



Module 4

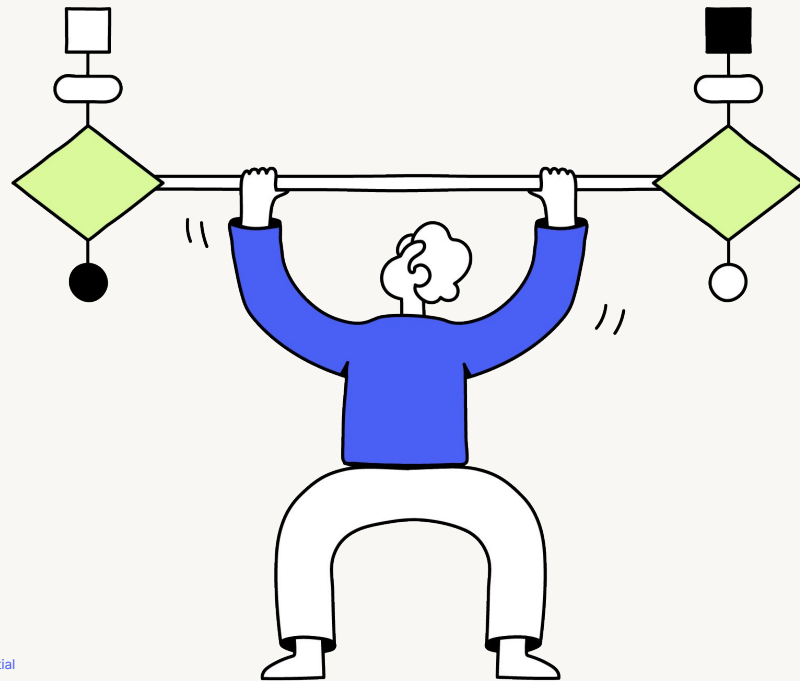
Workshop 2: Advanced Feature Engineering for Time-Series Data



The worst predictions ever

Predictions about the future don't always go as planned. Can you think of a personal, historical, or pop culture prediction that was completely wrong?

Share your best response in the chat!





Module 4

Workshop 2: Advanced Feature Engineering for Time-Series Data



Agenda

- **Review:** Recap key concepts.
- **Practice:** Time-series features for energy prediction.
- **Closing:** Key takeaways and next steps.



Learning objectives

- **Create time-based features from raw timestamp data** to capture temporal patterns and improve predictive model performance.
- **Incorporate domain-specific contextual data** into feature engineering to enhance model relevance and accuracy.
- **Apply feature selection or dimensionality reduction techniques** to optimize model performance when working with a large number of engineered features.
- **Explain how engineered features would be maintained and monitored** in a production environment to ensure continued model performance.

Async review: Units 2 and 3

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Workshop 2

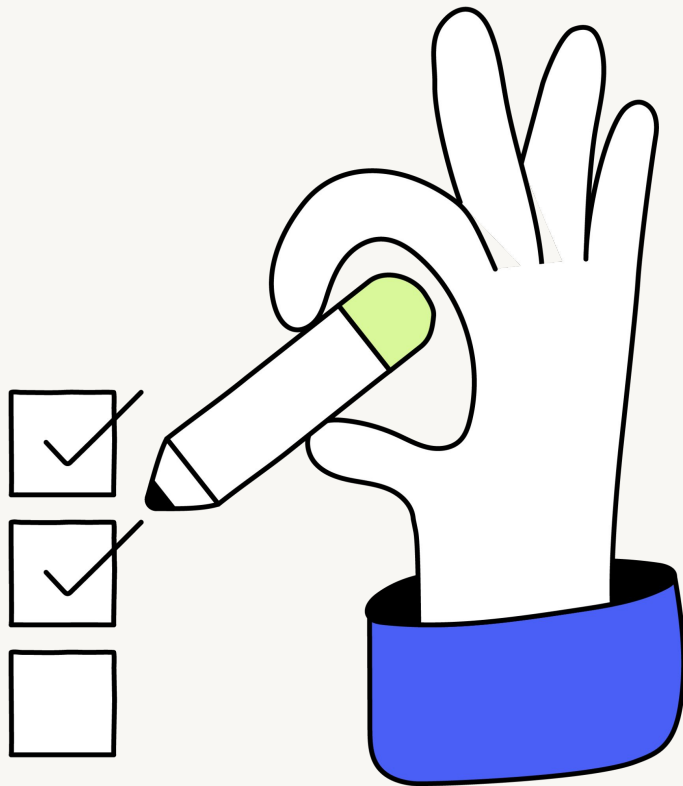


Navigate to the **"Async review"** page



Review the summaries of Units 2 and 3,
then complete the following Poll:

