



**Web-Based for Calculating and Tracking Tool Machine
Lifespan in the Production Process at PT Mitsubishi Electric
Automotive Indonesia**

UNDERGRADUATE THESIS

**Submitted as one of the requirements to obtain
Sarjana Komputer**

By:

DILVER PRINCE DAELI

001202200041

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ABSTRACT

In the fast-paced environment of automotive manufacturing, even a small oversight in monitoring tools inside production machines can lead to costly downtime. At PT Mitsubishi Electric Automotive Indonesia, the Tool Center team used to handle this by manually photographing machine displays and updating Excel sheets to track each tool's lifespan—a process prone to delays and errors.

Seeing the need for something more reliable, we set out to build a web-based system that could transform how the Tool Center manages its tools. The platform brings together several smart features: an OCR module that automatically reads tool lifetime values from uploaded images, a chatbot named MELVA that allows staff to quickly ask about tools, machines, or production lines, and dashboards that highlight which tools are nearing replacement.

To ensure all this sensitive data stays protected, I focused on integrating a solid layer of security. By implementing multi-factor authentication, carefully designed role-based access, and proven web security practices, the system now makes sure only authorized personnel can view or update critical information.

By moving away from manual methods to an integrated, secure platform, the Tool Center is better equipped to plan tool replacements proactively and maintain smoother production processes with reduced risk of unplanned interruptions, ultimately supporting higher productivity, improved safety, and more reliable manufacturing outcomes.

Keywords: *Predictive maintenance, machine learning, industrial automation, web application security, multi-factor authentication (MFA), Laravel framework, manufacturing systems, equipment failure prediction*

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