JELINSKI - SOFTWARE SUPPLY RELIABILITY PROPHECY TO DO FOR MORANDA MODEL AND BASED ON ITS GA OPTIMIZED SIMULATION TRAJECTORY

Shonazarov Sarvarbek
TATU, DIF Student,
sshonazarov938@gmail.com, +998942342082

Sultanov Hayotjon,
TATU, DIF Student,
anonymousdeveloper2005@gmail.com, +998936083334

INTRODUCTION

In our systems software of supply more and more increased going role account received without , last one how many ten in annuals " software supply about quality " . worry constant respectively grow up went , this basically another factors with one in line reliability with is described .Software of supply reliability is known one in the environment known time during computer of the program fault free performance probability _ Software of supply not working stay for many reasons available , but usually they are new or changed requirements , re seeing exits or corrections and etc as a result surface coming design problems with depend There is problems if , har always failures _ immediately do not create , then they are only known circumstances and in inputs to work falls _ Reliability operational efficiency point of view in terms of is determined , the product ready to be until him measure possible not _ Reliability indicators provide for system from completion before to reliability effect doer a model is created from the factors and from him after system work outgoing at the time his concept based on his predictions is constructed ([1], [4]).Prophecy to do system unknown parameters determination and the results comment for prophecy to do procedures collection with together mathematician from the model consists of ([1], [2], [3], [4]). Software of supply reliability model Fault of the process to him effect doer main to factors of dependence common form , that is mistakes input , faults eliminate reach and of the environment reliability determines _ Such modeling three wide from the stage consists of : assessment , model work exit and measurement [6].Reliability growth in the context of future reliability prophecy to do for when called upon software supply reliability different models very different answer to give possible ([8], [9]). Jelinski-Moranda reliability model this in the subject next failure prophecy to do for aggregated .This prophecy analysis to do for different different measurements used ([4], [5], [7]). Prophecy in doing more convenience and efficiency for evolutionary algorithm by optimized simulation trajectory work developed.

This model is the first reliability model as acceptance will be done . It is exponential in order to the statistical model class belongs to is the error determination and correction N failures in

the program there is when and all faults f fast gi one different when assuming it starts does ph .

A. Assumptions and data requirements :

of the model main assumptions of the following consists of :

1. Speed mistake detection , software of supply current error content with is proportional .
2. Malfunctions determination speed malfunctions surface came time between constant being remains .
3. Fault software to supply new malfunctions without entering immediately will be corrected
4. Software supply reliability prophecy to do need has been way works
5. failures , failures is independent when defined In a row in the middle received time

faults - in Appendix I Musa information provided taken from the collection [4]. seeing outgoing problem for necessary has been data .

B. Modal form

Model and of assumptions common apparently that's it determination possible if the violation cases between time xi= ti -t(i-1), i = 1,....,n if xi,s will be average with independent exponent distributed random are variables . f(ti) is known ti time for probability density function so be it $f\left(x^{i}/_{t_{i-1}}\right) = \phi[N - i(-1)] \exp(-\phi[N - (i-1)]x_i)$

and don't collect density function will be $F_i(t_i) = -\exp(-\lambda_i t_i)$ And $1/\phi[N-(i-1)] = 1/\lambda_i$ this on $\lambda_i$the ground risk level

This exponential model to the binomial type belongs to that it was from equations (2), (3) due to using the following is taken :

$\mu(t) = N(1 - \exp(-\phi t))$ $\lambda(t) = N\phi(\exp -(\phi t))$

Here _ $\mu(t)$ - average value function and $\lambda(t)$- breakdown density function .

This is clear failure type is a model because -

$\lim_{t\to\infty}\mu(t) = \lim_{t\to\infty}N(1 - \exp(-\phi t)) = N$ …..(6)

C. MODEL EVALUATION AND RELIABILITY PREDICTION

X_i of joint from the density The maximum likelihood estimates of the calculated MLE are the solutions of the following equations:

$$\phi = \frac{n}{N[\sum_{i=1}^{n} x_i] - \sum_{i=1}^{n}(i-1)x_i} \qquad \sum_{i=1}^{n}\frac{1}{N-(i-1)} = \frac{n}{N - \left(\frac{1}{\sum_{i-1}^{n} x_i}\right)(\sum_{i-1}^{n}(i-1)x_i)}$$

(8) equation solve for Pentium III in C language software supply work developed _

So by doing received solution N and ϕ put into equation (7) to find maximum likelihood estimates (MLE's). Variant reliability measures are then q biased reliability the quantities N and fi in the function replacement through taken can _ An example as , the (n+1)th MLE failures for average not working to stay time (MTTF) is as follows :

$$MTTF = \frac{1}{\phi(N-n)}$$

D. Algorithm

(8) equation solve algorithm below cited :

```
1. min = 0.1
2.    For N=3 to N=50
3.    begin
4.        pl = f(N)
5.         if (p =< min)
6.           begin
7.             min = p1
8.             print min, N
9.         end
10.   end
```

Above Musa information in the program collection used _ The value of N to work dropped. Algorithm The value of N for which f(N) is minimal gives - this on the ground

$$f(N) = \sum_{i=1}^{n} \frac{i}{N-1\cdot(-1)} - \frac{n}{N-\left(\frac{1}{\sum_{t=1}^{n} x}\cdot 1\right)\left(\sum_{i=1}^{n}(i-1)x_i\right)}$$

In the J-M model, in the example of software reliability, it is appropriate to use several statistical models to predict the reliability quality of any predictive environment.

Creating an optimized simulation in the prediction space defined by the J-M model is most convenient for predicting reliability behavior, which is effective as a tool for solving complex optimized problems by applying a hybrid stochastic search technique based on simulated Anneling in G.A.

References

1. Lyu.M(ed.), Handbook of Software Reliability Engineering, IEEE Computer Society Press, 1996.
2. Abdel-Ghaly, A.A., Chan, P.Y. and Littlewood, B., “Evaluation of Competiting Software Reliability Predictions,” IEEE Transactions on software Engineering, SE-12(9), p.p. 950-67, 1986.
3. Fenton, N.E., Pfleeger, S.L., Software Metrics, International Thomson Computer Press, London, 1996.
4. Musa, J., Lannino, A. and Okumoto, K., Software reliability: Measurement, Prediction and Application, McGraw Hill, New York, 1985.
5. Littlewood, B., “How to measure Software Reliability and how not to,” IEEE Trans. Rel., Vol. R-28, pp.103-110, June 1979.
6. Lyu, M., Nikora, A., “Applying Reliability Models more effectively,” IEEE

Software 9(4), July 1992.

7. Srimani Pradip K., Malaiya, Yaswant K., "Steps to practical Reliability measurement," IEEE Software 9(4), July 1992.
8. Schick, G.J., Wolverton, R.W., "An analysis of competing Software Reliability Model", IEEE Transactions on Software Engineering, Vol.SE-4, No.2, March 1978.
9. Brocklehurst, S., Chan, P.Y., Littlewood, B. and Snell, J., "Recalibrating Software Reliability Models," IEEE Transactions on Software Engineering, Vol.16, No.4, April 1990.