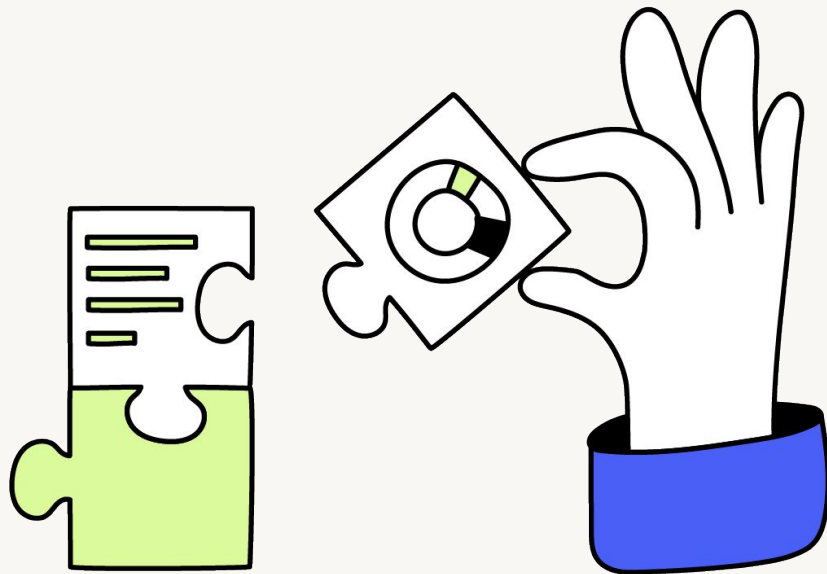
Time and categories





Handling temporal data

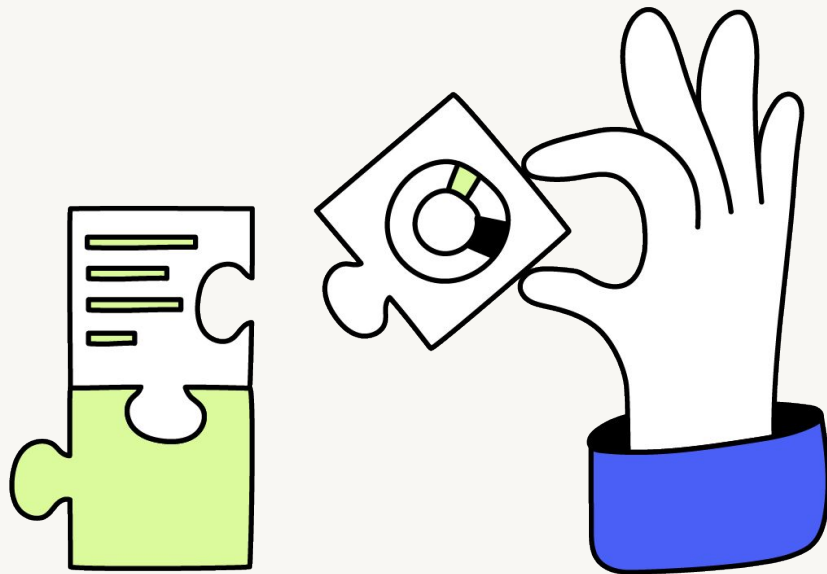
- **Lag features:** Use past values as predictive inputs (e.g., yesterday's sales to predict today's).
- **Rolling statistics:** Compute moving averages, min/max, or standard deviation over time windows.
- **Date part extraction:** Extract useful time components (hour, day, month, weekday, weekend flag).





Automated feature engineering

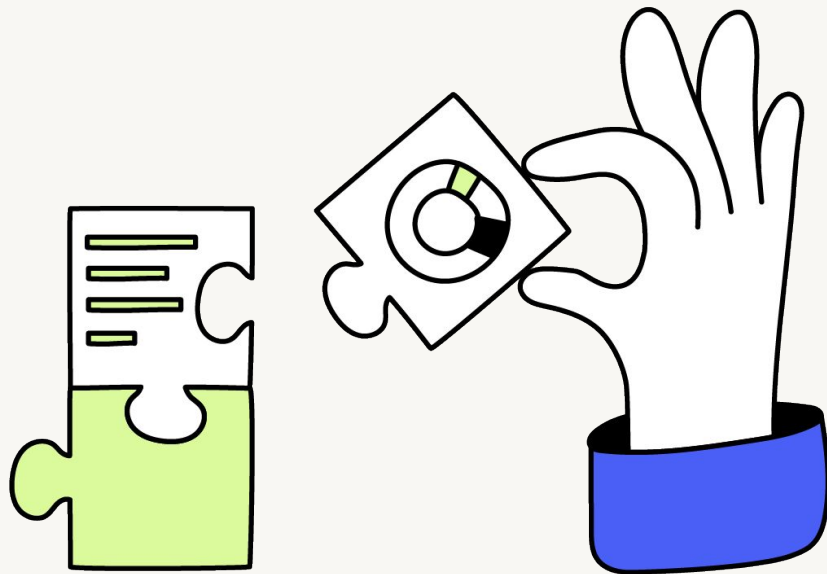
- **Tools like *tsfresh*:** Automatically generate relevant time-series features.
- **Deep Feature Synthesis (DFS):** Creates new features by combining existing ones programmatically.





