



On Predicting the Time taken to Correct Bug Reports in Open Source Projects *



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Problem

Existing studies on the maintenance of open source projects focus primarily on the analyses of the overall maintenance of the projects and less on specific categories like the corrective maintenance

Contribution

- An empirical study of 72482 bug reports from Ubuntu, a popular Linux distribution.
- Identification of user participation in the corrective maintenance process through bug reports.
- A model to predict the corrective maintenance effort for the project in terms of the time taken to correct faults

Corrective Maintenance Measures

Correction time (CT)

Duration between when a bug report is opened, the fault fixed, the fix is released and the bug report is closed.

Participation (Pa)

Any activity (like fixing the bug, providing feedback to developers, replying to comments) that is explicitly visible through the bug reports

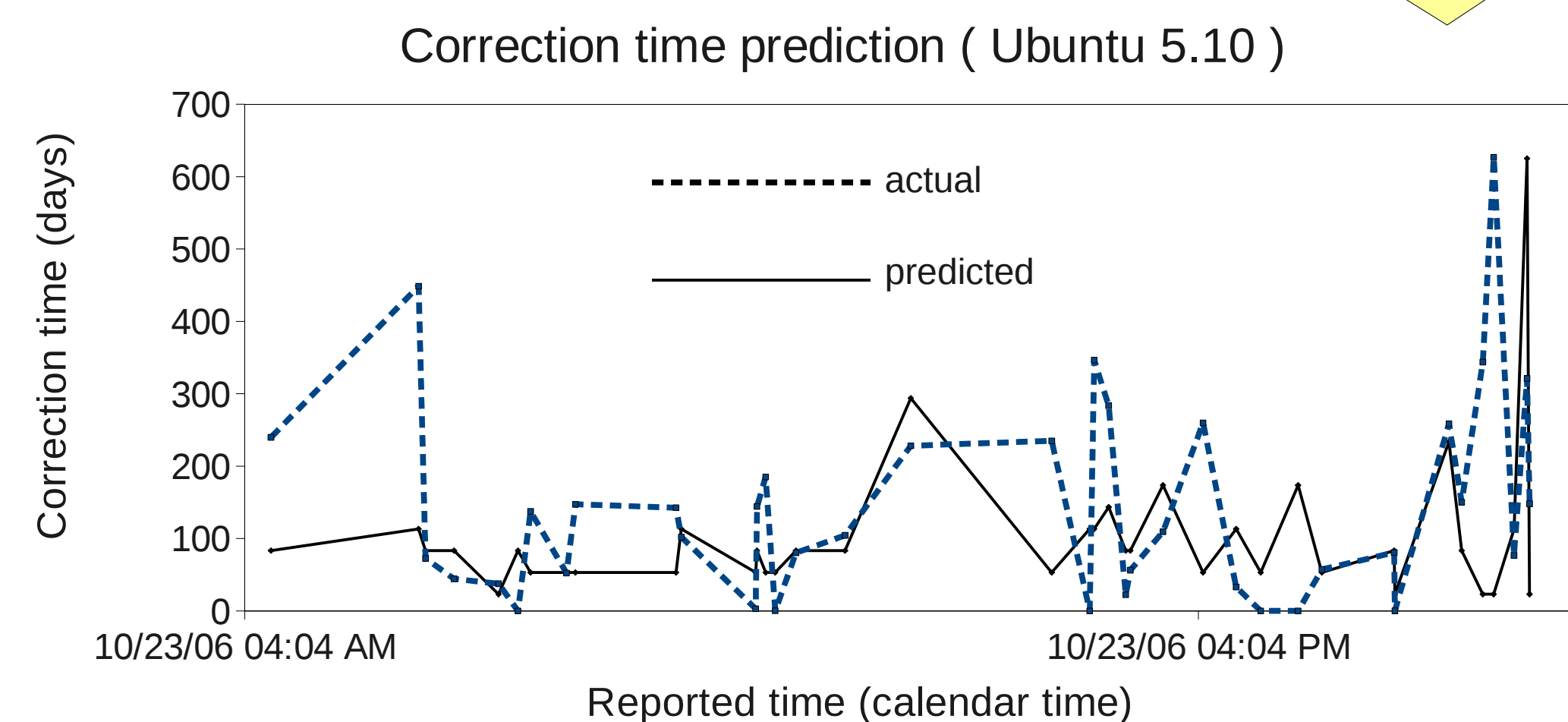
Participant (P)

A user performing any of the above activities.

