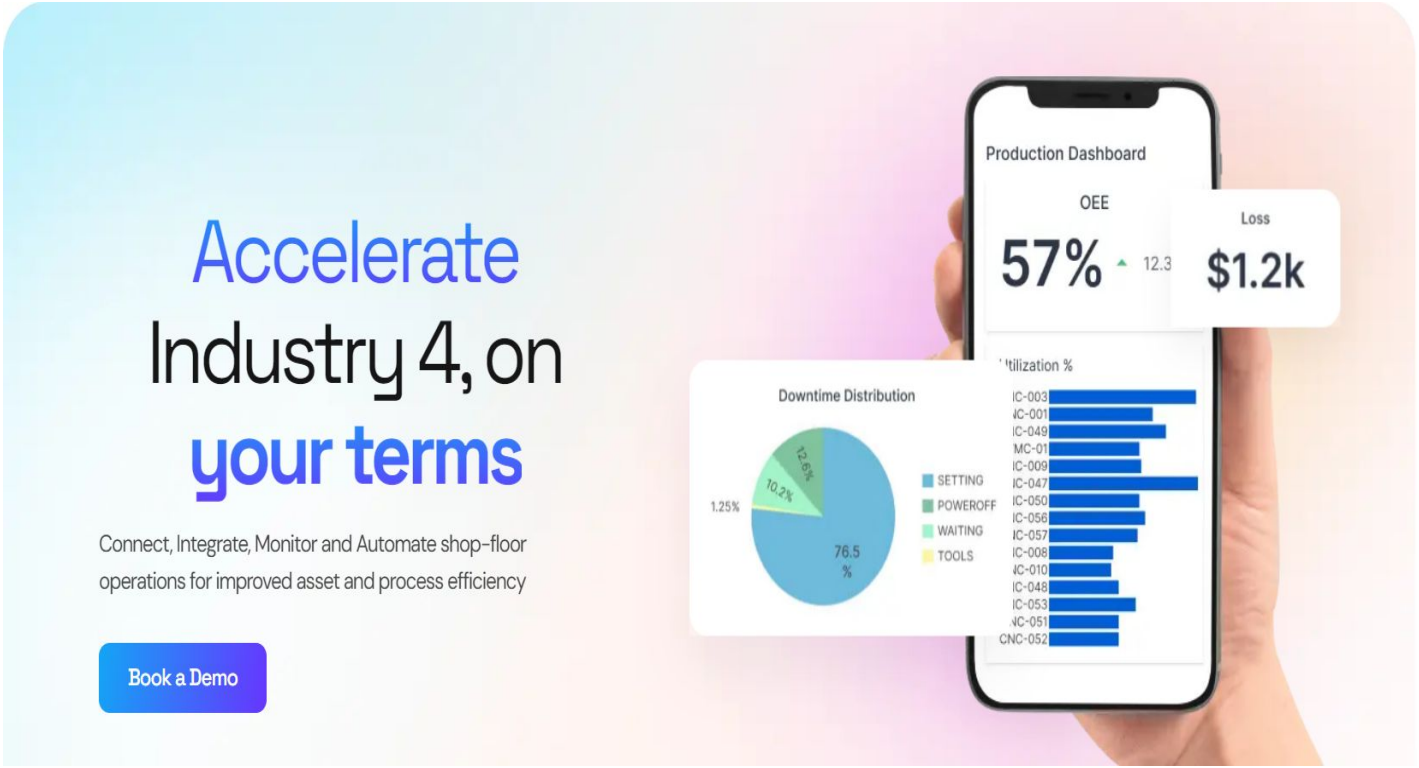
MachDatum



Project Review

Shakthi Mahendira K
20PD10

Special Thanks

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- **Dr. M. Megala , Academic Guide,**

  Department of Applied Mathematics and Computational Sciences, PSG College of Technology.

- **Mr Hemanand, External Guide,**

  Founder CEO at MachDatum Pvt. Ltd.

Agenda

- Introduction to Organization
- Work Environment
- Project Details
- My Contribution
- Tools and Technology Used
- Q & A

Introduction to Organization

- MachDatum,is a startup in Coimbatore, specializes in crafting and implementing Industry 4.0 solutions for manufacturing and process sectors. Their expertise lies in enhancing and maintaining equipment and process efficiency.

- They harness a blend of advanced technologies including the Industrial Internet of Things (IIoT), Data Engineering, Machine Learning, and Artificial Intelligence to drive transformative outcomes.

