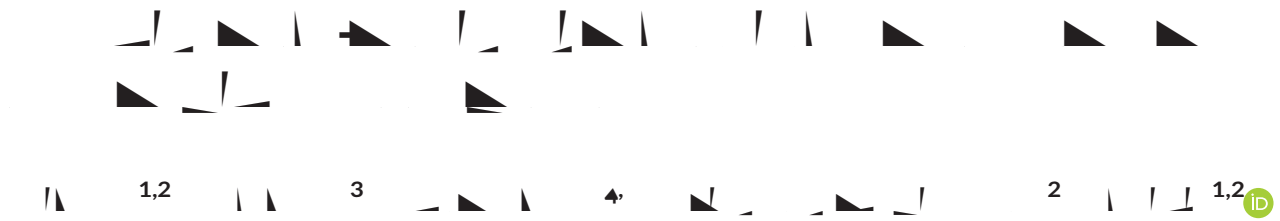


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FIGURE 1 | (A) Workflow of the prediction model. (B) Heatmap of flu activity across regions and time. The color scale ranges from 0 (blue) to 200 (red). The heatmap shows distinct seasonal peaks in flu activity across different regions.

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I_{DNM}

$$I_{DNM} = \frac{PCC_{in} \cdot SD_{in}}{PCC_{out}}$$

I_{DNM}

I_{DNM}

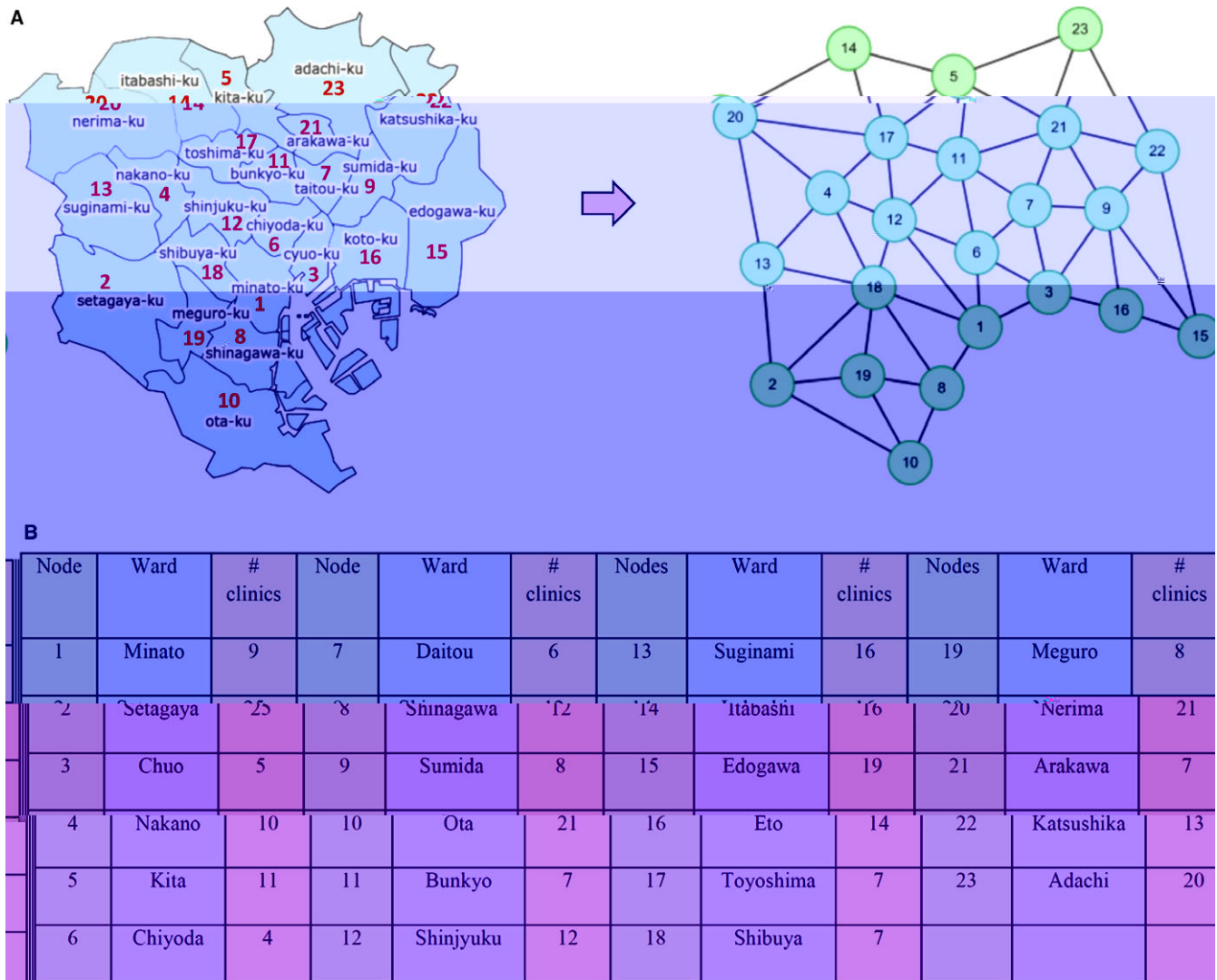


FIGURE 2 The network graph of Tokyo wards. The nodes are numbered 1 to 23, corresponding to the wards in the map. The nodes are color-coded: green (14, 23), light blue (20, 17, 11, 21, 22), medium blue (4, 12, 7, 9, 13, 18, 16, 15), and dark blue (2, 19, 8, 10). The edges represent the adjacency between wards. The network graph is a directed graph, and the edges are labeled with the number of clinics in the ward. The network graph is a directed graph, and the edges are labeled with the number of clinics in the ward.

TABLE 1 The network graph of Tokyo wards

	SD_t	$\Delta SD_t (in)$	$PCC_t (in)$	$\Delta PCC_t (in)$	$PCC_t (out)$	$ \Delta PCC_{out} (t) $	I_t
1.	↗	↗	↗	↗	↗	↗	↗
2.	↗	↗	↗	↗	↗	↗	↗
	→	0	↘	↗	↘	↗	
			→	0	→	0	
3.	→	0	→	0	↘	↗	0
					→	0	

1. "↗": $t-1 \rightarrow t$, $t \in \text{critical state}$, and $t-1 \notin \text{critical state}$.

2. "→": $t-1 \rightarrow t$, $t \in \text{critical state}$, and $t-1 \in \text{critical state}$.

3. SD_t : Standard Deviation, $PCC_t (in)$: Pearson Correlation Coefficient (in), $PCC_t (out)$: Pearson Correlation Coefficient (out), I_t : Information Index.