% of faults corrected	GroupSize
95%	1 to 8
80%	1 to 4

Prediction

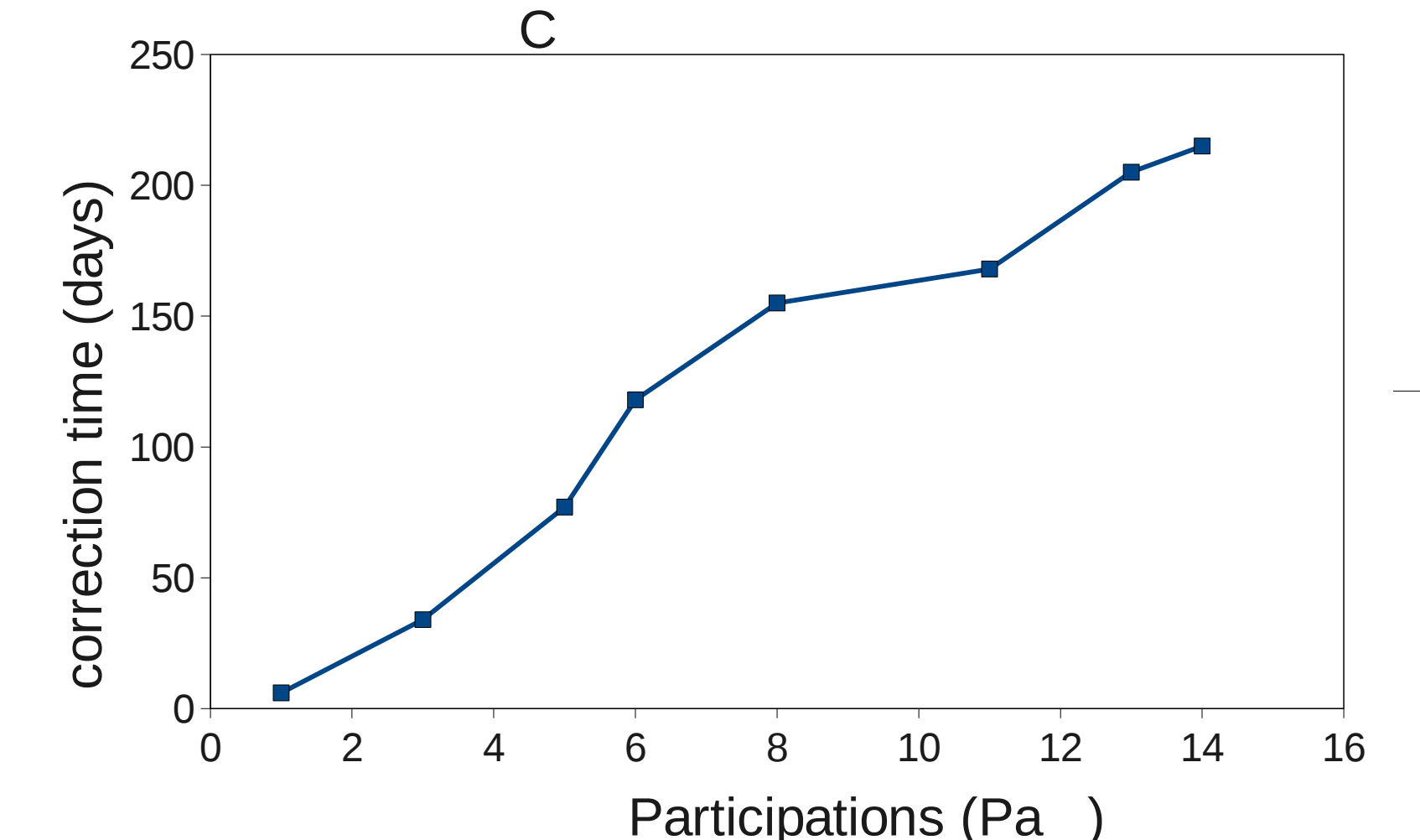
$$\text{Model : } CT_p = \alpha \cdot P + \beta$$