- Prestigious MNCs like ZF Wind Power and Shanthi Gears are among MachDatum’s esteemed clients

Work Environment

Hardware Specifications

- Processor - intel i7 10th Gen
- Ram- 8GB

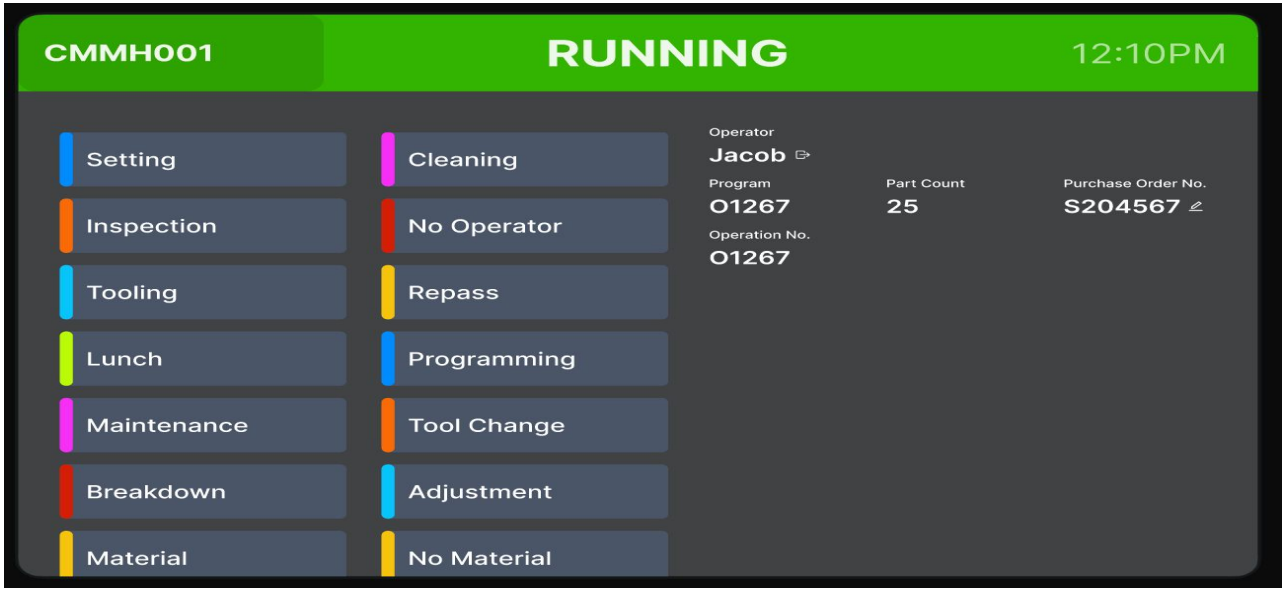
Software Specifications

- OS Windows 11

Bator Operator

- The Bator operator is employed for real-time digital surveillance of the shop floor.
- Machine-generated raw data is seamlessly relayed to the Bator operator's display.
- This interface presents both contextual information and the machine's operational cycle, offering an in-depth insight into its current performance.
- By integrating CNC machines, operations become more efficient, minimizing the necessity for manual intervention.

Operator Screen



Bator Engine

- The Bator Engine is employed to oversee the operational dynamics of CNC Machines.
- Within the Bator Engine, we analyze the machine's active and inactive periods to ascertain the OEE value.
- OEE, or Overall Equipment Effectiveness, stands as the benchmark in gauging manufacturing efficiency.
- The formula for OEE is given by: OEE = Availability × Performance × Quality.
- Various metrics are used to compute the OEE, ensuring a comprehensive understanding of production effectiveness.

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Data From CNC Machine

monitorid	monitortime	monitortype	monitorport	monitortag
1	1,678,426,526	0	1,000,000	CFGUPDATE
2	1,678,426,526	0	1,000,000	CFGUPDATE
3	1,678,426,526	0	1,000,000	CFGUPDATE
4	1,678,426,547	0	1	INFO
5	1,678,426,547	0	2	INFO
6	1,678,426,547	0	3	INFO
7	1,678,426,548	0	4	PORTONLINE
8	1,678,426,548	0	5	INFO
9	1,678,426,548	0	5	PORTOFFLINE
10	1,678,426,548	0	6	INFO
11	1,678,426,548	0	1	MONONLINE
12	1,678,426,548	0	1	CYCLESTART
13	1,678,426,548	0	1	SETPROGRAM
14	1,678,426,549	0	1	AUTOMATICMODE
15	1,678,426,549	0	7	INFO
16	1,678,426,549	0	7	PORTOFFLINE
17	1,678,426,549	0	2	MONONLINE
18	1,678,426,549	0	8	INFO