Feature selection and dimensionality reduction

- **Correlation analysis:** Remove highly correlated features.
- **Principal Component Analysis (PCA):** Reduce feature space while retaining variance.
- **Embedded selection:** Use models like LASSO or tree-based methods to rank feature importance.



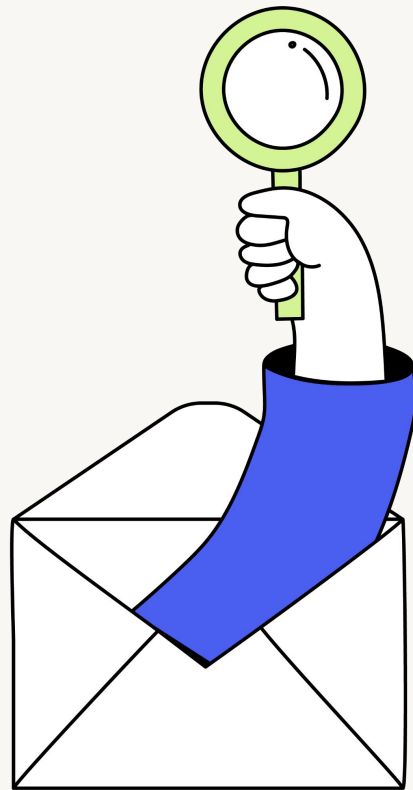


Skills application: Time-series features for energy prediction



Skills application context

- You are a data scientist for a city's energy provider.
- The company collects hourly electricity consumption data across districts.
- The goal is to predict next-day power demand to optimize distribution.
- Accurate forecasting helps prevent shortages and excess supply.
- **Your task:** Use the provided historical consumption dataset to engineer time-series features that enhance forecast accuracy.





Access the skills application

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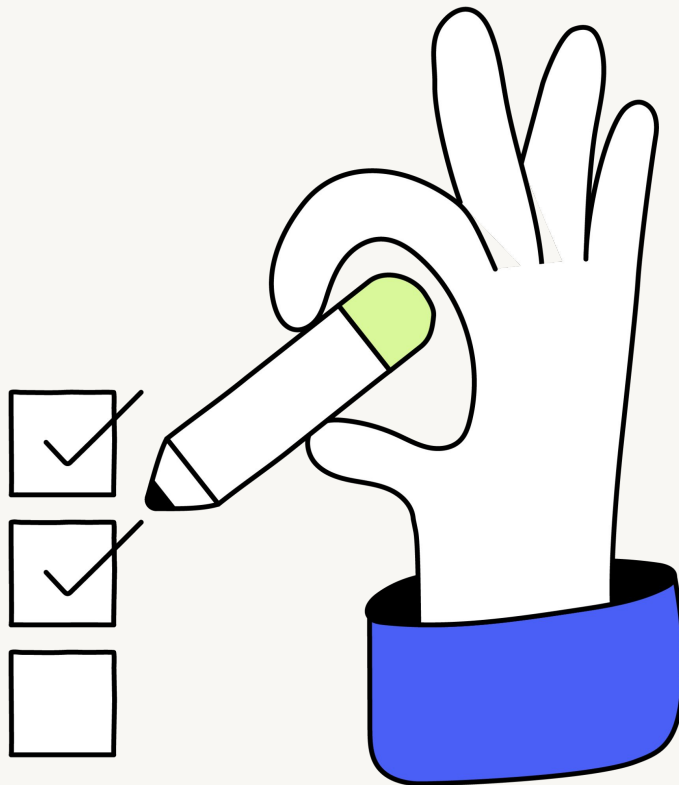
Navigate to the **"Skills application"**
page