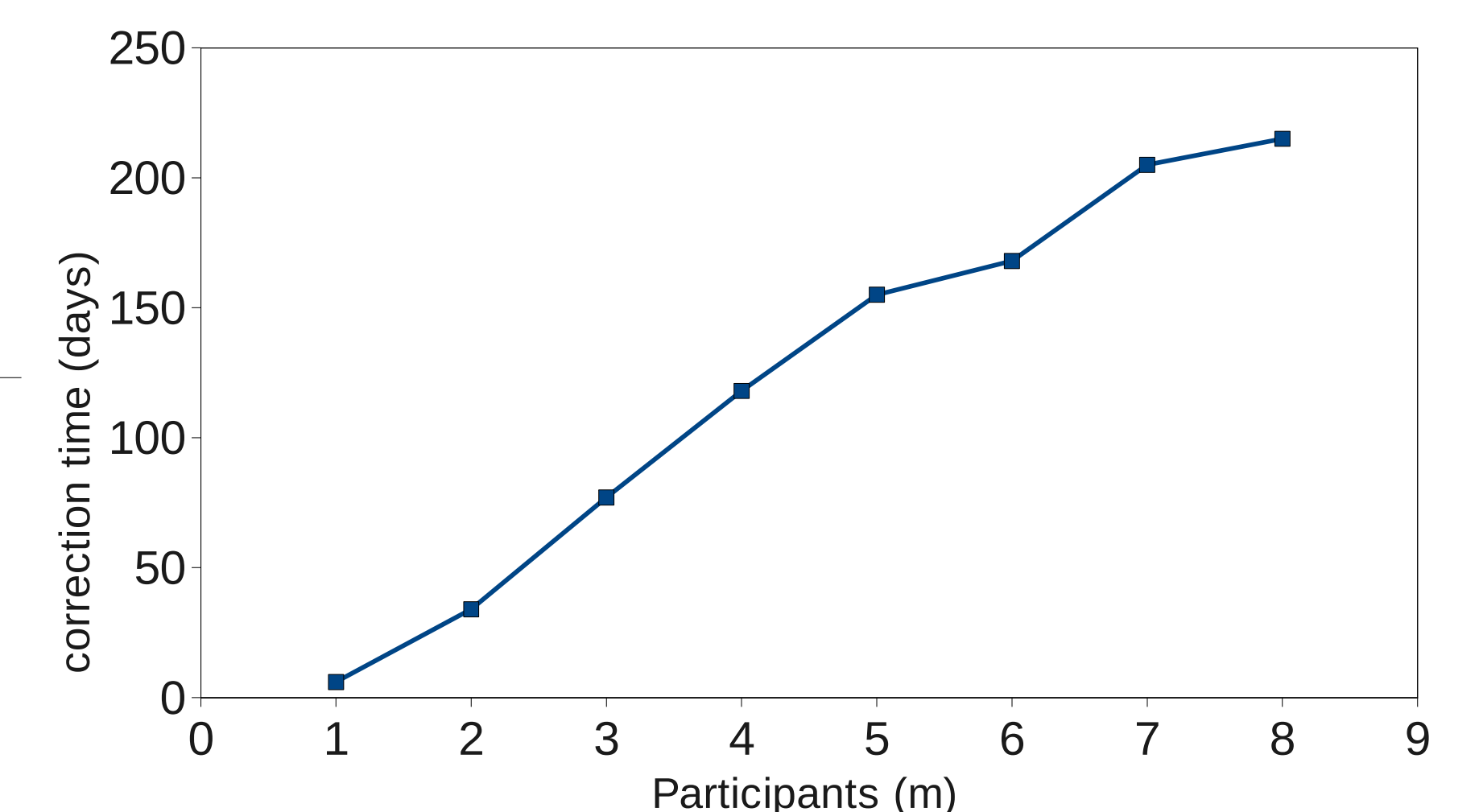
Magnitude of Relative Error (MRE) is the ratio of difference between the actual value and predicted value.

PRED_{0.25} gives the percentage of prediction less than or equal to an MRE of 0.25

Correction time (CT_C) vs Participation (Pa) (Ubuntu 5.10)



Strong linear relationship (91-92%)



Correction time (CT_C) vs Participants (m) (Ubuntu 5.10)

Model Performance

Model	PRED _{0.25}	MMRE
Walston-Felix	0.30	0.48
Basic COCOMO	0.27	0.60
Intermediate COCOMO	0.63	0.22
Bailey-Basili	0.78	0.18
SLIM	0.06-0.24	0.78-1.04
Jensen	0.06-0.33	0.70-1.01
COPMO	0.38-0.63	0.23-5.7
Our model	0.10-0.22	0.70-0.80

* This work is supported by the U.S. Army Research Office (ARO) under grant W911NF-08-1-0105 managed by NCSU Secure Open System Initiative (SOSI)