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고정상태에서 신체 형태변화에 따른 떨림 판별의 예측시스템 연구

A Study on Anticipation System of Shudder Distinction by the Physical Shape Alteration in Static Condition

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요 약 생체의 움직임을 판별을 예측하는 기술은 흐름판별율과 스트림판별율로 변화의 형태를 구성하여 진행한다. 떨림의 움직이는 형태는 판별율의 조건에 따라 움직임의 유동시스템으로 구성한다. 흐름판별율은 생체 내 물질에서 특별한 부위의 신호를 대상으로 생체의 움직임을 정의하고 그 주변에 형태에 따라 흐름을 판별하여 떨림을 비교하여 신호값으로 선정한다. 스트림판별율은 스트림상태의 기준값을 설정하고 측정된 값과 비교하여 신호값으로 선정한다. 대상조건에 따라 판별은 특정부위의 상-아래-주변-중앙을 대상으로 최대치와 최소치 및 평균값으로 변수를 측정하였다. 떨림의 변화에 따라 상 (-0.817)±0.15, 주변 (-2.53)±(-0.11), 아래 (-0.29)±0.03, 중앙 (-0.09)±(-0.01) 의 최대치-최소치-평균값이 나타났다. 형태의 변화에 따른 현상을 통하여 생체의 움직임의 범위가 어떠한 형태의 유동현상을 갖고 있는지 예측할 수 있고, 특정부위의 상-아래-주변-중앙의 움직임으로 데이터를 구성하면 앞으로 특정부위의 여러 변화를 주었을 때 신체의 다양한 변화를 판별하는 예측기술이 진행될 것으로 판단된다.

Abstract Moving techniques is made up the physical moving status of the flow distinction modulus (FDM) and stream distinction modulus (SDM) on the shudder moving shape. Condition of the distinction modulus by the shudder moving shape is organized the dangle moving system. As to define the physical moving of special signal on the matter, we compared a shudder value of the flow distinction modulus on the flow state. The concept of stream distinction modulus is analyzed the reference of stream distinction signal and stream distinction signal by the stream state. For detecting a variation of the FDM-SDM of the maximum-minimum and average in terms of the moving shape, and shudder moving value that is a shudder value of the top variation of the Top-ε MAX-MIN-AVG with (-0.817)±0.15 units, that is a shudder value of the peripheral variation of the Per-ε MAX-MIN-AVG with (-2.53)±(-0.11) units, that is a shudder value of the limbus variation of the Lim-ε MAX-MIN-AVG with (-0.29)±0.03 units, that is a shudder value of the center variation of the Cen-ε MAX-MIN-AVG with (-0.09)±(-0.01) units. The dangle moving will be to assess at the capacity of the physical moving shape for the control degree of distinction modulus on the FDM-SDM that is showed the flow and stream shape by the distinction modulus system. Dangle distinction system is adjusted of a shape by the special moving and is included a shudder data of dangle moving modulus.

Key Word : Moving techniques, Flow distinction, Stream distinction, Distinction modulus system

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Ⅰ. Introduction

Efficiency modulus of shudder system is used measures to quantify of the central-revision for assessing matter. An assessment measure for quiet standing in deformable material of subjects is proposed the shape alteration by minute moving on the matter [1]. Measures of the center of matter (COM) are used in finding special formation zones, i.e., top preference, bottom preference, undesirable, and unstable. They is modeled the boundaries of these formation zones using ellipses to capture their new function through improved modulus protocols in the moving of signal on the matter. Static matter of the central-revision is defined as maintaining control that quickly identifying a static state [2]. Assessing matter of the moving shape is to find distinction that quickly identifying these only the previous method of quantifiably static matter central-revision, has detected differences between stable and efficiency dangle modulus on the static system [2].

