

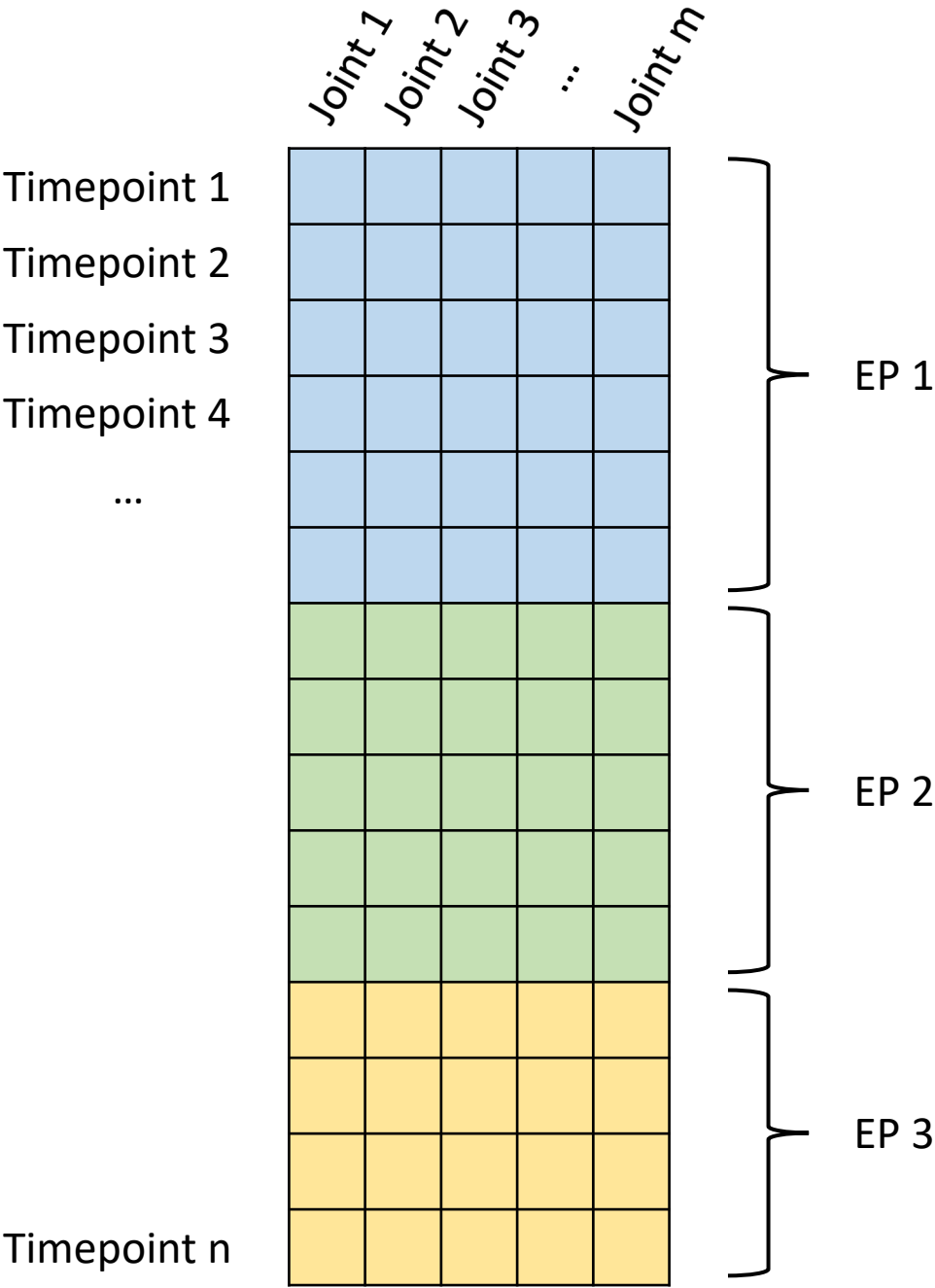
Trial

	Joint 1	Joint 2	Joint 3	...	Joint m
Timepoint 1					
Timepoint 2					
Timepoint 3					
Timepoint 4					
...					
Timepoint n					

