Response to Reviewer 1 Comments

Thanks to the reviewers for their hard work and careful guidance.

I have already responded to the reviewer’s comments as follows.

**Point 1:** I recommend to significantly improve the style and grammar of the manuscript.

**Response 1:** Reference reviewer’s opinion, I have asked a native English speaker to edit the file, and I have modified the error that the editor pointed out in the paper.

**Point 2:** I do not understand, why the manuscript submitted for publication in MDPI Entropy has Sensors 2019, 19, x; doi: FOR PEER REVIEW in subscriptions. These little things make the paper look sloppy.

**Response 2:** I am sorry for my carelessness, I have made relevant changes.

**Point 3:** Figure 1 should be clarified - the text is poorly readable. In my opinion, the introduction is excessively inflated and can be reduced. The novelty of your approach and the contribution of your paper must be emphasized.

**Response 3:** Reference reviewer's opinion, I have revised related content and figure. The revised content is as follows: Line 50: “If the mold level fluctuates too much, the following will occur: First, it will cause impurities on the surface of the mold. Surface defects and internal defects of the slab are generated which affect the surface and internal quality of the slab. Second, it will affect the casting speed, affecting productivity and the production rhythm. Eventually it will cause the slab and the continuous casting machine to stick together, damage the tundish slide, and even cause downtime. Accurate prediction of the mold level occupies an important position in the continuous casting production process. This paper proposes an advanced mold level signal denoising method to prepare accurate data input for future mold level prediction, realize the purpose of predictive control, and greatly reduce the occurrence of accidents affecting quality and safety in the continuous casting production process.”

**Figure 1**

**Point 4:** Equation 2 is not clear for me. If you mean the first local minima, then please correct the description, which says "

How did you obtain K=6 implementing EMD for 6 modes?
Why do you analyze MIE? It does not impact the K calculation.
Why the IMF border #3 is K=6? Shouldn't it be K=3? If I got it right, K is the real number of modes.

**Response 4:** EMD is adaptive decomposition. The number of IMFs decomposed by EMD is not affected by humans. The VMD process is not adaptive decomposition. The number of IMFs decomposed by VMD is determined by K value. The determination of K by human affects the effect of VMD decomposition. So, using the adaptive decomposition of EMD, MIE analysis of IMFs after EMD can effectively determine the value of K. The VMD results of K=3, K=4, K=5, K=6 and K=7 are given below.
Figure 1. Result of VMD based on K=3

Figure 2. Result of VMD based on K=4
Figure 3. Result of VMD based on K=5

Figure 4. Result of VMD based on K=6
As shown in above figures, when $K<6$, there is mode aliasing in IMFs. When $K=6$ (obtained by the method proposed in this paper), the centre frequency of each IMF is obvious, and no pattern aliasing occurs. When $K>6$, there is mode aliasing in IMFs too. The result shows that MIE is used to analyse the result of EMD to determine $K$ is correct.

**Point 5:** I heavily doubt that a multi-mode decomposition denoising algorithm is proposed for the first time in this paper, please clarify this or refer to:


**Response 5:** Reference reviewer's opinion. I have revised related content and references. The revised content is as follows: Line 92: “D. M. Klionskiy et al. discusses pattern discovery in signals via EMD and the EMD technique relative to signal denoising. They conclude that EMD is an efficient tool for signal denoising in the case of homoscedastic and heteroscedastic noise [26,27]. Butusov D et al. proposed a new filtering algorithm based on the cascade of driven chaotic oscillators, and the algorithm showed the best performance and reliability than traditional denoising and filtering approaches [28].”

References [26].
References [27].
References [28].
**Point 6:** "In comparison with other algorithms, the proposed algorithm is a better denoising algorithm with higher signal-to-noise ratio and lower RMSE". Please consider more algorithms in this comparison.

**Response 6:** Reference reviewer's opinion, I have added related content. The revised content is as follows: Line 308:

![Figure 11. RMSE indicator for denoising results of multiple algorithms](image1.png)

![Figure 12. SNR indicator for denoising results of multiple algorithms](image2.png)

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**Table 6** Denoise results