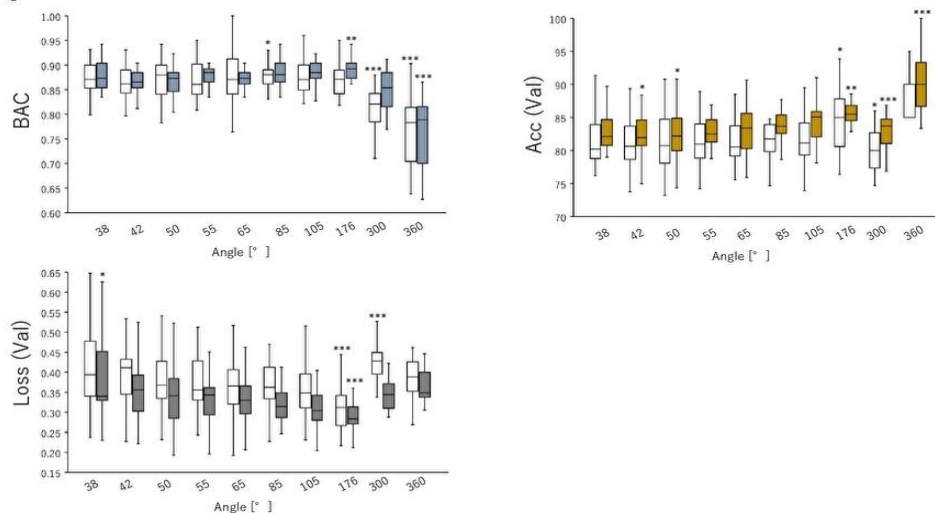
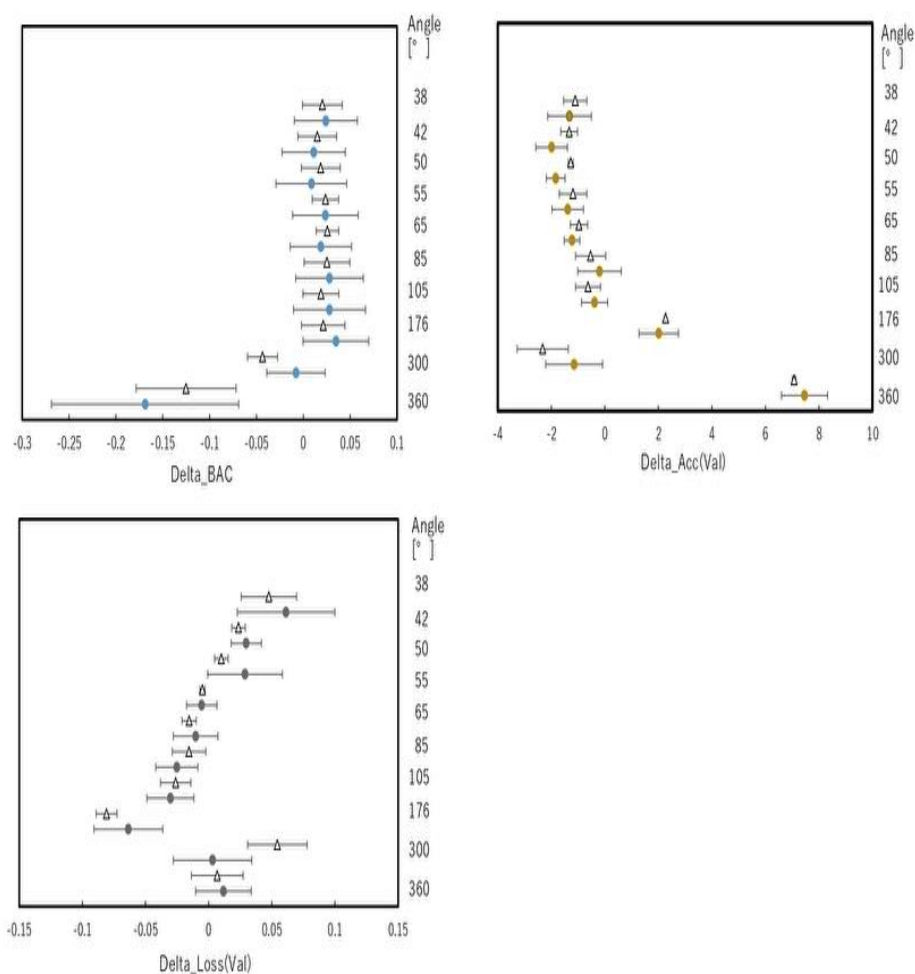