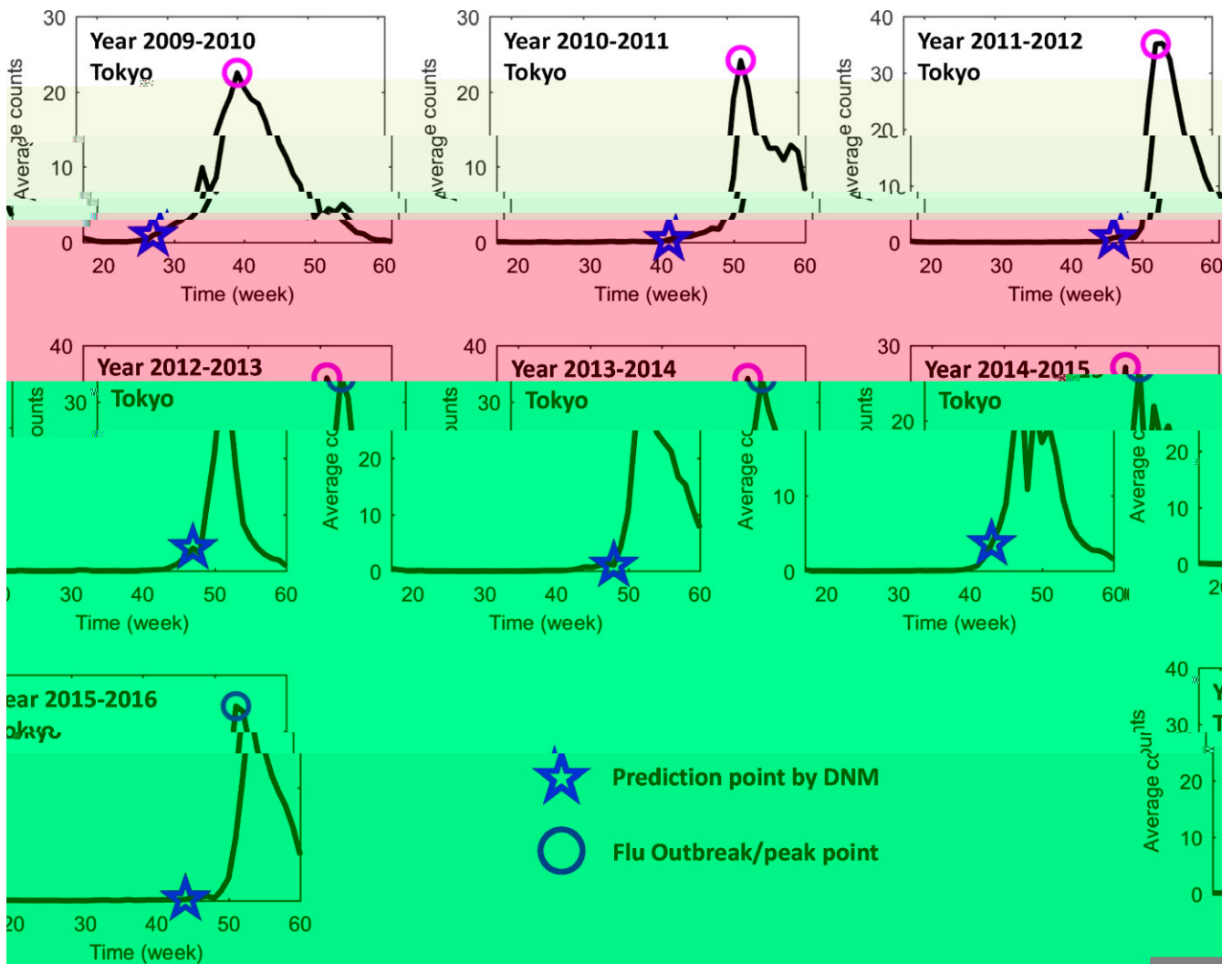


FIGURE 3

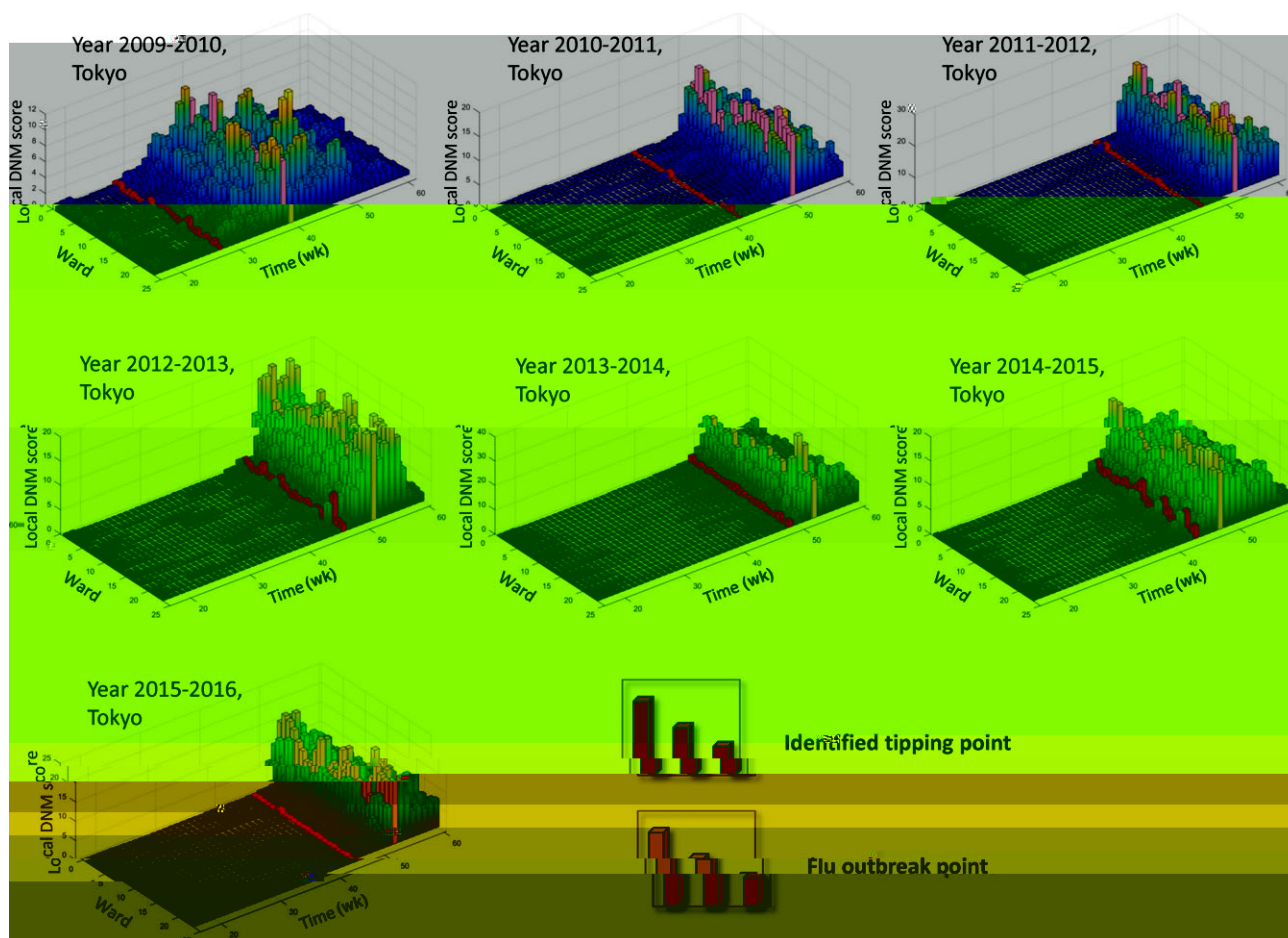


FIGURE 4

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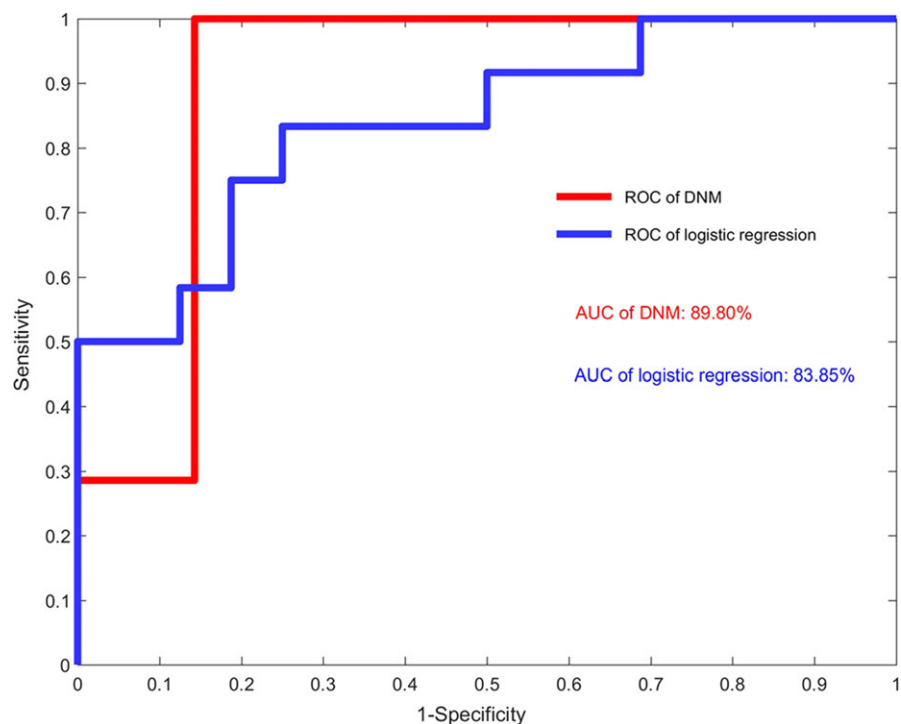
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FIGURE 6



the model. The results of the model are shown in Table 1. The model was evaluated using the area under the curve (AUC) and the sensitivity and specificity. The AUC of the model was 0.8980, which is significantly higher than the AUC of the logistic regression model (0.8385). The sensitivity and specificity of the model were 0.90 and 0.84, respectively.

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Rui Liu  // <https://orcid.org/0000-0002-454-1152>

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