Trial



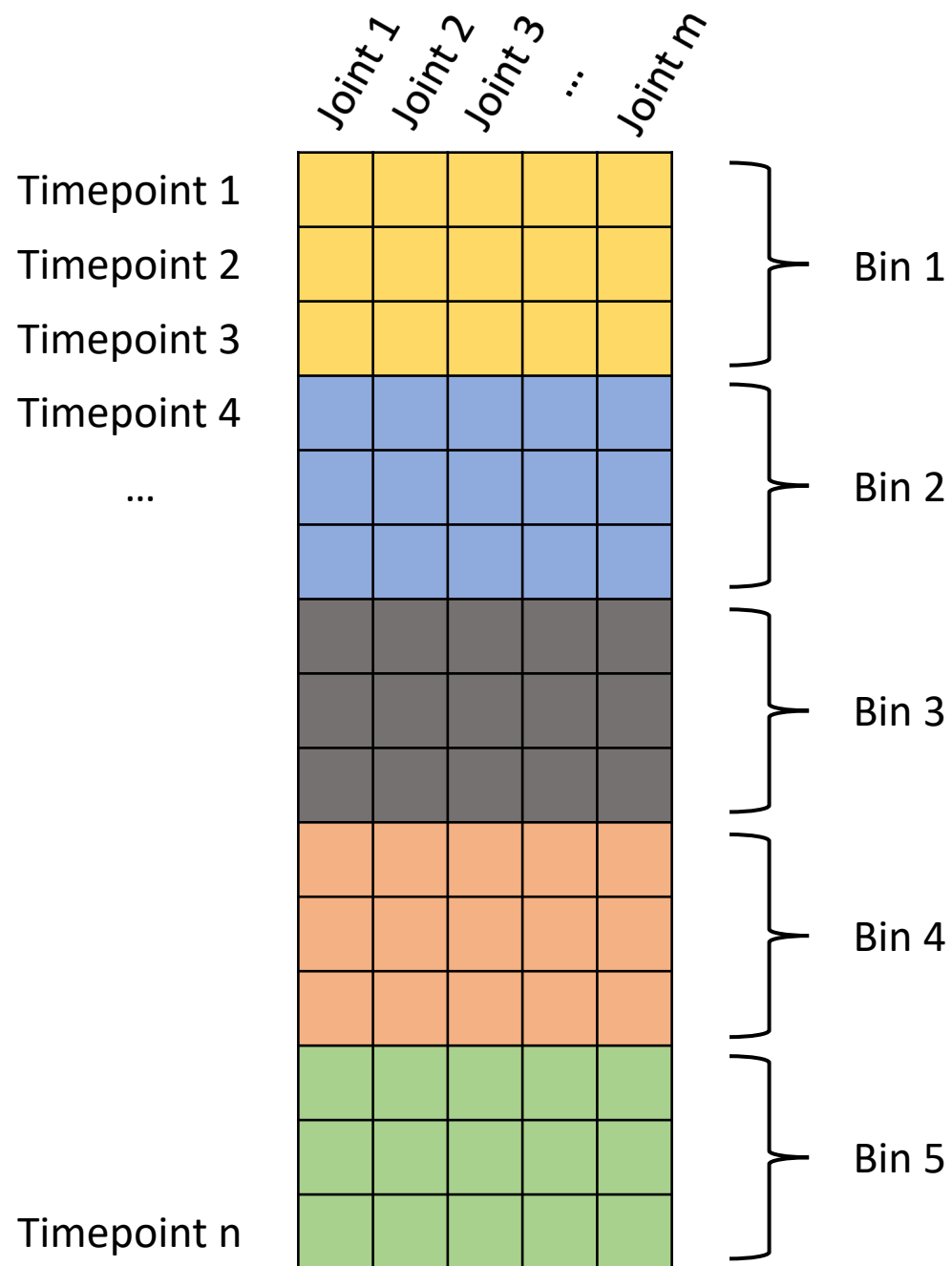
EP



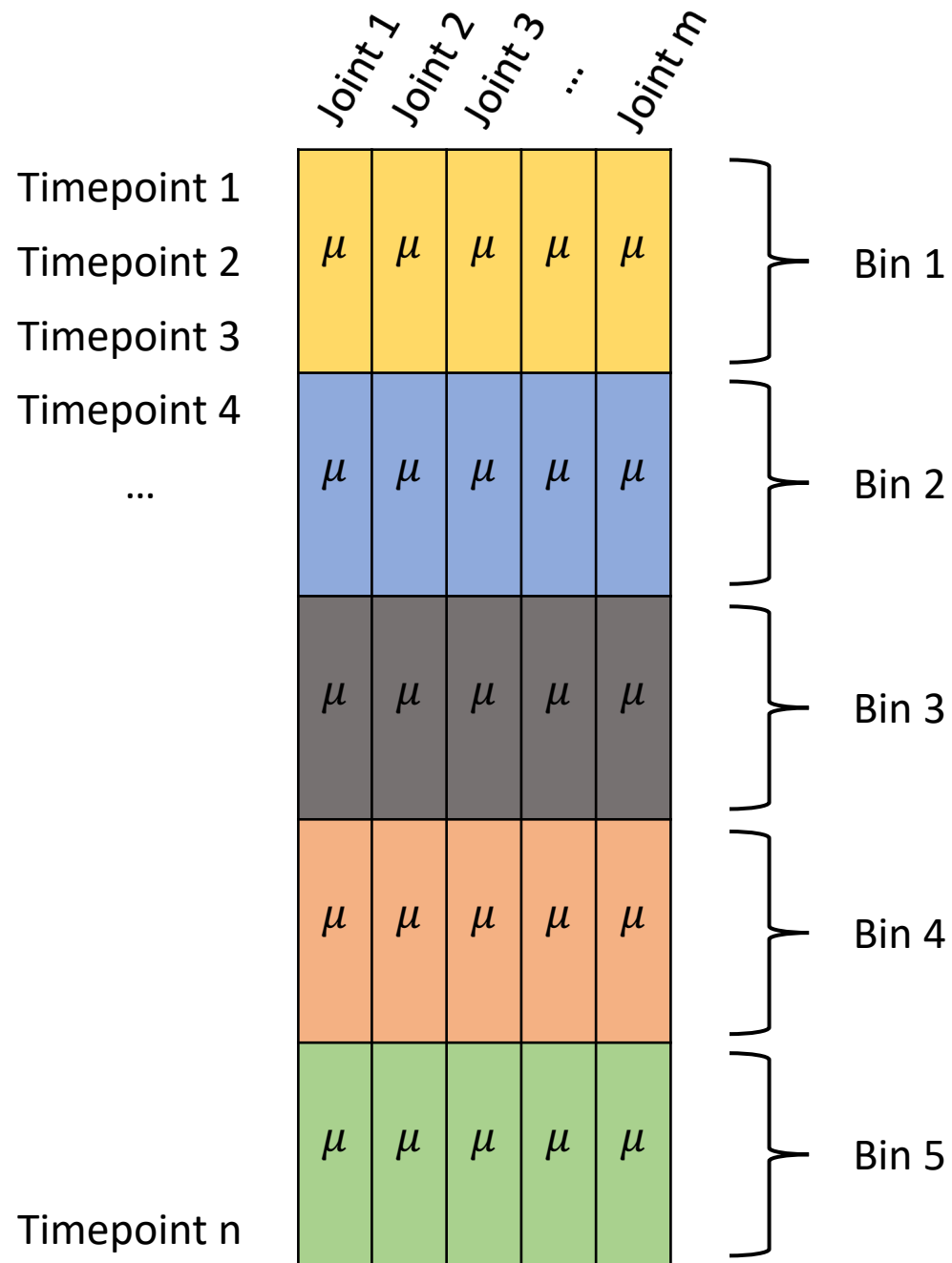
EP

	Joint 1	Joint 2	Joint 3	...	Joint m
Timepoint 1					
Timepoint 2					
Timepoint 3					
Timepoint 4					
...					
Timepoint n					