Fig.S1



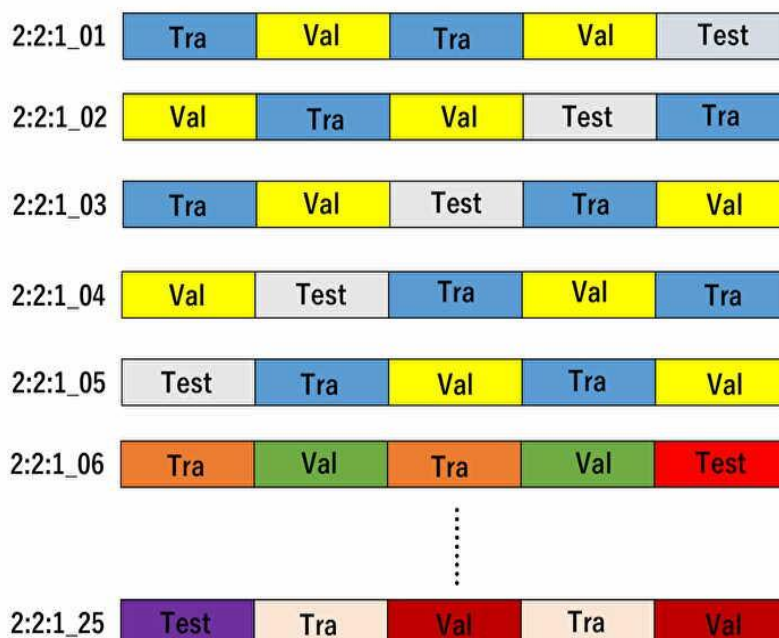
**Figure S1.** Prediction performance at different snapshot angles by DeepSnap. For each of the 10 angles (38°, 42°, 50°, 55°, 65°, 85°, 105°, 176°, 300°, 360°), an unfilled box (left) and a filled box (right) indicate datasets ratios Tra:Val:Test = 1:1:1 and 2:2:1, respectively. The means of MMC, F, Acc (Test), AUC, Acc (Val), Loss (Val), and BAC were calculated by 25-fold. \*:  $p < .05$ , \*\*:  $p < .01$ , \*\*\*:  $p < .001$ .

Fig.S2



**Figure S2.** Differences in the mean levels of performance of DeepSnap at different angles. Differences in the mean values of the performance indicators between one angle and the other nine angles, denoted as Delta\_Acc (Val), Delta\_Loss (Val), and Delta\_BAC, were calculated based on the results shown in Fig. S1, with a 95% confident interval (CI) as error bars. The filled dots and unfilled triangles indicate the dataset ratios Tra: Val: Test = 1: 1: 1 and 2: 2: 1, respectively.

Fig.S3



**Figure S3.** Preparation of dataset split into Tra, Val, and Test. Three dataset groups, including Tra, Val, and Test, were then built with a ratio of 2:2:1. A prediction model was created by the Tra and Val datasets, respectively. Finally, prediction performance was calculated by using the Test dataset (2:2:1\_01). Finally, a total of 25 tests were performed (2:2:1\_25).

<b>Table S1a.</b> Optimization of the solver types in hyperparameters		
Solver Type	Loss (Val)	Acc (Val)
NAG	<b>0.259221</b>	87.1231
AdaGrad	0.273683	83.7705
AdaDelta	0.410498	80.9836
Adam	0.344194	85.5738
RMSprop	0.317712	<b>87.7049</b>
SDG	0.313697	83.9753
Angle:176° , BT:40, LR:0.001		
Most high-performance of each Solver types were indicated by bold.		

**Table S1b.** Optimization of the Learning rates and Batch sizes in hyperparameters with Loss (Val)

	LRs	LRs	LRs	LRs	LRs	LRs	LRs	LRs
BSs	0.0025	0.0024	0.0023	0.0022	0.0021	0.0020	0.0019	0.0018
35	0.187423	0.182966	0.189255	0.187056	0.183283	0.187059	0.178084	0.186253
36	0.177527	0.189400	0.187449	0.185641	0.184379	0.186366	0.188569	0.190117
37	<b>0.146634</b>	0.154745	0.153164	0.154488	0.154003	0.153302	0.154567	0.152418
38	0.171144	0.171241	0.170632	0.171688	0.174109	0.173029	0.173709	0.171152
39	0.155759	0.159271	0.157051	0.156157	0.158705	0.159942	0.159590	0.158212
40	0.164046	0.167822	0.168609	0.173596	0.172465	0.170931	0.171160	0.168201

LRs: learning rates, BSs:Batch sizes  
 Angle:176° , Solver type: NAG  
 Most high-performance of each predictions were indicated by bold.

