

Intelligent Project Management Sreejith Mohan Menon, Development Architect, SAP Labs India Session ID #84566

May 7 – 9, 2019



About the Speakers

Sreejith Mohan Menon

- Development Architect, SAP Labs India
- Responsible for design and development of S/4 HANA applications focusing on the Intelligent ERP Scenarios



Key Outcomes/Objectives

- 1. Intelligent Project Management
- 2. Early Insight into Budget Overrun
- 3. Better Project Planning with Cost Prediction



Agenda

- Motivation and Overview
- Project Cost Forecasting
- Forecast Detailed Analysis
- Situations Possible Budget Overrun
- Demo
- Q&A



Motivation and Overview

Problem

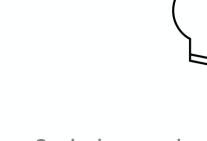
- Projects don't meet their budget and timeline.
- Reserving safety buffer leads to poor project planning and forecasting.

Goal

- To increase planning/forecasting accuracy by automatically learning by past
- How will my cost plan look like accordingly to similar projects in the past?
- How will my project schedule and cost evolve based on the current progress and the experience of historical project data?



Motivation and Overview



Planned Total Project \$ Over Budget The Channel Tunnel \$21.1bn Three Gorges Dam \$16.1bn Boston's Big Dig \$13.4bn Berlin Brandenburg Airport** \$3.2bn Great Belt Fixed Link \$1.8bn Denver International Airport \$3.1bn World Trade Center Transportation Hub** \$2.0bn Montreal Olympic Stadium \$3.0bn Budapest Metro Line 4 \$1.6bn × Millennium Dome \$895m Wembley Stadium × \$776m Elbphilharmonie** \$678m 0 5bn 10bn 15bn 20bn 25bn 30bn 35bn 40bn * Converted to US dollars and adjusted for inflation; ** Still not completed Forbes statista (cc)(i)(=)Sources: Podio, Der Spiegel, NY Times

Over-Budget Construction Projects In Comparison

Selected over-budget construction projects worldwide (in U.S. dollars)*

One in six companies exceed its budget by



200% - University of Oxford and McKinsey, 2011

> **Root Causes** Wikipedia, Cost Overrun



[...]imperfect forecasting techniques, inadequate data, [...]optimism bias with forecasters.

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Project Cost Forecasting

Hypothesis 1:

There is a connection between the project (master) data and the project costs.

Hypothesis 2:

Similar projects have similar cost characteristics.



Master data

- Project Type
- Customer
- Cost Center
- Profit Center
- Location
- Duration



Transaction data

- Costs
- Resources
- Progress
- Change requests

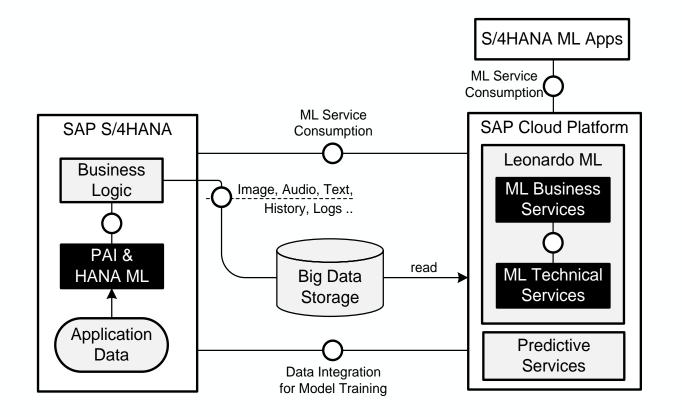


External factors

- Weather conditions
- Inflation rate
- Exchange rates
- Commodity prices
- Vacation times.



ML Solution Architecture



EMBEDDED ML:

SIMPLE CASES LIKE TRENDING OR FORECASTING

ALGORITHMS WITH LOW CPU/RAM/DATA DEMAND

SIDE-BY-SIDE ML:

DEEP LEARNING CASES LIKE IMAGE OR LANGUAGE PROC.

NEURAL NETWORKS WITH HIGH GPU/RAM/DATA DEMAND

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Project Cost Forecasting



Similar Projects

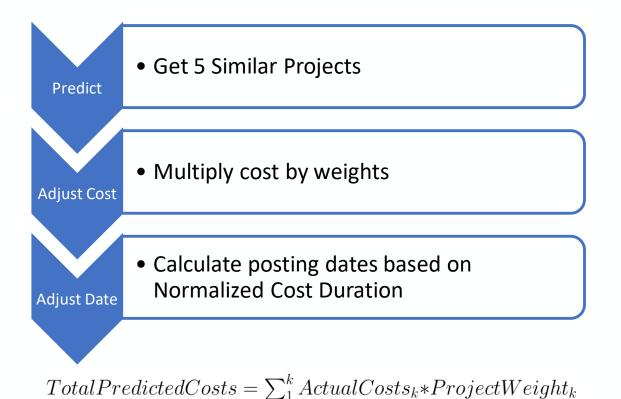
ojects (4)							\$ (
Project	Project Manager	Planned Start	Planned Finish	Plan Cost	Actual Cost	Project Similarity	
Bring your own device MDLEMPROJ023	George	11/22/2017	04/28/2018	17,000.00 USD	7,000.00 USD	0.9	Exclude
Hybris Implementation MDLEMPROJ024	Oliver	12/21/2017	05/25/2018	19,000.00 USD	6,550.00 USD	0.8	Exclude
OT Project MDLEMPROJ022	James	01/02/2018	07/15/2018	17,500.00 USD	7,500.00 USD	0.7	Exclude
Project Apollo MDLEMPROJ021	Charlie	03/03/2018	08/04/2018	16,500.00 USD	6,660.00 USD	0.6	Exclude