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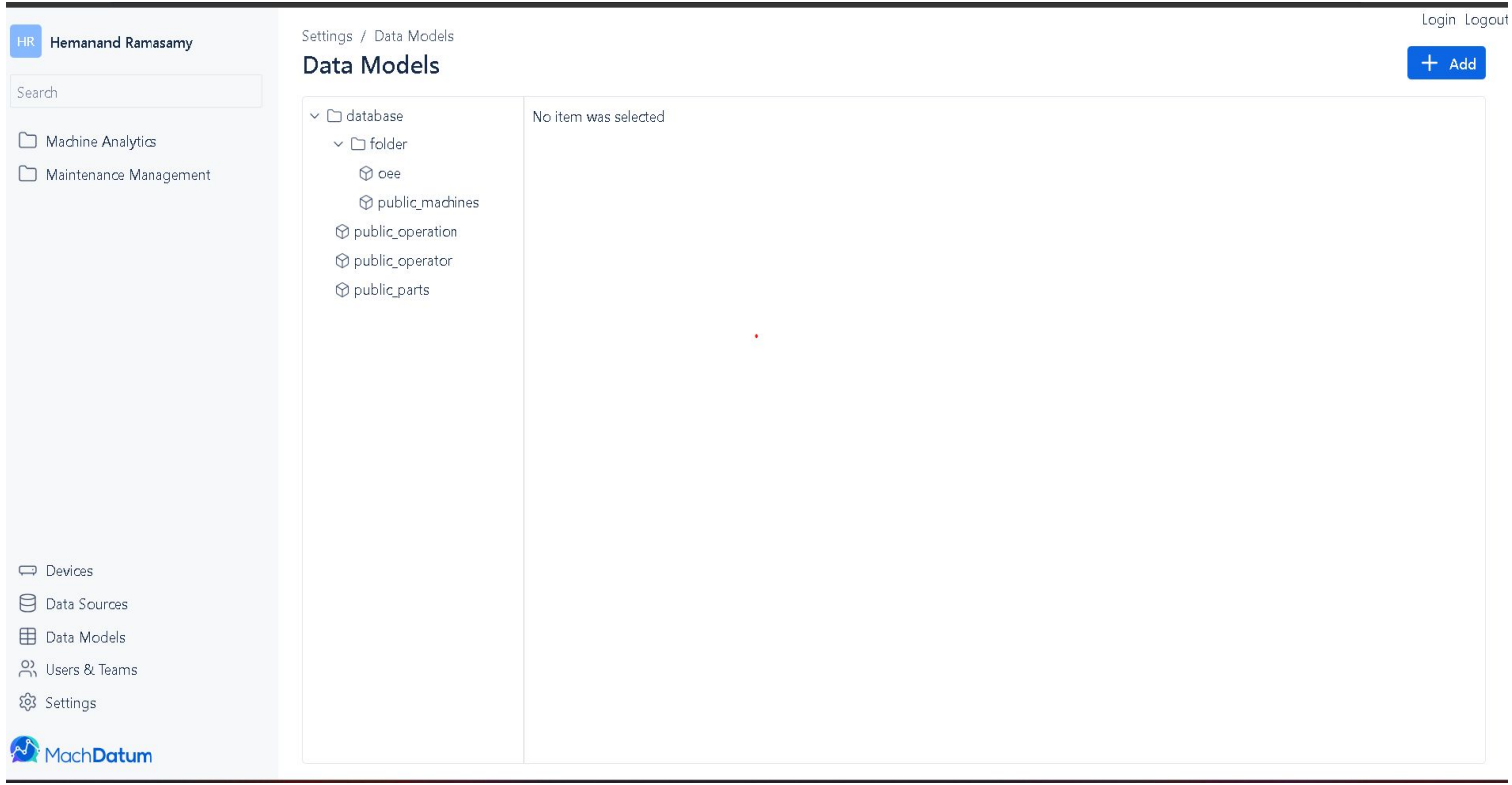
ThingPlatform

- ThingPlatform offers a seamless transformation of data into dynamic visualizations, providing businesses with a quick and efficient way to interpret and interact with their information.
- Its user-centric approach sets it apart from established giants like PowerBI, focusing on intuitive design and straightforward processes to cater to a broad range of users, not just data scientists.
- ThingPlatform empowers businesses, regardless of their size or tech expertise, to harness the full potential of their data, ultimately enabling better-informed decisions and insights.


