**:
   DMTCL is in the process of launching a Universal Ticketing System (UTS), which will allow passengers to use various payment methods, such as mobile payments and credit cards. This system will provide a seamless travel experience for commuters across different platforms.

7. **Smart City Integration**:
   DMTCL is aligning its systems with the broader smart city initiatives by integrating its operations with other urban services like traffic management and public safety. The integration of these systems aims to improve the efficiency of urban infrastructure and create a more connected city.

Experience

Our visit to DMTCL provided us with a comprehensive understanding of how software systems are integrated into urban transportation infrastructure. Through the guidance of G. M. Monjur Morshed Mridha, a skilled programmer at DMTCL, we were given valuable insights into the software development practices employed by the company. His detailed explanations helped us grasp the critical role of technology in ensuring the efficiency and safety of the metro rail system.

We were introduced to various aspects of the software systems in place, including the development and implementation of smart ticketing systems that allow passengers to enjoy a seamless, cashless travel experience. These systems require robust backend software for transaction processing, user data management, and system integration across different payment platforms.

In addition, we learned about the real-time monitoring systems used by DMTCL to track the locations of trains, monitor performance, and ensure that trains are operating efficiently. These systems rely on advanced GPS tracking, data integration, and real-time updates, which are essential for minimizing delays and improving overall operational efficiency.

One of the most intriguing discussions was on the use of AI-driven maintenance solutions. DMTCL utilizes artificial intelligence and machine learning to predict when and where maintenance is needed, reducing downtime and preventing potential failures. This proactive approach to maintenance helps optimize train availability and ensures smooth operations throughout the metro network.

Overall, the visit gave us a deeper appreciation of how cutting-edge software technologies are applied in real-world scenarios to solve the challenges of urban transportation, and how these technologies work together to improve the overall passenger experience and operational efficiency of the metro system.

Conclusion

The visit to DMTCL gave us a deeper understanding of the essential role that software systems and technology play in the smooth operation of a large-scale infrastructure project like the metro rail system. We saw how innovative solutions, such as smart ticketing systems, real-time monitoring, and AI for predictive maintenance, are transforming urban transportation.

The smart ticketing system streamlines fare collection, improving convenience for passengers, while real-time monitoring ensures trains operate on time and without disruptions. The use of artificial intelligence to predict and prevent maintenance issues helps avoid unexpected breakdowns, keeping the system running smoothly.

This visit broadened our perspective on how technology can drive the development of efficient, sustainable, and modern transportation solutions, making urban transport more reliable and accessible.