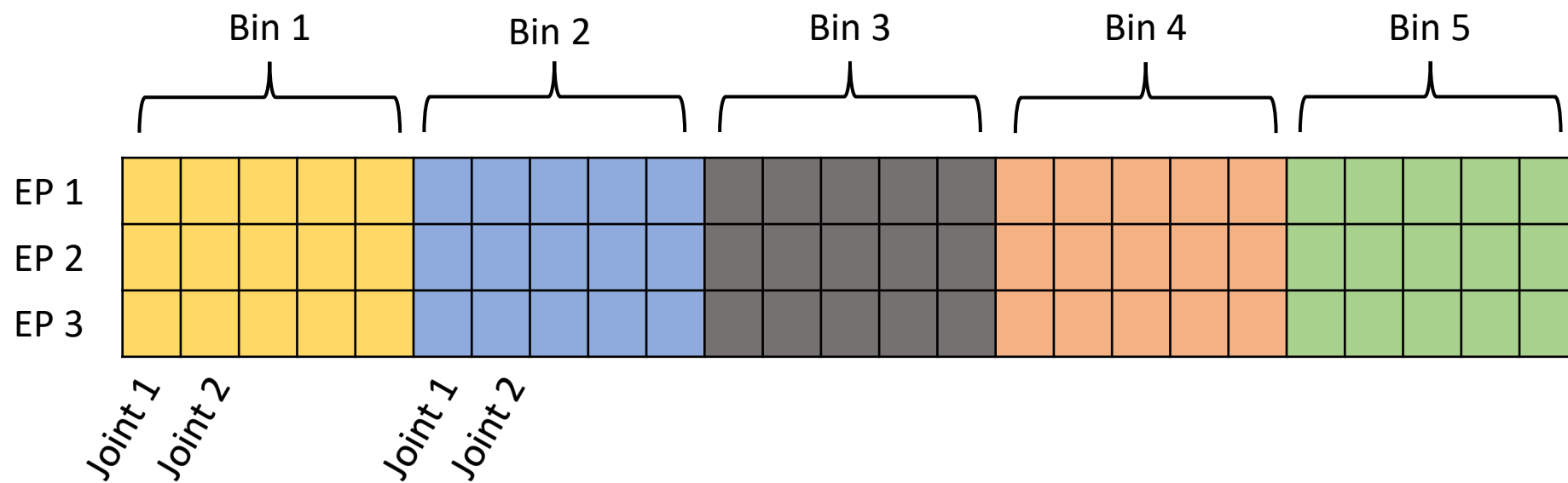
EP
↓
Bins



EP
↓
Bins



EP
↓
Bins



Each input to the classifier has a size of [number of bins X number of joints]

Logistic Regression

- Elastic Net Regularization (avoids overfitting)

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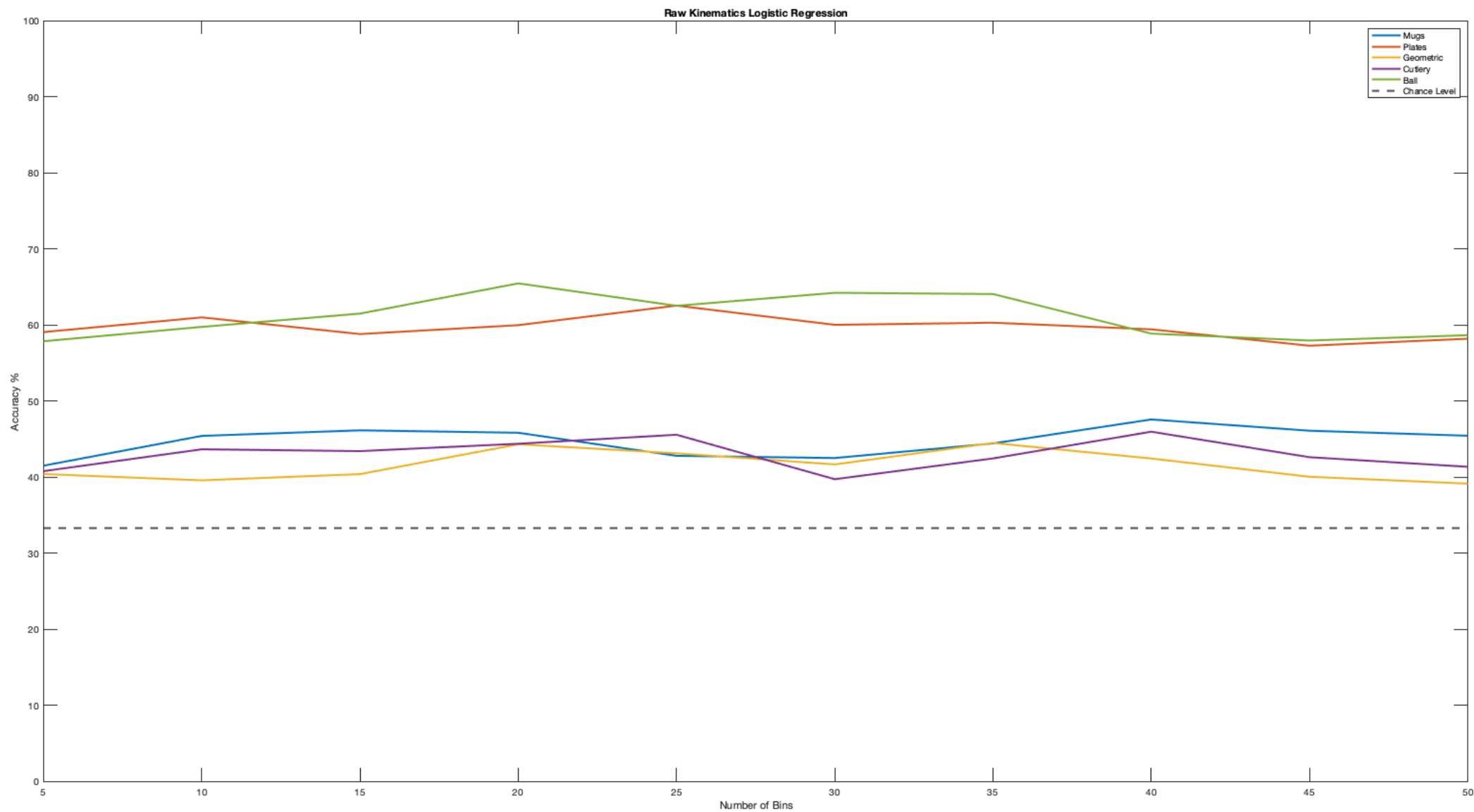
$$p(\text{Class}) = \frac{1}{1 + e^{-(\beta_0 + \beta_1 x_1 + \beta_2 x_2 + \dots + \beta_n x_n)}}$$

