論文審査の要旨

| 博士の専攻分野の名称 | 博　士　（　工学　） | 氏名 | Momotaz　Begum |
|---|---|---|---|
| 学位授与の要件 | 学位規則第４条第1・2項該当 | | |

論　文　題　目

A Study on Refined Neural Network Approach with Data Transformation for Software Fault Prediction

(ソフトウェアフォールト予測のためのデータ変換を用いたニューラルネットワークアプローチに関する考察)

論文審査担当者

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〔論文審査の要旨〕

　　Software fault prediction is one of the most fundamental techniques in software fault management, and is used to assess the software product reliability and to control the development process. For the purpose of quantitative assessment, software reliability growth models (SRGMs) have been widely used during the last four decades. The major drawbacks of SRGMs are that their goodness-of-fit performance and the prediction performance strongly depend on the data. Apart from SRGMs based on stochastic modeling, artificial neural network (ANN) has received considerable attentions to deal with non-linear phenomena arising in applications to time series forecasting, pattern recognition, function approximation, etc.

　　In this thesis, the applicant concerns the software fault prediction using a multilayer-perceptron neural network, where the underlying software fault count data is transformed to the Gaussian data, by means of the well-known five data transformation methods. In details, she discusses two different research topics; one-stage look ahead prediction and multi-stage look ahead prediction.

　　In Chapter 2, the applicant focuses on one-stage look-ahead prediction problem with the common multiplayer perceptron neural network of the cumulative number of software faults in sequential software testing. She applies the well-known back propagation algorithm for feed forward neural network architectures.

　　In Chapter 3 and Chapter 4, the applicant pays her attention to the software fault prediction and prediction interval for long-term. Here she studies the long-term prediction of the number of software faults, and proposes a refined neural network approach with the grouped data, where the

multi-stage look ahead prediction is carried out with a simple multi-layer perceptron neural network with multiple outputs.

In Chapter 5, the applicant considers the optimal software testing time which minimizes the relevant expected software cost via a refined neural network approach with the grouped data, where the multi-stage look ahead prediction is carried out with a simple three-layer perceptron neural network with multiple outputs. To our best knowledge, there have no research result on the optimal software release problems for the long-term prediction via the refined neural network approach. She compares the proposed neural network approach with the common NHPP -based SRGMs.

Finally, the applicant concludes the thesis with some remarks in Chapter 6.

From the above research achievement, we are pleased to judge that Mrs. Momotaz Begum is capable of receiving Dr. of Engineering degree from Hiroshima University.

備考：審査の要旨は，1,500字以内とする。