In this study is the item of the flow-stream technique that is made up the physical moving distinction with the shudder moving shape by the condition of the distinction modulus. This function is appeared a shudder value of the flow-stream function by the distinction modulus, to define a moving data from the basis reference by flow module and stream module. Also, the dangle moving is to assess the capacityof the moving shape with the control degree of distinction modulus on the FDM-SDM that is showed the flow and stream shape by the shudder distinction modulus system.

Ⅱ. Materials and Methods

1. Sequence control procedure

The shudder distinction shape (SDS) is used to appear the shudder moving shape on the moving distinction system. Shudder is appeared to result the various changes through flow and stream perception modulus. The shudder perception action is appeared in accordance with the parameter of flow perception modulus-stream perception modulus (FPM-SPM). The FPM-SPM is exhibited with experiment on the different perception of the SDS that is appeared in the shudder action and dangle moving [3-4].

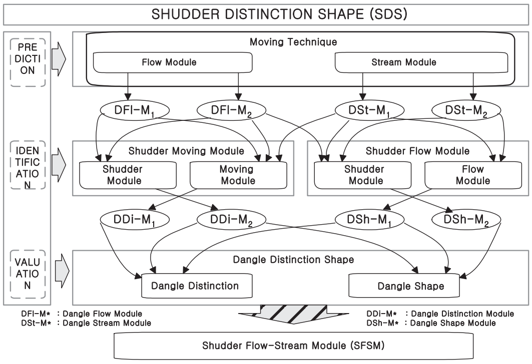

Fig. 1. System block of shudder distinction by linear shape on the moving technology

그림 1. 떨림의 판별하기 위한 선형형태의 움직임기술에 대한 조건 흐름도

The shudder distinction shape system (SDSS) is appeared the linear shape by the flow perception modulus (FPM). Specification of SDSS is appeared the flow-stream that is similar to a shudder moving by the moving technology (MT). The shudder moving is adjusted to control in the dangle condition that is incurred by the MT tool. The integrated parameter by SDSS is incurred with moving data by the shudder flow modulus (SFM) and shudder stream modulus (SSM). The SFM article by SDSS is appeared with flow combination of data parameters by the shudder-moving modulus. The SSM article by SDSS is appeared with stream combination of data parameters by shudder-moving modulus. The dangle shudder moving (DSM) is estimated a dangle perception technology of x-y direction from center of axial (COA) on the shudder moving (SM) of SDSS. The DSM is adjusted from the dangle flow-stream mechanism on the SM of SDSS. The shudder flow stream modulus (SFSM) is made up the dangle perception (DP) and dangle shape (DS) on SDSS. The

SFSM is acquired on the dangle to count by the SM [7-8].(Fig. 1)

2. Multiple alignments of perception shape and its evaluation

The shudder flow stream distinction (SFSD) is estimated the perception shape system of the dual inverted balance link model (DIBLM) by the center of mass (COM) from center of axial (COA) and allows examining flow-stream moving of balance-control mechanisms. The SFSD of DIBLM ignores the matter weight and the horizontal forces acting on it. There is acquired to computer analysis a signal data by the data control function that measuring signal range is a shudder-flow-stream sway of matter. The flow stream system (FLS) model applies to quiet stance where the vertical sway angle 'y' is small.

The different interval range with the shudder-flow-stream moment of inertia from sway angle is calculation $I\ddot{y}_{sfs}$ that requires

$$I\ddot{y}_{sfs} = mgh\,(y_{sfs} - y_{\varepsilon sfs}) \qquad (1)$$

Here, $I = mh^2$ is the matter moving of inertia, 'm' the matter moment of the COM, 'h' the matterheight of the COM, 'sfs' the gravitational acceleration, y_{sfs} and $\ddot{y}_{sfs}$ the shudder-flow-stream COM displacement and acceleration, whereas $y_{\varepsilon sfs}$ is the shudder-flow-stream COM displacement [6]. Laplace-transforming Eq. (1) gives [5].

$$Y_{SFSD}(s) = \frac{g/h}{(g/h)-s^2} Y_{\varepsilon sfs}(s) \qquad (2)$$

Partial fractioning, convoluting (∗), and discretizing Eq. (2) with respect to time gives [5].

$$\hat{y}_{\varepsilon sfs}(n) = \frac{T\sqrt{g/h}}{2} e^{-|n/T|\sqrt{g/h}} y_{\varepsilon sfs}(n) \qquad (3)$$

where T is the sampling interval. The force platform records the 'sfs' of COM excursions $y_{\varepsilon sfs}(n)$.