β_0 = Intercept

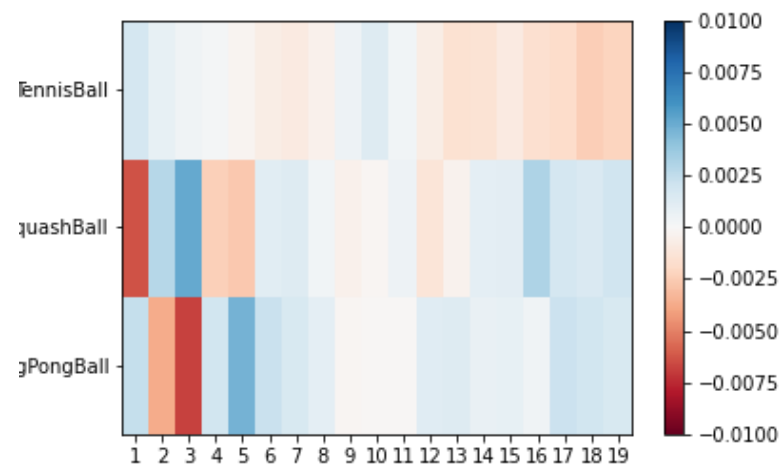
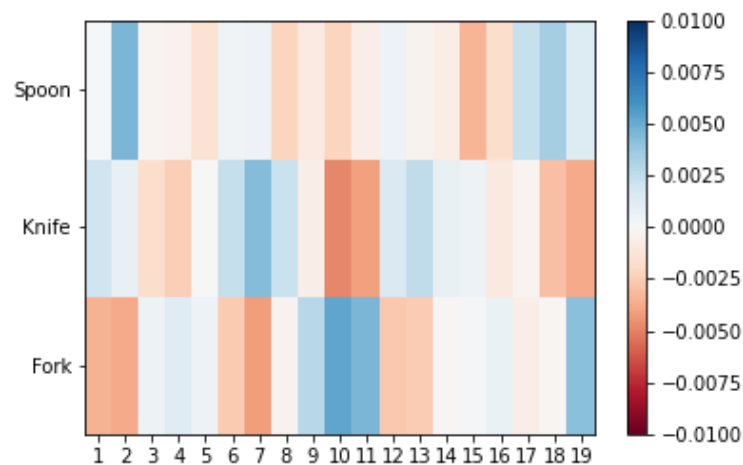
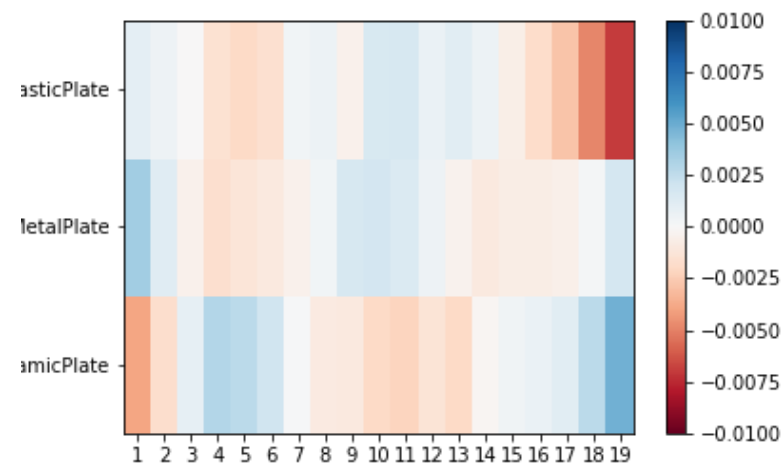
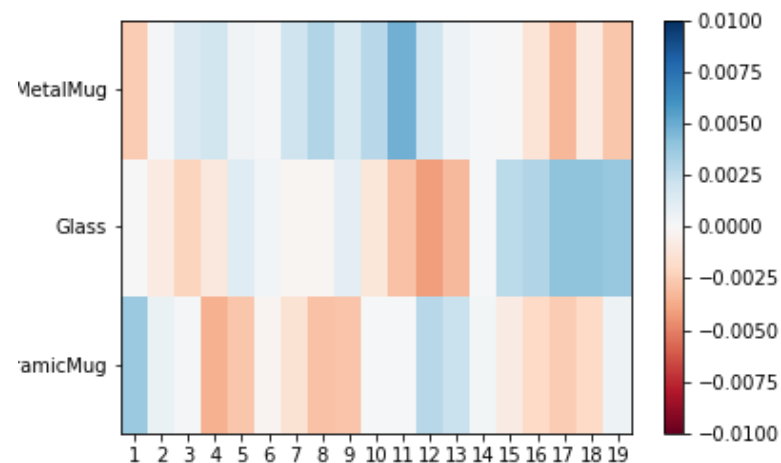
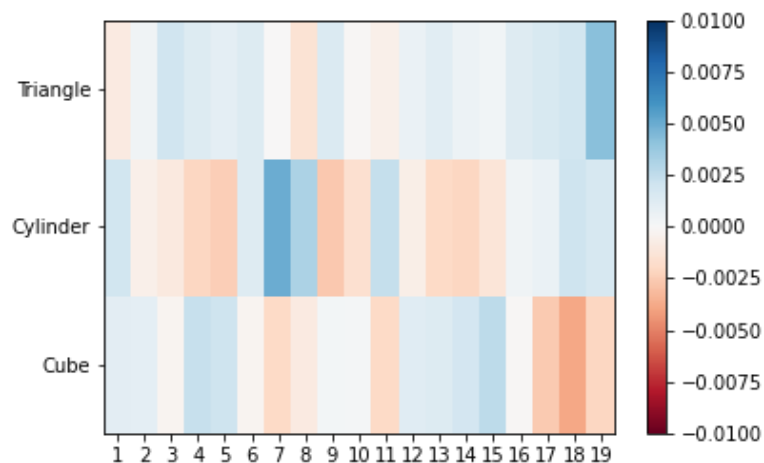
$x_{1\dots n}$ = Variables

