- Raw Data structure
  - 23 formulations
  - Columns -
    - i. Name of the API
    - ii. QTY (mg)
    - iii. Polymer
    - iv. Polymer Qty
    - v. Diluent
    - vi. Diluent Qty
    - vii. Binder
    - viii. Binder Qty
    - ix. Lubricant
    - x. Lubricant Qty
    - xi. Glidant
    - xii. Glidant Qty
    - xiii. Total Weight
    - xiv. Thickness
    - xv. Hardness
    - xvi. Friability
    - xvii. Disintegration time
  - Constant values and range of values-
    - i. Name of the API - Rosuvastatin Calcium [10mg]
    - ii. Polymer - Crosspovidone[2 - 4]
    - iii. Diluent - Mannitol[162.0 - 181.75]
    - iv. Binder - MCC[5.0 - 20.0]
    - v. Lubricant - Magnesium stearate [0.25 - 1.0]
    - vi. Glidant - Talc[1 - 3]
    - vii. Total Weight : [200 - 200]
    - viii. Thickness : [2.4 - 3.0]
    - ix. Hardness : [3.0 - 5.6]
    - x. Friability : [0.169 - 0.489]
    - xi. Disintegration time : [7 - 15]
  - We have not used the box Behnken method

- Models Used -
  1. Extra Tree Regressor
  2. Random Forest
  3. Gradient Boost Regressor
  4. Decision Tree Regressor
  5. SVM Regressor
  6. CART Bagging
  7. kNN Regressor
  8. XGBoost

*The two tables below can be merged as in similarity to the reference research paper with each model showing both values

**can add the DNN model NRMSE and r2 score to the following tables or can keep them in separate tables.

- NRMSE of models:*lower is better

	Extra Trees	Random Forest	Gradient Boost	Decision Tree	SVM Regressor	CART Bagging	KNN Regressor	XGBoost
Thickness	**0.04**	0.06	0.08	0.06	0.05	0.06	0.06	0.06
Hardness	0.03	0.03	**0.02**	0.06	0.04	0.03	0.04	0.03
Friability	0.05	0.05	**0.04**	0.08	0.19	0.05	0.09	**0.04**
Disintegration time	0.06	0.08	0.1	0.08	0.13	**0.1**	**0.1**	**0.1**

- R2 score of Model:*higher is better

	Extra Trees	Random Forest	Gradient Boost	Decision Tree	SVM Regressor	CART Bagging	KNN Regressor	XGBoost
Thickness	0.81	0.67	0.39	0.62	0.7	0.59	0.66	0.6
Hardness	**0.97**	0.98	0.99	0.9	0.97	0.98	0.96	**0.98**
Friability	**0.97**	0.96	0.98	0.93	0.56	0.97	0.89	**0.98**
Disintegration time	**0.94**	0.9	0.82	0.89	0.7	0.84	0.82	0.83

- DNN/ANN model score [NRMSE and R2 score]:

Model	NRMSE	R2
Thickness	0.04	0.89
Hardness	0.02	0.98
Friability	0.03	0.97
Disintegration time	0.3	0.96

- Criteria for best formulation: [Reference Barathi Mam]
  1. Tablet diameter: 8.00 mm
  2. Tablet thickness: 2.4 to 3.0 mm
  3. Tablet Hardness: 3 to 6 kg/cm2
  4. DT: 10 to 60 secs

- Sorting criteria for NYJ_data to get the best 10 formulations:
  1. Lowest Dissolution Time
  2. Lowest absolute difference from ideal thickness value [2.7 mm]
  3. Lowest absolute difference from ideal Hardness value [4.5 kg/cm2]

Top 10 formulations:

Name of the API	QTY (mg)	Polymer	Polymer Qty	Diluent	Diluent Qty	Binder	Binder Qty	Lubricant	Lubricant Qty	Glidant	Glidant Qty	Total Weight	Thickness	Hardness	Friability	Disintegration time
Rosuvastatin Calcium	10	Crosspovidone	3	Mannitol	170.7	MCC	13.31	Magnesium stearate	0.99	Talc	2	200	2.69	4.51	0.37	10
Rosuvastatin Calcium	10	Crosspovidone	3	Mannitol	172.16	MCC	13.2	Magnesium stearate	0.64	Talc	1	200	2.53	4.47	0.36	10.42
Rosuvastatin Calcium	10	Crosspovidone	3	Mannitol	171.77	MCC	13.94	Magnesium stearate	0.29	Talc	1	200	2.46	4.58	0.37	10.26
Rosuvastatin Calcium	10	Crosspovidone	3	Mannitol	171.1	MCC	13.97	Magnesium stearate	0.94	Talc	1	200.01	2.46	4.58	0.37	10.26
Rosuvastatin Calcium	10	Crosspovidone	2	Mannitol	171.58	MCC	13.93	Magnesium stearate	0.49	Talc	2	200	2.51	4.59	0.37	10.15
Rosuvastatin Calcium	10	Crosspovidone	3	Mannitol	172	MCC	12.5	Magnesium stearate	0.5	Talc	2	200	2.8	4.4	0.358	10
Rosuvastatin Calcium	10	Crosspovidone	4	Mannitol	169.5	MCC	12.5	Magnesium stearate	1	Talc	3	200	2.6	4.6	0.366	11
Rosuvastatin Calcium	10	Crosspovidone	2	Mannitol	171.75	MCC	15	Magnesium stearate	0.25	Talc	1	200	2.4	4.6	0.387	10
Rosuvastatin Calcium	10	Crosspovidone	2	Mannitol	174.25	MCC	12.5	Magnesium stearate	0.25	Talc	1	200	2.4	4.4	0.342	11
Rosuvastatin Calcium	10	Crosspovidone	3	Mannitol	173.08	MCC	12.27	Magnesium stearate	0.65	Talc	1	200	2.57	4.38	0.34	10.68