Start working on the activity challenges



Be prepared to share in 30 minutes
when we come back together





Skills application debrief



Skills application debrief

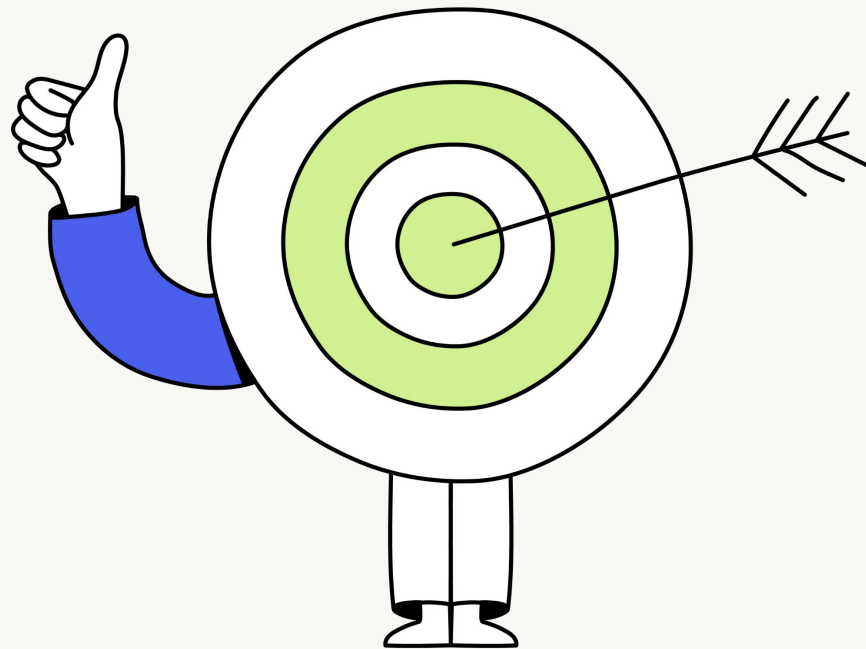
Which time-based features had the most impact on forecast accuracy, and why do you think they were effective?





Key takeaways

- 1 Feature engineering applies across data types.
- 2 Automated and manual techniques improve models.
- 3 Well-engineered features make AI models more effective.





Applying key takeaways to your organization



Applying key takeaways

1 How can time-series feature engineering improve forecasting or decision-making in your organization?

2 What external factors could be integrated into your models to enhance predictive accuracy?



Share your plan to apply new skills

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Workshop 2



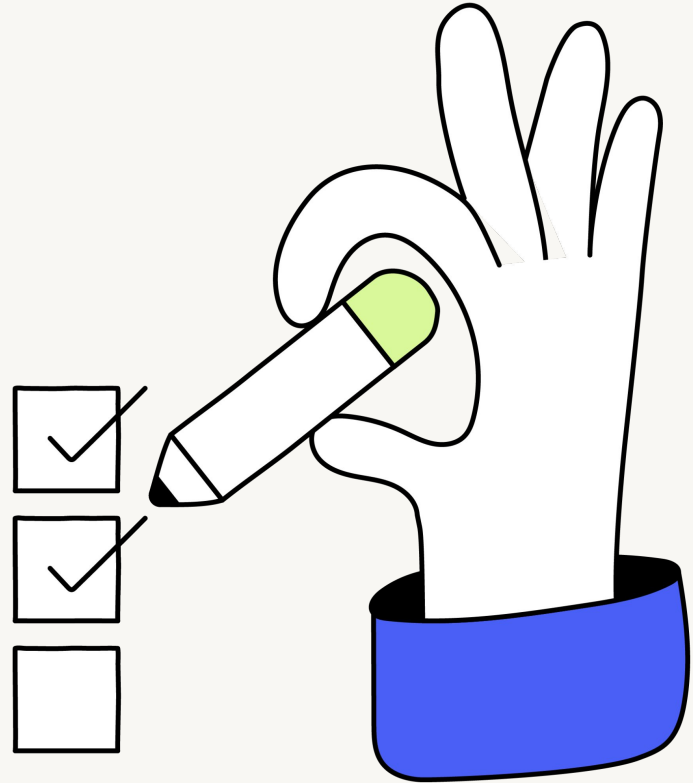
Navigate to the discussion activity
page **"Apply new skills to your role"**



Take 5 minutes to share how you will
apply this skill in your role



Take time this week to read what
others have written and get new ideas!





Closing out

- **Next up:** Module Wrap-Up Workshop
- **If you have questions, you can:**
 - Chat with Atlas
 - Reach out to your Cohort Coach
 - Sign up for Tutoring
- **Log your OTJ hours**
- **Take the Workshop Survey** on My Multiverse

multiverse