$\beta_{1\dots n}$ = Coefficients

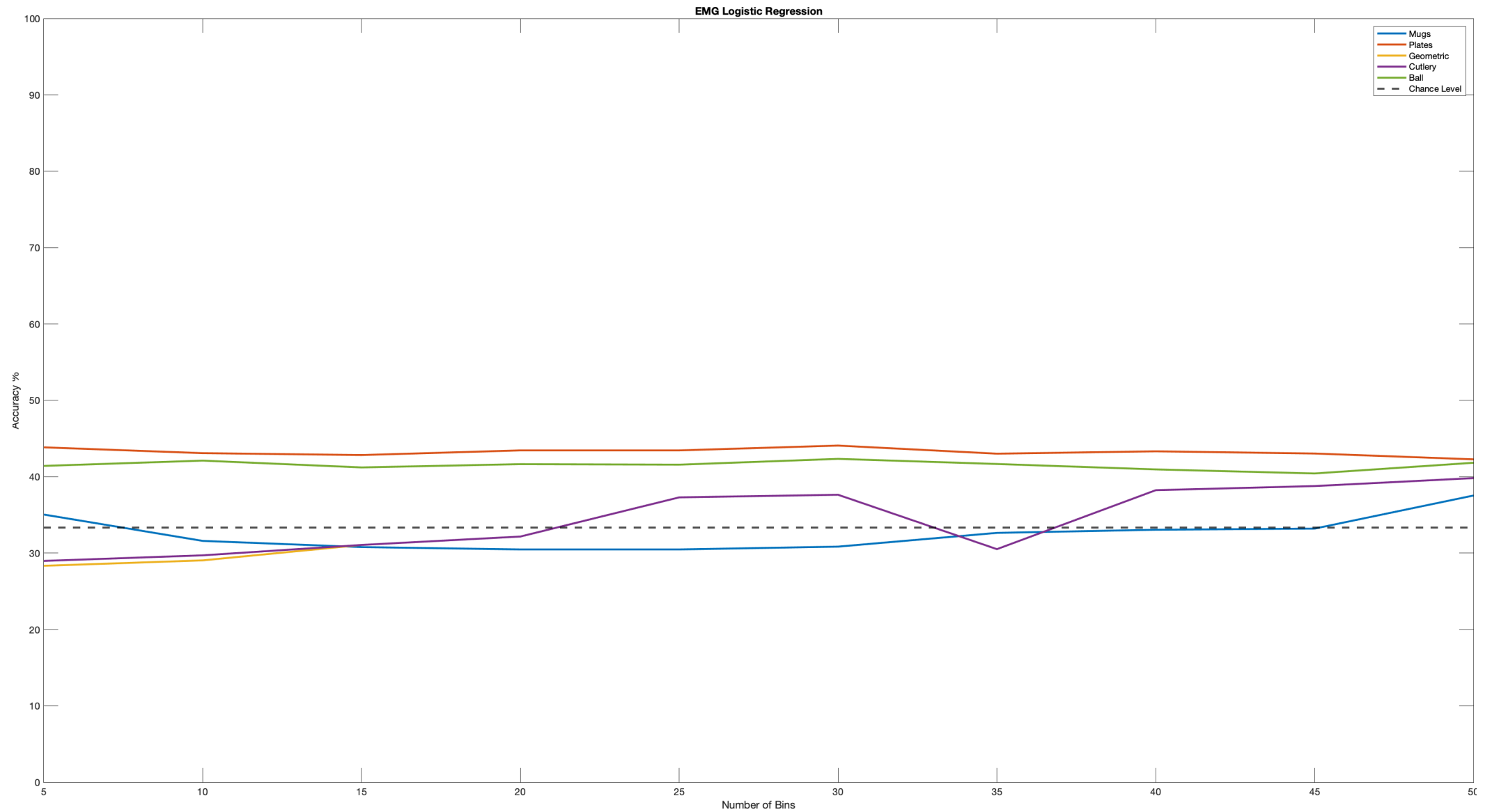
Raw Kinematics



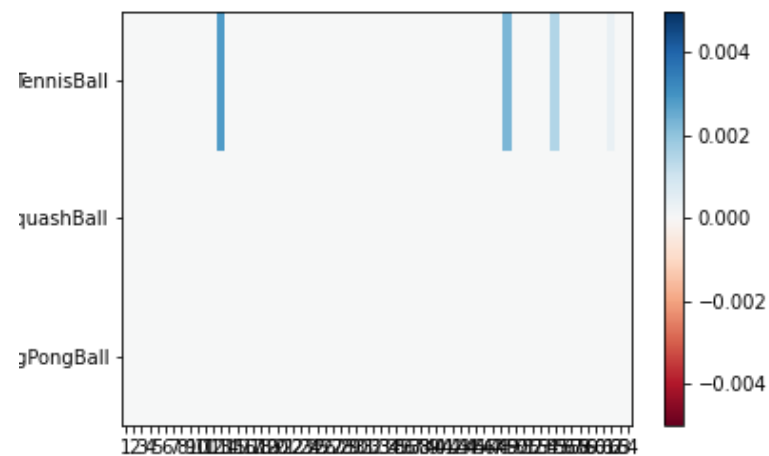
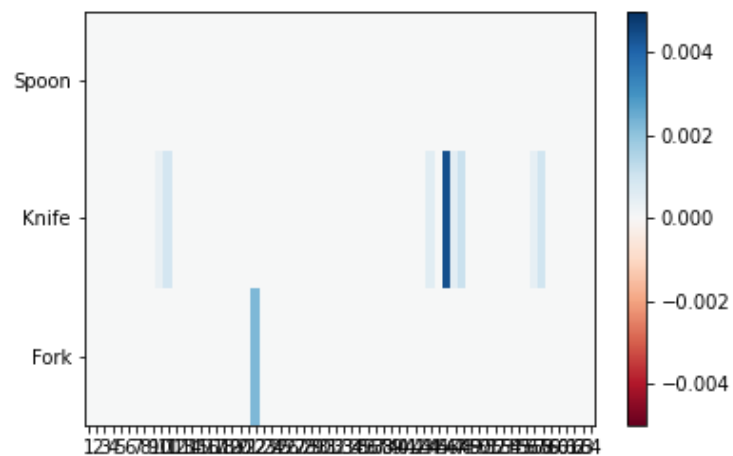
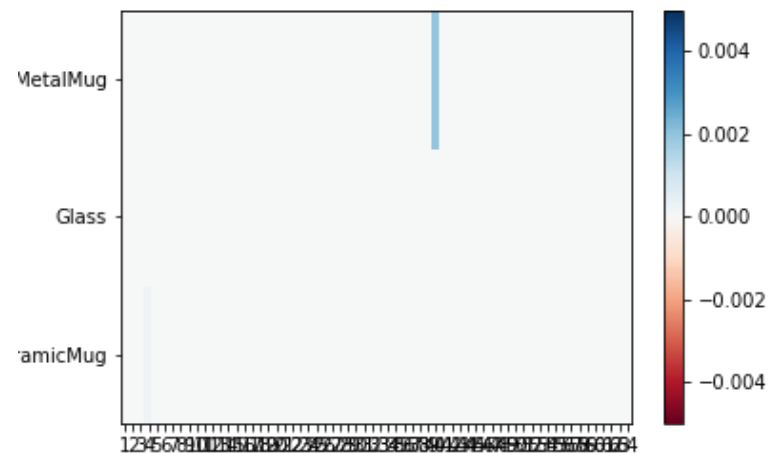
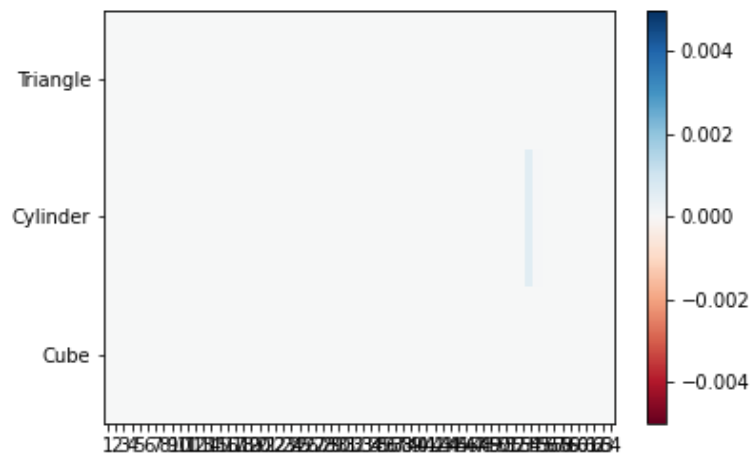
Raw Kinematics