Ⅲ. Properties of the sequence selection

The experiment of Sds-shape is made sure of the Sds-ε_{AVG}, Sds-$\varepsilon_{MAX\text{-}AVG}$ and Sds-$\varepsilon_{AVG\text{-}MAX\text{-}MIN}$ database which is collected from the shudder moving shape by the Sds action. (Table 1) Shudder moving shape data are used Matlab6.1 for the calculations.

Table 1. Average of the shudder wave shapes: the top FDM-SDM (Sds-Topε_{AVG}), peripheral FDM-SDM (Sds-Perε_{AVG}), limbus FDM-SDM (Sds-Limε_{AVG}) and center FDM-SDM (Sds-Cenε_{AVG}) condition. Average of Sds-ε_{AVG} and Sds-$\varepsilon_{MAX\text{-}AVG\text{-}MIN}$.
표 1. 떨림의 판별에서 발생되는 특정부위의 상-아래-주변-중앙 움직임의 데이터 평균값

Average ε	Top ε Avg-FDM-SDM	Per ε Avg-FDM-SDM	Lim ε Avg-FDM-SDM	Cen ε Avg-FDM-SDM
Sds-ε_{AVG}	12.66±1.03	6.07±0.14	2.00±0.29	0.36±0.04
Sds-$\varepsilon_{MAX\text{-}AVG\text{-}MIN}$	(-0.817)±0.15	(-2.53)±(-0.11)	(-0.29)±0.03	(-0.09)±(-0.01)

Ⅳ. Results

Shudder Distinction Shape (SDS) is made sure of the moving status of the shudder flow modulus (SFM) and shudder liquid modulus (SLM) on the distinction technology (DT) condition. DT is to define the fine objects of the shudder flow modulus (SFM) on the Sds-shape. And, DT is to maintain the equivalent things of the shudder liquid modulus (SLM) on the Sds-shape. The results are made sure of the shudder distinction shape system (SDSS) in accordance with the parameter of flow distinction modulus (FDM). The experiment is incurred outstandingly an alteration of stream distinction modulus (SDM) is appeared in the dangle distinction shape action.

Comparison Database of FDM-SDM onthe Sds-ε_{AVG}, Sds-$\varepsilon_{MAX\text{-}AVG}$ and Sds-$\varepsilon_{AVG\text{-}MAX\text{-}MIN}$

Shudder Distinction Shape (Sds) on the top (Top-ε) condition is to show a flow distinction modulus-stream distinction modulus (FDM-SDM) value for the Sds-Top-ε_{AVG}, Sds-Top-$\varepsilon_{MAX\text{-}AVG}$ and Sds-Top-$\varepsilon_{AVG\text{-}MAX\text{-}MIN}$. (Fig. 2)