**Table S1c.** Optimization of the Learning rates and Batch sizes in hyperparameters with Acc (Val)

	LRs	LRs	LRs	LRs	LRs	LRs	LRs	LRs
BSs	0.0025	0.0024	0.0023	0.0022	0.0021	0.0020	0.0019	0.0018
35	91.8804	91.4529	90.5983	91.2393	91.0257	88.2479	91.2393	91.4529
36	91.7211	91.0676	91.2854	91.0676	90.6318	90.4140	90.6318	90.6318
37	<b>94.0816</b>	92.4490	93.2653	92.8572	93.0612	92.6531	92.6531	92.6531
38	92.2917	92.2917	92.2917	92.2917	92.2917	90.8333	91.4583	91.4583
39	92.5532	92.1277	91.7021	92.1277	92.3404	91.0638	91.9149	92.3404
40	92.8261	92.8261	92.0913	92.6087	91.0869	92.8261	91.9565	93.2609

LRs: learning rates, BSs:Batch sizes  
 Angle:176° , Solver type: NAG  
 Most high-performance of each predictions were indicated by bold.

**Table S2.** Performance of prediction models with thresholds of Max score.

Max Score	average Loss(Val) ± SD			average Acc(Val) ± SD			average BAC ± SD			average F ± SD		
0.10	0.221	±	0.050	93.453	±	1.782	0.878	±	0.096	0.662	±	0.139
0.15	0.301	±	0.065	88.561	±	2.232	0.804	±	0.077	0.541	±	0.143
0.20	0.342	±	0.049	82.284	±	2.869	0.851	±	0.056	0.704	±	0.065
0.30	0.325	±	0.029	82.272	±	2.645	0.903	±	0.036	0.849	±	0.033
0.35	0.279	±	0.030	86.756	±	1.611	0.903	±	0.051	0.848	±	0.044
0.40	0.232	±	0.056	89.638	±	3.012	<b>0.933</b>	±	0.040	0.904	±	0.041
0.45	0.287	±	0.095	89.489	±	3.230	0.890	±	0.052	0.877	±	0.037
0.50	<b>0.142</b>	±	0.063	<b>95.560</b>	±	2.455	0.921	±	0.010	<b>0.914</b>	±	0.027
0.55	0.195	±	0.061	93.433	±	2.019	0.858	±	0.070	0.871	±	0.071
0.40PMT	0.666	±	0.013	61.431	±	4.672	0.594	±	0.107	0.469	±	0.215

Each average and standard deviation (SD) were calculated by 5-fold.  
 Most high-performance of prediction in each Max Scores were indicated by bold.  
 0.40PMT showed permutation test in 0.40 of Max Score.

Table S3a. Clustering analysis of principal components of molecular descriptors extracted by MORPRED from training dataset.

Cl.No.	CV01_Tra			CV04_Tra			CV13_Tra			CV17_Tra			CV24_Tra		
	variables No.	variables	Fluctuation	variables No	variables	Fluctuation	variables No	variables	Fluctuation	variables No	variables	Fluctuation	variables No	variables	Fluctuation
1	63	VR3_D	0.978	65	VR3_D	0.966	108	LogEE_A	0.888	68	nBonds	0.949	62	VR3_Dcse	0.982
2	63	nBonds	0.938	66	VRL_Dcp	0.936	92	nAtom	0.858	66	VR3_D	0.969	61	SpDiam_Dcse	0.949
3	60	SpDiam_Dcse	0.976	59	SpMax_Dcse	0.951	78	SpMax_Dcse	0.909	63	SpMax_Dcse	0.959	45	VRL_D	0.961
4	51	ATS9d	0.962	44	SI	0.972	66	LogEE_Dt	0.841	48	VRL_Dct	0.96	44	Spe	0.958
5	31	MPC5	0.903	32	ATS1v	0.933	41	Sm	0.805	26	ATS7v	0.935	34	ATS5d	0.941
6	28	ATS1Z	0.902	24	AATS0se	0.925	37	AATS1se	0.824	26	MPC5	0.903	26	AATS0se	0.904
7	27	Mare	0.898	25	Xp-7d	0.885	37	nBondsM	0.726	24	Mse	0.902	22	Sm	0.886
8	23	ATS7d	0.894	22	SML_Dcp	0.904	36	SML_Dcse	0.742	22	MWCl0	0.917	19	ATS7p	0.909
9	23	SML_Dcse	0.896	18	Xp-4d	0.869	35	Mm	0.719	21	SML_Dcse	0.862	17	Xp-5d	0.899
10	18	ATS4dv	0.885	16	ATS2z	0.91	27	MATScore	0.635	16	SZ	0.897	17	nAtom	0.871
means	38.7		0.927	37.1		0.925	55.7		0.795	38.0		0.924	34.7		0.926
sd	18.3		0.035	19.8		0.034	28.3		0.087	20.9		0.037	17.4		0.037
total	387		0.359	371		0.717	557		0.442	380		0.368	347		0.317