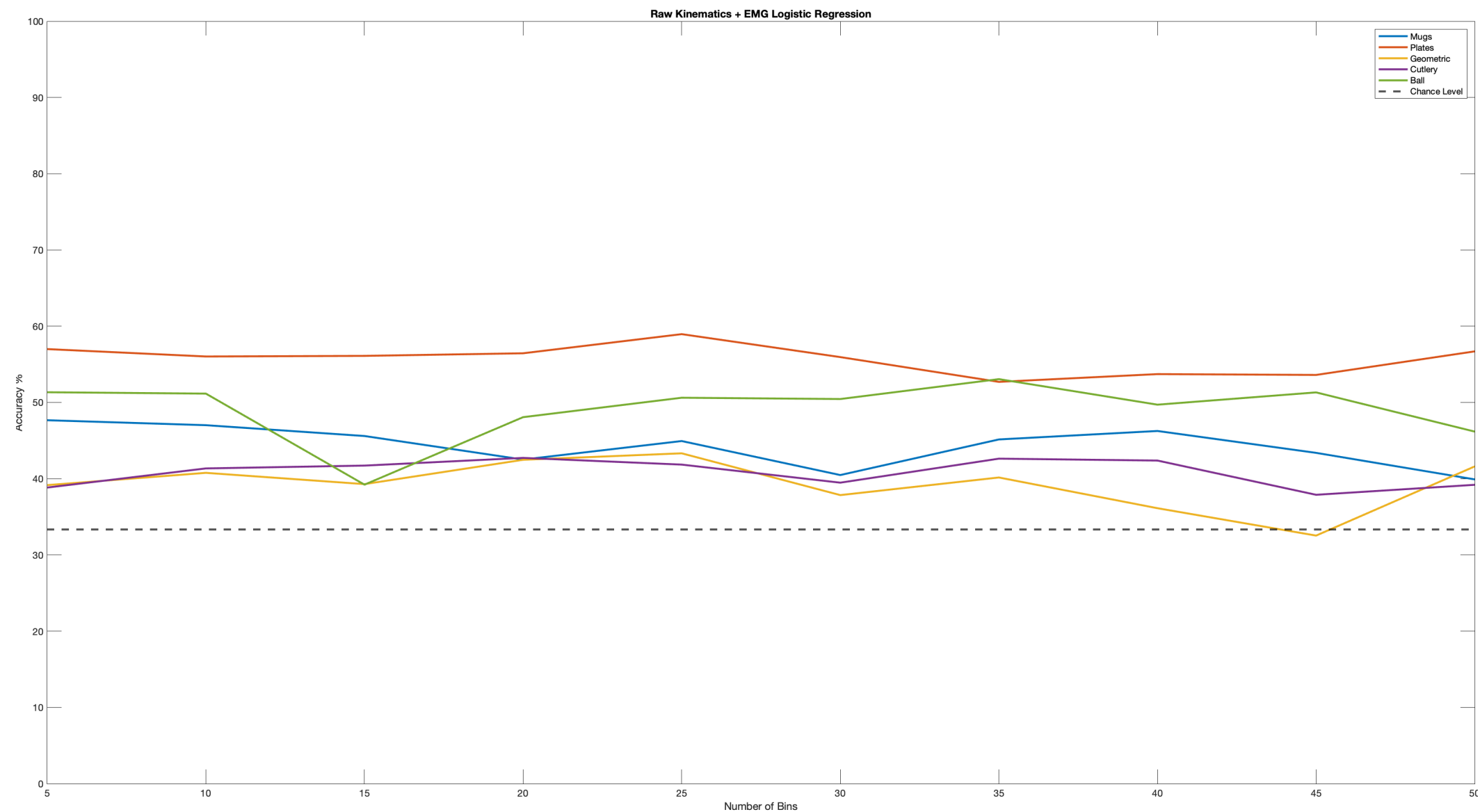
EMG



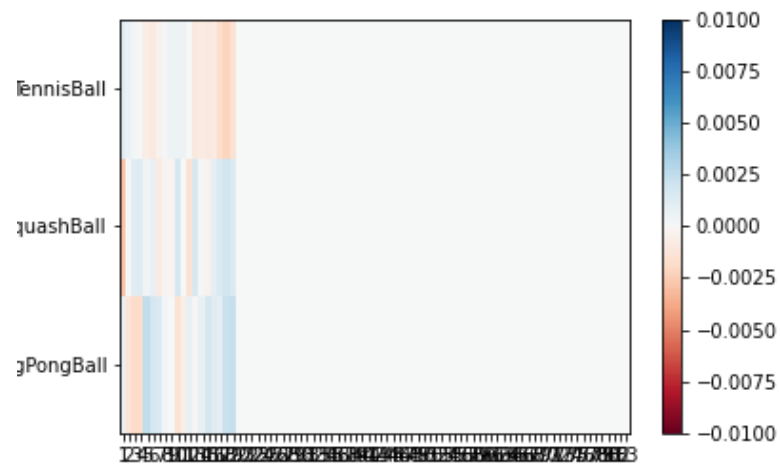
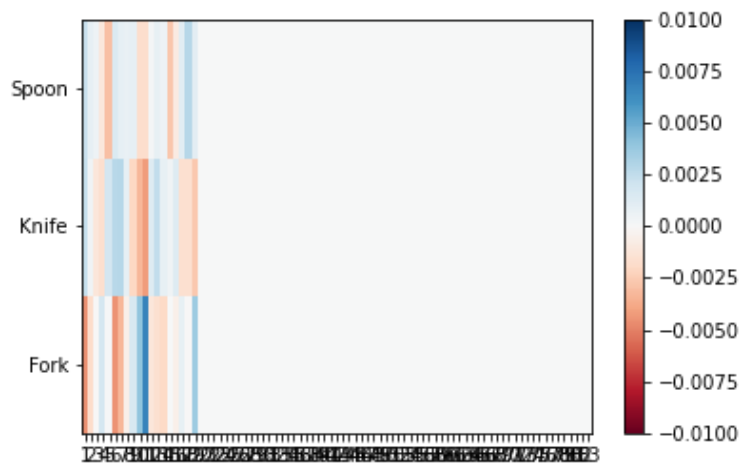