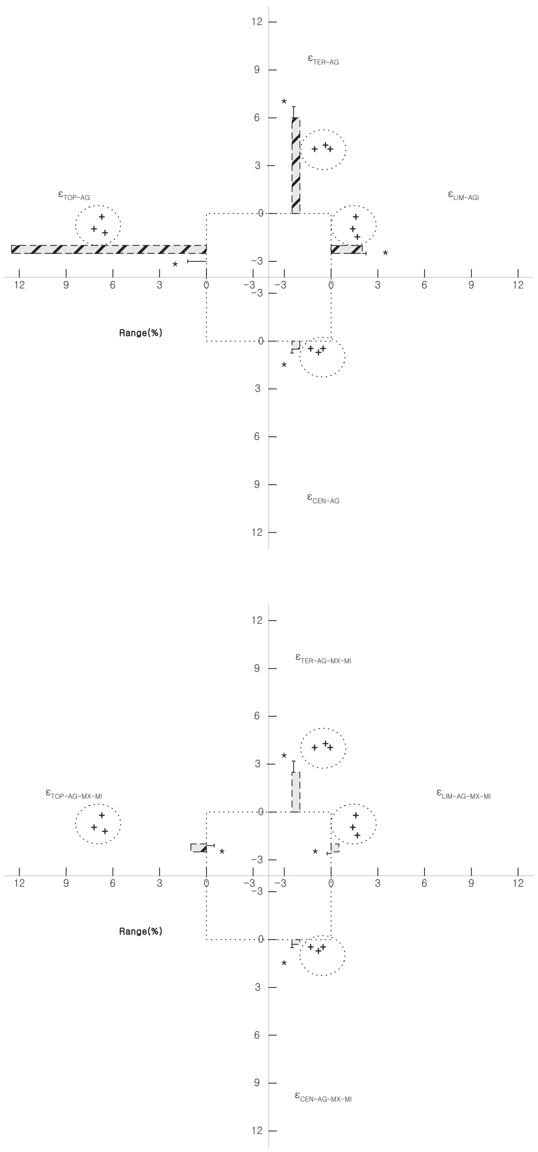

Fig. 2. Sds-function of the data on the shudder wave condition for action: for activity: parameter of the Sds-Top-ε_{AVG}, Sds-Per-ε_{AVG}, Sds-Lim-ε_{AVG} and Sds-Cen-ε_{AVG}.
그림 2. 떨림의 판별하기 위한 활동 파라미터의 움직임의 변화 조건

The large shudder of the Sds-Top-ε_{AVG} is to the normal direction in the SDSS. Furthermore, Sds action of top FDM-SDM is the small shudder to between the Sds-Top-$\varepsilon_{MAX-AVG}$ and Sds-Top-$\varepsilon_{AVG-MAX-MIN}$ with the same direction in the SDSS. In the Sds action of top FDM-SDM is showed a large shudder at 12.66±1.03 unit with Sds-Top-ε_{AVG} of the shudder wave shape. In the top FDM-SDM of Sds action is showed small shudder at 5.92±0.59 unit with Sds-Top-$\varepsilon_{MAX-AVG}$ in the SDSS. The outstandingly, this action of shudder wave shape in the top FDM-SDM is show that a shudder influence is occurred the same direction in the SDSS. It is an important role in the shudder action of a Sds-Top of top moving. In the shudder of Sds action is showed a very small shudder at 0.81±(-0.15) unit with Sds-Top-$\varepsilon_{AVG-MAX-MIN}$.

Shudder Distinction Shape (Sds) of peripheral (Per-ε) condition is to show a flow distinction modulus-stream distinction modulus (FDM-SDM) value for the Sds-Per-ε_{AVG}, Sds-Per-$\varepsilon_{MAX-AVG}$ and Sds-Per-$\varepsilon_{AVG-MAX-MIN}$. (Fig. 2)

Sds action of peripheral FDM-SDM is the some shudder to difference between Sds-Per-ε_{AVG} and Sds-Per-$\varepsilon_{MAX-AVG}$ with the same direction in the SDSS. Whereas, the Sds action of peripheral FDM-SDM is showed very small shudder at Sds-Per-$\varepsilon_{AVG-MAX-MIN}$ of the shudder wave shapes on the normal direction in the SDSS. Sds action of peripheral FDM-SDM is showed large shudder at 6.07±0.14 unit with Sds-Per-ε_{AVG} of the shudder wave shape. In the peripheral FDM-SDM of Sds action is showed very small at 1.77±0.01 unit with Sds-Per-$\varepsilon_{MAX-AVG}$ in the SDSS. The outstandingly, this action of shudder wave shape in the peripheral FDM-SDM is show that a shudder is occurred the same direction in the SDSS. But, it is a minute role in the shudder action of a peripheral moving. In the shudder of Sds action is showed little small shudder at 2.52±0.11 unit with Sds-Per-$\varepsilon_{AVG-MAX-MIN}$ on the same direction.

