

## A new approach to develop computer-aided diagnosis using artificial intelligence for gastric biopsy specimens - 4th report-

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### Purpose:

To create a universally available AI-based support system for pathologists (AI-SSP), we supervised and assessed for various types of gastric tumors enrolled from six hospitals in Japan. Then, we evaluated whole slide images (WSIs) from another seventh hospital in Japan to examine the robustness of our system created.

### Materials and Methods:

To improve the AI-SSP reported last year at the 20th JSDP, we additionally supervised 151 signet-ring cell carcinomas and 1293 non-signet-ring cell carcinomas WSIs enrolled from four of six hospitals. After assessing the improved AI-SSP (AI-SSP 2), we re-supervised the AI-SSP 2 with 895 non-neoplastic and 845 neoplastic WSIs from six hospitals in addition to the minor changes of system software itself and created AI-SSP 3. To examine the robustness, both AI-SSP 2 and 3 were compared by assessing 485 non-neoplastic and 528 neoplastic WSIs from another seventh hospital.

### Results:

On the assessment of AI-SSP 2 and 3 with WSIs from six hospitals, specificity was about 50% and sensitivities varied from 98.9% to 100% in each hospital for both AI-SSPs. Area under the curves (AUCs) of six hospitals and seventh hospital were 0.95 and 0.96 respectively by assessments of WSIs from seventh hospital in AI-SSP 2. On the contrary, both were 0.95 and 0.89 respectively in AI-SSP 3.

### Conclusion:

Decreased AUCs from 0.95 to 0.89 in AI-SSP 3 and increased AUCs from 0.95 to 0.96 in AI-SSP 2 for WSIs from seventh hospital may indicated an overfitting happened in the former and robustness achieved for the universal use in the latter.