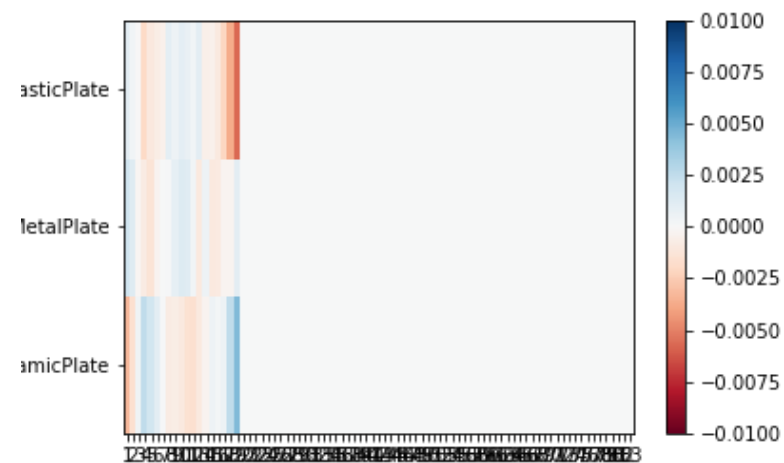
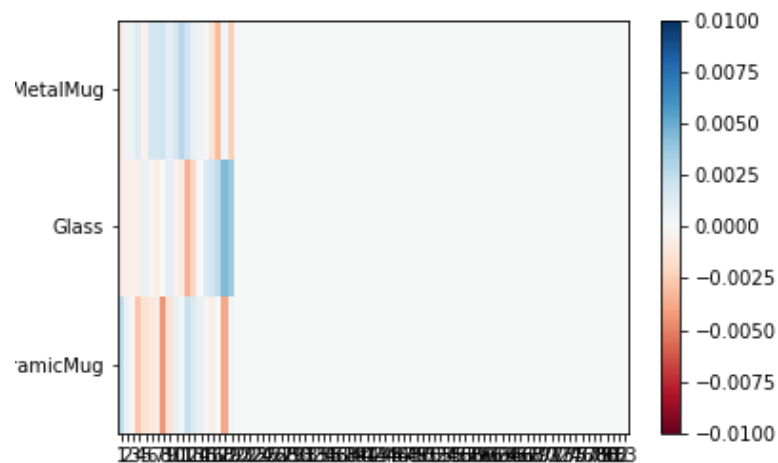
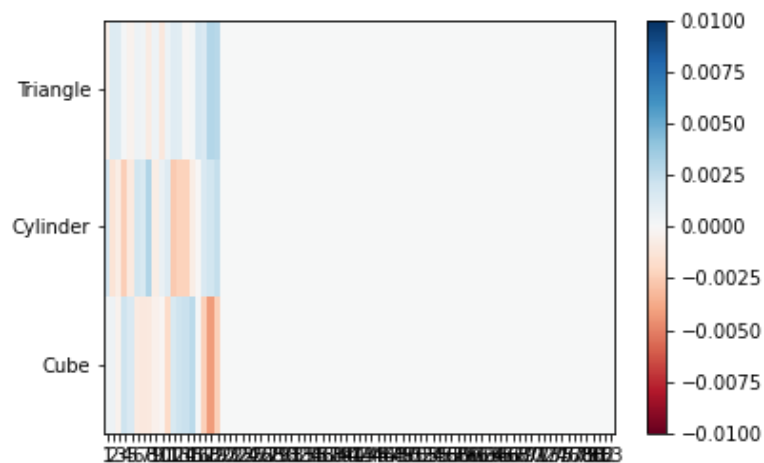
EMG



