Predicting Transit Time with Machine Learning

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Sponsor: Maersk

MIT | Supply Chain MANAGEMENT

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Background

MAERSK

90% of the world's trade goods is transported by containers

Only 50% of ships arrive within 24h of their schedules

Schedule unreliability increases costs across the supply chains

Key Objectives

- **Identifying** external factors that contribute to transit time variability
- **Converting** historical data to predictor variables
- **Training** Machine Learning models
- **Testing** performance against real transit time
- **Build** a prototype that predicts the transit time in real time

Relevant Literature

- Salleh, N. H. et al. Predicting a Containership's Arrival Punctuality in Liner Operations by Using a Fuzzy Rule-Based Bayesian Network. *The Asian Journal of Shipping and Logistics* (2017)
- Chung, C.-C., & Chiang, C.-H. The Critical Factors: An Evaluation of Schedule Reliability in Liner Shipping (2011)
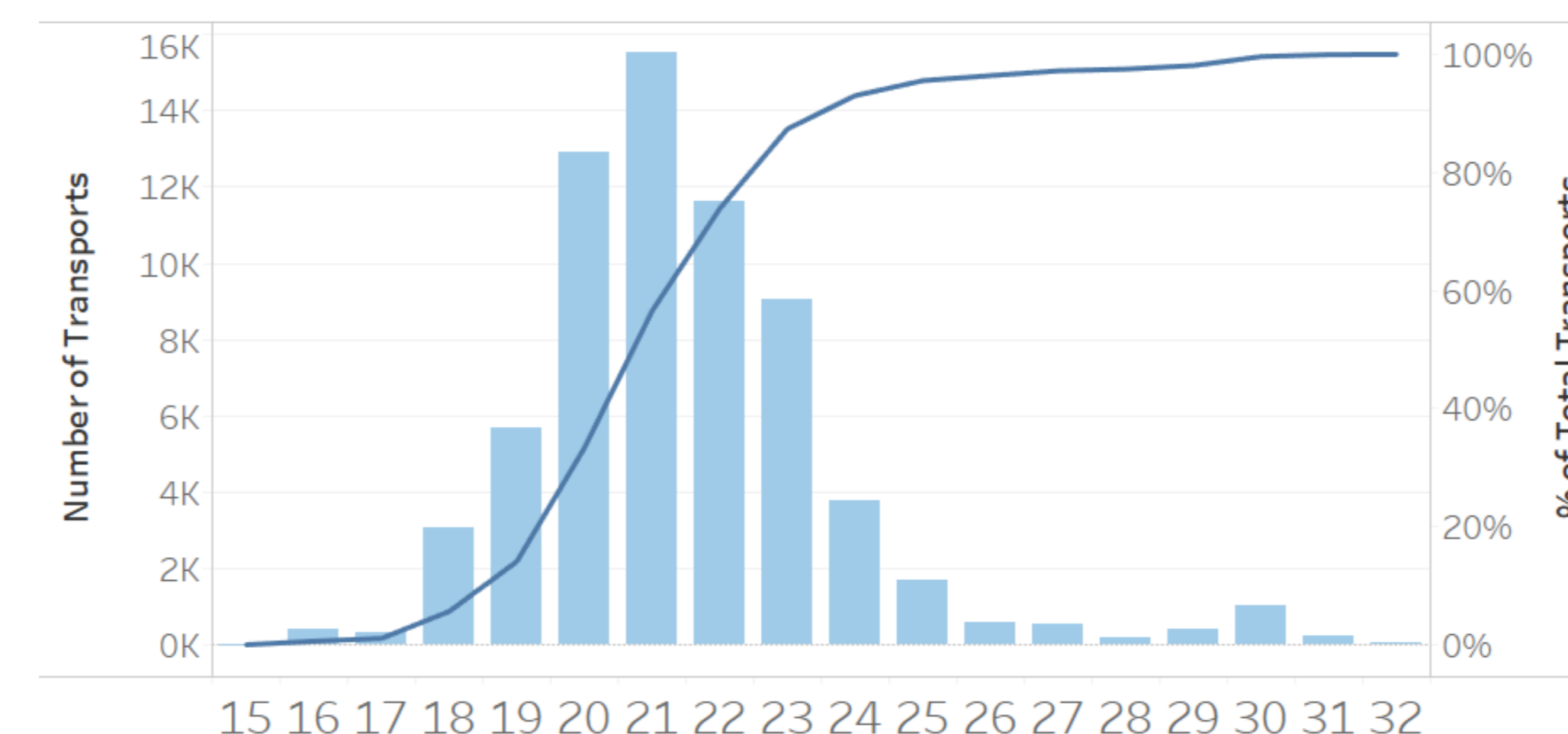
Maersk controls 21% of the container shipping global market. Image source: shipmap.org

Problem & Methodology

Analyze Historical Data → Identify Explanatory Variables → Train Machine Learning Algorithm → Validate Performance and Predict

Transit Time from Ningbo to Long Beach

Initial Results

- **Identification** of 18 predictor variables
- **Initial models** outperform naïve prediction and linear regression

60 days Average time from booking to unloading

2.9 days Mean Absolute Error

5.26% Mean Absolute Percentage Error

Expected Contribution

- **Improve** on Maersk's tool "Harmony" and upgrade it with a predictive capability
- **Validate** the concept of using Machine Learning to predict arrival times on a large scale
- **Gain** insights on relevance of factors influencing transit time

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