HR
Hemanand Ramasamy
Search
Machine Analytics
Maintenance Management
Devices
Data Sources
Data Models
Users & Teams
Settings
MachDatum
Settings / Data Models
Data Models
Login
Logout
Add
database
folder
oee
public_machines
public_operation
public_operator
public_parts
No item was selected

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My Contribution

Code Efficiency Improvements:

- Reduced the number of SQL commands executed in the database by utilizing dictionaries.
- Developed new functions to decrease the code length.
- Transitioned state files from text format to the database.

Enhancements to Data Segmentation and Reporting:

- Introduced two new feature: "Reports".
- Data will be segmented into shifts to calculate the OEE value for each shift.
- "Reports" is a new table where the duration of each status will be stored in JSON format.

Refinement of Reporting and OEE Calculation Methods:

- Previously, reports were generated using multiple joins from tables in the database. Now, we have a dedicated "reports" table.
- OEE is now calculated machine-wise, month-wise, and shift-wise.
- Generating OEE Reports
- Generating Downtime Reports

Operator Screen Enhancements:

- Developed a responsive UI for the Bator Operator Screen.
- Designed the header section for the screen.
- Added a "Downtime" button to the screen.

Api for users

Admin-Centric API:

- Admin-focused actions: add, delete, update user profiles, and reset passwords.
- Centralized control for efficient user management, ensuring security and compliance.

Centralized User Management API:

- Streamlines user processes for administrators.
- Endpoints for retrieving all users, suspending/activating accounts, and role modifications.

User-Driven Access API:

- User actions: update personal info, change passwords, and manage profiles.
- Empowers users with self-service functionality, enhancing convenience and satisfaction.

User Form

User-Focused Design: Designed user and user profile forms with a user-centric approach, ensuring an intuitive and user-friendly experience.

Comprehensive Data Handling: Developed forms that encompass a wide range of functionalities, including user registration, profile updates, password changes, and more.

Seamless Integration: Integrated these forms seamlessly with the frontend and backend systems to facilitate efficient data capture, submission, and management.

API for teams

- Team API Creation: Designed an API for teams, simplifying team setup and management.
- Access Control: Implemented role-based access controls within the API, ensuring secure data access for team members.
- User-Friendly Interface: Crafted an intuitive interface for seamless team collaboration and resource sharing.

Building a Schema for Data Sources

- Migrations for Schema: Utilized migrations to define and create the structured "datasource" schema, enabling version control and adaptability.
- Repository Pattern: Implemented a repository pattern to encapsulate data access logic, offering methods for adding and updating datasources while abstracting database interactions.
- API Controllers: Developed API controllers to handle HTTP requests, creating endpoints for datasources' addition and updates, with validation and error handling for data accuracy.

Building a Schema for Data Model

- Define Data Model Structure:Identify the core attributes and relationships that constitute a data model and create a structured schema to represent this in a database.
- Migrations for Data Model:Use database migrations to define and version the data model schema, allowing for easy updates and rollbacks.
- Repository for Data Model:Implement a data model repository to encapsulate data access logic, providing methods for CRUD operations and abstracting database interactions.
- Controller for Data Model:Develop an API controller to handle HTTP requests related to the data model, creating endpoints for retrieving, creating, updating, and deleting data model entities.

Import and Transform Data Model

- Importing Data Model:Create mechanisms to import data model tables directly from a data source, offering users a straightforward way to use existing tables as data models.
- Data Transformation:Develop a data transformation feature that allows users to customize existing tables through SQL queries to form new data models, providing flexibility in data modeling.
- Migrations for Import/Transform:Extend the migration system to include scripts for importing data models and applying SQL transformations, ensuring version control and traceability.
- Validation and Testing:Implement validation checks and testing procedures for imported and transformed data models, ensuring data integrity and compatibility with the application.

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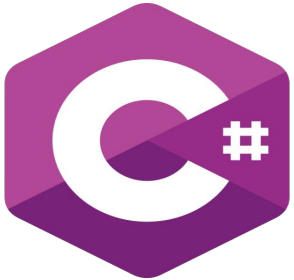
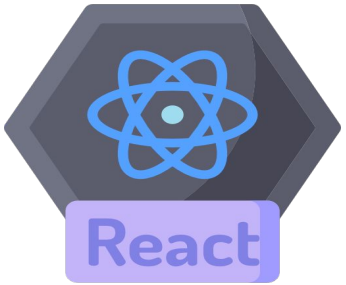
Tools and Technologies





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ANY

QUESTIONS?

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Thank You