

Productivity Prediction of Garment Employees

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Introduction

The Garment Industry is one of the key examples of the industrial globalization of this modern era. It is a highly labour-intensive industry with lots of manual processes. Satisfying the huge global demand for garment products is mostly dependent on the production and delivery performance of the employees in the garment manufacturing companies. So, it is highly desirable among the decision makers in the garments industry to track, analyse and predict the productivity performance of the working teams in their factories. The goal of this project is to create a predictive multiple regression model that can help the manufacturers set an accurate target, minimize the production loss and maximize the profit.

Data Set Information

The `garments_worker_productivity` dataset can be used for regression purpose by predicting the productivity range (0-1) or for classification purpose by transforming the productivity range (0-1) into different classes. Table 1 provides attribute information for the dataset.

Table 1: Table 1: Attribute Information about `garments_worker_productivity` dataset.

Variable	Interpretation	Values
date	Date in MM-DD-YYYY	1/1/2015 – 3/11/2015
day	Day of the Week	Sunday – Thursday (Friday excluded)
quarter	A portion of the month. A month was divided into four quarters	Q1 – Q5
department	Associated department with the instance	Sewing and Finishing
team_no	Associated team number with the instance	1 – 12
no_of_workers	Number of workers in each team	2 – 89 (min – max)

Variable	Interpretation	Values
no_of_style_change	Number of changes in the style of a particular product	0 – 2
targeted_productivity	Targeted productivity set by the Authority for each team for each day	0.07 – 0.80 (min – max)
smv	Standard Minute Value, it is the allocated time for a task	2.90 – 54.56 (min – max)
wip	Work in progress. Includes the number of unfinished items for products	7 – 23122 (506 missing)
over_time	Represents the amount of overtime by each team in minutes	0 – 25920 (min – max)
incentive	Represents the amount of financial incentive (in BDT) that enables or motivates a particular course of action.	0 – 3600 (min – max)
idle_time	The amount of time when the production was interrupted due to several reasons	0 – 300 (min – max)
idle_men	The number of workers who were idle due to production interruption	0 – 45 (min – max)
actual_productivity	The actual % of productivity that was delivered by the workers. It ranges from 0-1	0.2337 – 1.1204 (min – max)

Data Inspection

The dataset has 691 complete cases and 506 missing observations in the work in progress variable. Therefore, these values will be filled using the predictive mean matching method.

Attaching package: 'mice'

The following object is masked from 'package:stats':

filter

The following objects are masked from 'package:base':

cbind, rbind

	date	quarter	department	day	team	targeted_productivity	smv	over_time	incentive	idle_time	idle_men	no_of_style_change	no_of_workers	actual_productivity	wip	
691																0
506																1
	0	0	0	0	0	0	0	0	0	0	0	0	0	0	506	506

	date	quarter	department	day	team	targeted_productivity	smv	over_time
691	1	1		1	1		1	1
506	1	1		1	1		1	1
	0	0		0	0		0	0

	incentive	idle_time	idle_men	no_of_style_change	no_of_workers
691	1	1	1	1	1
506	1	1	1	1	1
	0	0	0	0	0

	actual_productivity	wip
691	1	1
506	1	0
	0	506

iter	imp	variable
1	1	wip
1	2	wip
1	3	wip
1	4	wip
1	5	wip
2	1	wip
2	2	wip

2	3	wip
2	4	wip
2	5	wip
3	1	wip
3	2	wip
3	3	wip
3	4	wip
3	5	wip
4	1	wip
4	2	wip
4	3	wip
4	4	wip
4	5	wip
5	1	wip
5	2	wip
5	3	wip
5	4	wip
5	5	wip

Warning: Number of logged events: 4

Acknowledgement

[1] Imran, A. A., Amin, M. N., Islam Rifat, M. R., & Mehreen, S. (2019). Deep Neural Network Approach for Predicting the Productivity of Garment Employees. 2019 6th International Conference on Control, Decision and Information Technologies (CoDIT).

[2] Rahim, M. S., Imran, A. A., & Ahmed, T. (2021). Mining the Productivity Data of Garment Industry. International Journal of Business Intelligence and Data Mining, 1(1), 1.