Shudder Distinction Shape (Sds) of limbus (Lim-ε) condition is to show a flow distinction modulus-stream distinction modulus (FDM-SDM) value for the Sds-Lim-ε_{AVG}, Sds-Lim-$\varepsilon_{MAX-AVG}$ and Sds-Lim-$\varepsilon_{AVG-MAX-MIN}$. (Fig. 2)

Sds action of limbus FDM-SDM is showed small shudder at Sds-Lim-ε_{AVG} and Sds-Lim-$\varepsilon_{MAX-AVG}$ of the shudder wave shape on the normal direction in the SDSS. Whereas, differently the very small shudder value of Sds-Lim-$\varepsilon_{AVG-MAX-MIN}$ is to the normal direction in the SDSS. Sds action of limbus FDM-SDM is showed small shudder at 2.00±0.29 unit with Sds-Lim-ε_{AVG} of the shudder wave shape. In the limbus FDM-SDM of Sds action is showed very little small at 0.85±0.17 unit with Sds-Lim-$\varepsilon_{MAX-AVG}$ on the opposite direction in the SDSS. The outstandingly, this action of the shudder wave shape in the limbus FDM-SDM is show that a shudder is occurred the same direction in the SDSS. But, it is an outstandingly role in the shudder action of a limbus moving. In the shudder of Sds action is showed very small shudder at 0.30±(-0.04) unit with Sds-Lim-$\varepsilon_{AVG-MAX-MIN}$.

Shudder Distinction Shape (Sds) of center (Cen-ε) condition is to show a flow distinction modulus-stream distinction modulus (FDM-SDM) value for the Sds-Cen-ε_{AVG}, Sds-Cen-$\varepsilon_{MAX-AVG}$ and Sds-Cen-$\varepsilon_{AVG-MAX-MIN}$. (Fig. 2)

Sds action of center FDM-SDM is showed small shudder at Sds-Cen-ε_{AVG} and Sds-Cen-$\varepsilon_{MAX-AVG}$ of the shudder wave shape on the normal direction in the SDSS. Whereas, differently the small shudder value of Sds-Cen-$\varepsilon_{AVG-MAX-MIN}$ is to the normal direction in the SDSS. Sds action of center FDM-SDM is showed very small shudder at 0.36±0.04 unit with Sds-Cen-ε_{AVG} of the shudder wave shape.

In the center FDM-SDM of Sds action is showed very little at 0.13±0.01 unit with Sds-Cen-$\varepsilon_{MAX-AVG}$ on the normal direction in the SDSS. The outstandingly, this action of the shudder wave shape in the center FDM-SDM is show that a shudder is occurred the normal direction in the SDSS. But, it is an outstandingly role in the shudder action of a center moving. In the shudder of Sds action is showed very small shudder at 0.10±0.01 unit with Sds-Cen-$\varepsilon_{AVG-MAX-MIN}$ on the normal direction in the SDSS.

V. Discussion

The dangle phenomenon of the top FDM-SDM is incurred outstandingly to propose the SDSS by the dangle wave in the Sds action direction. The dangle phenomenon of the peripheral FDM-SDM is incurred outstandingly to alter the SDSS by the dangle wave in the same direction. The peripheral FDM-SDM is showed to propose a very more variation of dangle moving than the top FDM-SDM in the Sds action direction. The dangle phenomenon of the limbus FDM-SDM is incurred outstandingly to alter the SDSS by the dangle wave in the same direction. The limbus FDM-SDM is incurred outstandingly to propose the SDSS by the dangle moving at the Sds action. The dangle phenomenon of the center FDM-SDM is incurred outstandingly to alter the SDSS by the dangle wave in the normal direction. The center FDM-SDM is incurred slightly to propose the SDSS by the dangle moving at the Sds action.

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