Cl.No.: cluster number that is top 10 of clusters of percentage of total variation explained by each cluster component

variables No.: variables number that is number of variables belonging to each cluster

variables: representative variable with the largest square of correlation coefficient with cluster component

Fluctuation in Cluster: the percentage of fluctuation explained by their first PC of the fluctuations of variables belonging to the cluster

Fluctuation in Total: percentage of total variation explained by each cluster component

Table S5b. Clustering analysis of principal components of molecular descriptors extracted by MORDRED from Test datasets.

CL No.	CV01_Test			CV13_Test			CV17_Test			CV24_Test											
	variables No.	variables	Fluctuation	variables No.	variables	Fluctuation	variables No.	variables	Fluctuation	variables No.	variables	Fluctuation									
			Cluster			Total			Cluster			Total	Cluster	Total	Cluster	Total					
1	63	72	ATS68e	0.964	0.072	65	VR3_DzZ	0.968	0.063	91	LogEE_Dzpe	0.961	0.066	62	VR3_Dzse	0.982	0.059	79	See	0.964	0.076
2	63	66	VR3_D	0.954	0.065	65	LogEE_Dzi	0.975	0.054	84	nHeavyAtom	0.967	0.08	61	SpDiam_Dzse	0.949	0.056	76	LogEE_Dzse	0.973	0.074
3	60	62	MID	0.946	0.061	49	VR1_D	0.963	0.047	60	See	0.966	0.067	45	VR1_D	0.961	0.042	58	VR3_Dzse	0.957	0.055
4	61	52	LogEE_Dzi	0.961	0.062	37	ATS2p	0.968	0.056	56	LogEE_A	0.974	0.054	44	See	0.968	0.041	52	VR1_Dzse	0.957	0.05
5	31	29	SML_Dzare	0.878	0.026	36	ATS01	0.966	0.035	29	SML_Dzare	0.943	0.026	34	ATS6d	0.941	0.031	48	Zagreb1	0.963	0.046
6	28	26	MPC5	0.888	0.024	34	ATS7p	0.927	0.032	28	MPC2	0.927	0.026	26	AATS58e	0.904	0.023	32	SML_Dzare	0.914	0.029
7	27	24	MW	0.887	0.022	26	TMPC10	0.909	0.026	23	MPC5	0.984	0.02	22	Sm	0.886	0.019	23	AATS08e	0.925	0.021
8	23	18	AATS58e	0.881	0.017	24	ATS2Z	0.923	0.022	21	AATS58e	0.907	0.019	19	ATS7p	0.909	0.017	17	AATS2p	0.833	0.014
9	23	17	MWCI09	0.932	0.016	25	AATS58e	0.85	0.021	21	MWCI0	0.896	0.019	17	Xp-5d	0.899	0.015	15	MWCI0	0.935	0.014
10	18	18	nAtomAtom	0.835	0.016	24	AATS58e	0.866	0.021	17	nAtomAtom	0.863	0.014	17	nAtomAtom	0.871	0.014	15	TMPC10	0.899	0.013
means	38.7	38.4		0.918	0.037	37.5		0.930	0.036	43.0		0.935	0.040	34.7		0.926	0.032	41.5		0.932	0.039
sd	18.3	22.0		0.043	0.023	14.4		0.043	0.015	27.7		0.042	0.027	17.4		0.037	0.017	24.6		0.042	0.024
total	387	384			0.371	375			0.357	430			0.401	347			0.317	415			0.392

CL No. : cluster number that is top 10 of clusters of percentage of total variation explained by each cluster component

variables No. : variables number that is number of variables belonging to each cluster

variables representative variable with the largest square of correlation coefficient with cluster component

Fluctuation in Cluster: the percentage of fluctuation explained by their first PC of the fluctuations of variables belonging to the cluster

Fluctuation in Total: percentage of total variation explained by each cluster component

