DATA ACQUSITION

Motion
Right Hand
Left Hand

Brain → Scalp →

Open BCI Cap
Electrodes: C_z, C_3, C_4,
F_3, F_4, P_3, P_z, P_4

→ OPen BCI GUI → saved .csv file → EEG dataset

KanDo
Motor learning app

→ ★accuracy score

Manually added data labels
• subject
• shape drawn
• time data

DATA PROCESSING

EEG Dataset → date _ subject _ shape data

Electrodes: C_z C_3 C_4 F_3 F_4 F_5 P_3 P_z P_4 FP1 FP2

MRCP
Areas of Activity
Selection
Attention

δ band filter
Net Activity in each electrode
α filter   θ filter
αFilter   βFilter

Average δ voltage over all instances of a shape

Regions of activity

Motor cortex α activity   motor cortex θ activity

frontal α activity   frontal β activity

Readiness potential + negative slope

METRIC NAME
METRIC EXTRACTION METHOD
METRIC OUTPUT (a number)

Motor Learning EEG Snapshot

Attach external ★Accuracy score

Labeled EEG Snapshot → EEG snapshot database

VALIDATION PIPELINE

EEG snapshot database → Training data → Random forest ML model
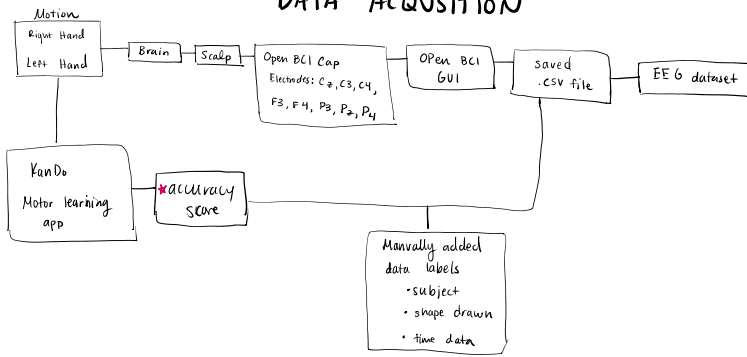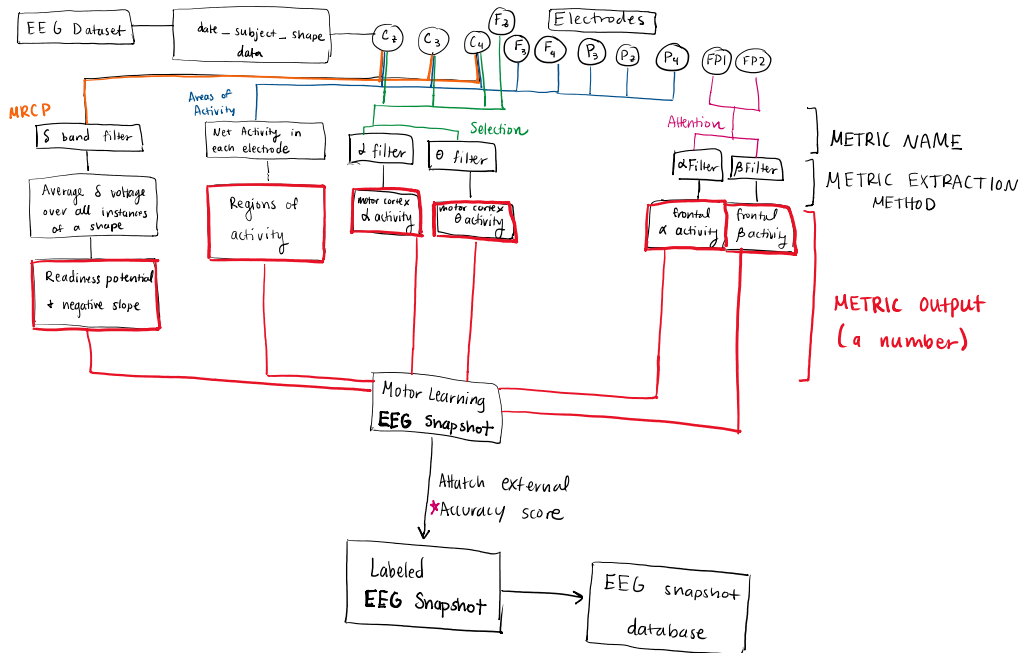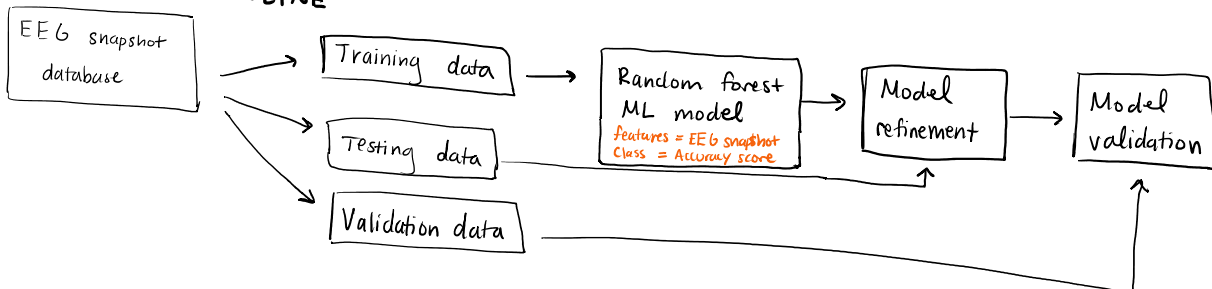features = EEG snapshot
Class = Accuracy score

→ Model refinement → Model validation

Testing data

Validation data

Cross-validated via several random training/ testing/ validation data splits.

5 sec × 20 shapes = 100 sec ~ 2 min
per hand
per shape

10 min / person

80 shapes ×8 people → 640 data points/ session

640 data points × 4 sessions = 2560 dp → enough for
ML?