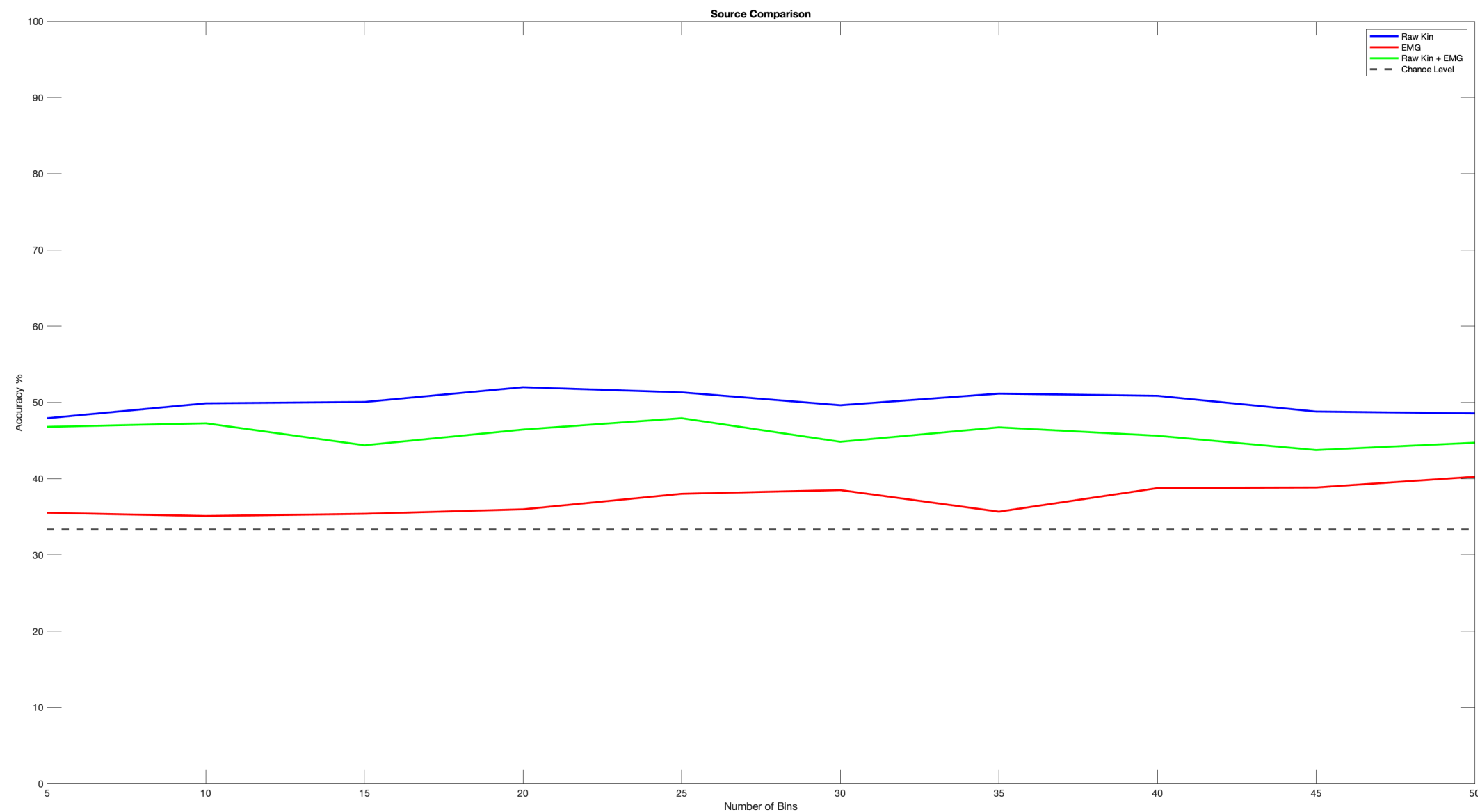
Raw Kinematics + EMG



Raw Kinematics + EMG



Comparison



Next Steps

- Extract synergies from EMG
- Study correlation with kinematic synergies
- Build classifier with muscular and kinematic synergies
- Build classifier with tactile data
- Time evolution of model coefficients