RIGA TECHNICAL UNIVERSITY

FACULTY OF COMPUTER SCIENCE AND INFORMATION TECHNOLOGY

INSTITUTE OF APPLIED COMPUTER SYSTEMS

Introduction to Operations Research
Assignment 11
Forecasting

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➢ Task

- The numbers of website visitors over the past five months were: 15, 18, 12, 17, and 13.
- Please forecast the number of visitors for the next month using the following methods:
  - Naïve Method
  - Averaging
  - Moving Average
  - Exponential Smoothing

➢ Answer

1. Naïve Method

- The Naïve Method assumes that the next value will be the same as the most recent observation.
- The number of visitors for the next month using the Naïve Method will be **13** (same as the last observation).

2. Averaging

- The Averaging method calculates the average of the past observations and assumes that the future values will follow the same pattern.
- The average of the past five months is (15 + 18 + 12 + 17 + 13) / 5 = 15.
- The number of visitors for the next month using the Averaging method will be **15**.

3. Moving Average

- The Moving Average method calculates the average of the past 'n' observations, where 'n' is a chosen number of periods.
- Let's use a 3-month Moving Average for this example.
- The number of visitors for the next month using the Moving Average method will be the average of the last three observations: (12 + 17 + 13) / 3 = **14**.

4. Exponential Smoothing

- Exponential Smoothing assigns exponentially decreasing weights to the past observations, with the most recent observations having more weight.
- Let's use a smoothing factor (alpha) of 0.2 for this example.
- The forecasted number of visitors for the next month using Exponential Smoothing can be calculated as follows:
- Forecast for the next month = (1 - alpha) * (last month's observation) + (alpha) * (last month's forecast)
  = (1 - 0.2) * 13 + 0.2 * 13
  = 0.8 * 13 + 0.2 * 13
  = 10.4 + 2.6
  = 13
- Therefore, the number of visitors for the next month using Exponential Smoothing will be **13**.

To summarize:

1. *Naïve Method:* 13
2. *Averaging:* 15
3. *Moving Average (3-month):* 14
4. *Exponential Smoothing (alpha = 0.2):* 13