..... Derive weighted averaged cost curve from neighbors ∮ ← # SMP Cost Prediction V Q, Predict Cost Again Fiori MDLEMPROJ00 Apps@Finance Predicted Cost 20,661.70 USD Costs by Cost Category General Information Predicted Cost Range: 20,000 to 21,323.40 USD Project Manager: John Predicted Last Predicted. Today 02/21/2018 Planned Start : 03/01/2018 Planned Finish : 07/31/2018 Cumulative Costs Similar Projects • 6 2 🔳 📾 O Plan Actual & Commitment Lower

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Project Cost Forecasting

PLANNED PROJECTS



ACTIVE PROJECTS

 Predict
 • Get 5 Similar Projects with Cost to Date as additional feature

 Adjust Cost
 • Multiply cost by weights

 Adjust Date
 • Calculate posting dates based on Normalized Cost Duration

 Rescale
 • Compute rescaling factor based on Actual and Predicted Costs

 $TotalPredictedCosts = \sum_{k=1}^{k} ActualCosts_k * ProjectWeight_k$ $NewCosts_t = PredictedCosts_t * rescalingFactor$

Situations

IDENTIFICATION

BUDGET OVERRUN AS IT REACHES A THRESHOLD DURING COST POSTING

NOTIFY

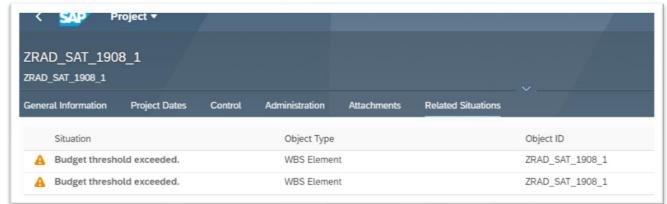
FIND THE RESPONSIBLE PEOPLE AND NOTIFY THEM

NAVIGATE TO THE PROJECT AND WORK PACKAGE WHERE THRESHOLD IS EXCEEDED

DETAILS

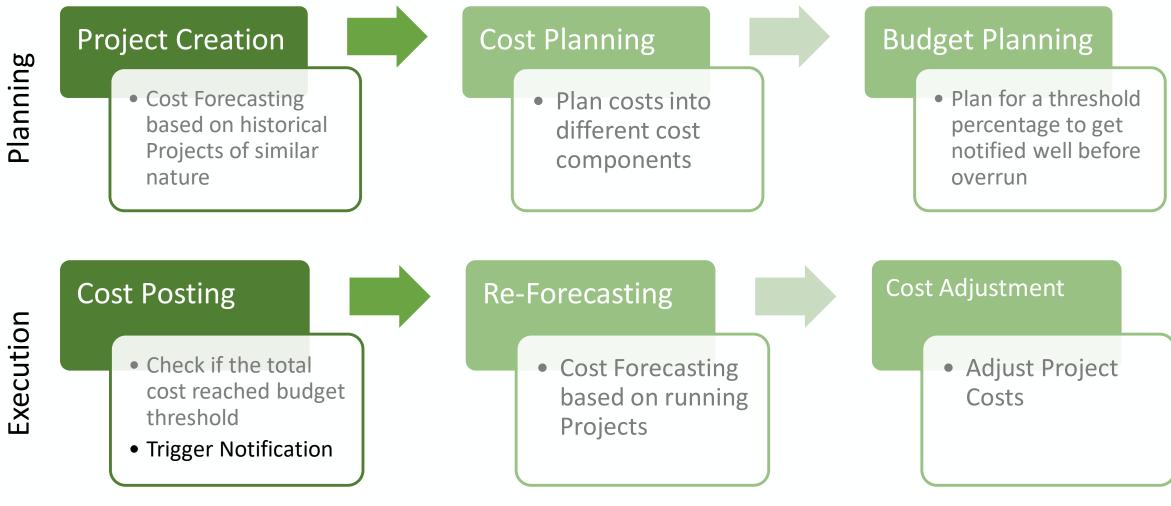
SHOW RELATED SITUATIONS IN THE OBJECT DETAILS







Intelligent Project Management



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DEMO



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Presentation Materials

Access the slides from 2019 ASUG Annual Conference here: http://info.asug.com/2019-ac-slides





For questions after this session, contact us at Sreejith.mohan.menon@sap.com



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