# Paperwork on Degree Project: Machine Learning Based Fault Prediction for Real-time Scheduling on Shop-floor

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## Logistic Regression

## Overview

Logistic regression, developed by David Cox in 1958, is a regression model that describes data and explains relationship between binary categorical dependent value and one or more nominal, ordinal, interval or ratio-level independent variables. Like all regression analysis, logistic regression performs predictive analysis, leading to its broad applicability ranging from investigating changes in birthweight for term singleton infants in Scotland (Sandra.R.Bonellie, Journal of Clinical Nursing[1]) to serious injuries associated with motor vehicle crashes(Douglas W.Kononen, Carol A.C.Flannagan and Stewart C.Wang, Accident Analysis and Prevention[2]) and assessing groundwater vulnerability to contamination in Hawaii(Alan Mair, Aly I.El-Kadi, Journal of Contaminate Hydrology[3]). In this project, we use logistic regression to analyse shop-floor data for real-time fault prediction. Since the dependent data has only two categories, 0 for good and 1 for fault, logistic regression is fit for the purpose. Other alternative machine learning algorithms are evaluated in this project as well, similar to the work of Daniel Westreich, Justin Lessler and Michael Jonsson Funk on propensity score estimation, Journal of Clinical Epidemiology[4]

## Algorithm Details

Step 1:
...
Step n: equations

## References

[1] Hassan K Khalil. *Nonlinear systems*. Prentice Hall, Upper Saddle river, 3. edition, 2002. ISBN 0-13-067389-7.

[2] Tobias Oetiker, Hubert Partl, Irene Hyna, and Elisabeth Schlegl. *The Not So Short Introduction to LaTeX 2ε*. Oetiker, OETIKER+PARTNER AG, Aarweg 15, 4600 Olten, Switzerland, 2008. http://www.ctan.org/info/lshort/.

[3] Shankar Sastry. *Nonlinear systems: analysis, stability, and control*, volume 10. Springer, New York, N.Y., 1999. ISBN 0-387-98513-1.