INITIAL MODEL

ANALYSIS OF BIOLOGICAL AGING OF LUNGS

AWARENESS

- ABOUT
  - ITS IMPACT
  - ITS FUTURE THREATS
    - INCLUDES SEVERE DISEASES LIKE
      - LUNG CANCER
      - RHEUMATOID ARTHRITIS
    - BAD HABITS LIKE SMOKING
      - THAT MAY RESULTS TO
      - REFERENCES
        - EXPOSURE TO SMOKING
        - https://www.cdc.gov/cancer/lung/basic_info/risk_factors.htm#:~:text=Cigarette%20smoking%20is%20the%20leading,lung%20cancer%20deaths%20in%20women.
- AVOIDING
- PRODUCES THE RESULT THAT CREATES
- THE MOTIVE FOR ANALYSIS

MAKE AN ML MODEL

- THAT RECORDS
  - ALL MEASURES AND HABITS
- WHICH HELPS IN
  - THE FUTURE VALUES
    - ANSWER IF CONTINUE THE SAME
      - CONDITIONS MIGHT GET WORSE
    - ANSWER IF AVOID BAD HABITS
      - CONDITIONS MIGHT IMPROVE
    - THAT PREDICTS
- AND USING PYTHON

COLLECTING DATA

- A FUEL FOR ANALYSIS
- AND COMBINING ACCORDING TO
- FOR ANALYSING
- THAT IS USED FOR

FACTORS AFFECTING

- AND THEN FORMING
  - GROUPS
    - H
    - A
    - C
    - AC
    - S
    - SA
    - SC
    - SAC
- HELP IN COMPARING WITH THE AFFECTED AND SERVE AS ANOTHER
  - HEALTHY INDIVIDUAL

THAT CONSISTS OF

THE FOLLOWING PARAMETERS

- FEV-1
- FVC
- SMOKING HABITS
- ASTHMA PATIENTS
- COPD PATIENTS
- HEIGHT

THROUGH SPIROMETRY TESTS.

AFTER INTERACTING WITH THE PEOPLE

MATHEMATICAL APPROACHES

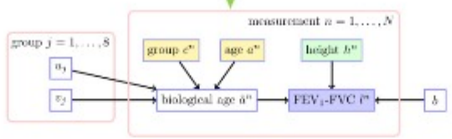
- THE METHOD FOR ANALYSIS
- HAVE A LESS EFFECTIVE PROCESS
  - TRADITIONAL METHOD
    - USING THE EQUATION
      - $l^n = b_1 + b_2 a^n + b_3 (a^n)^2 + b_4 \log h^n$
        - l^n–lung function
        - a^n–age function
        - h^n–height
        - b–unknown parameters
    - IT CREATES A LINEAR MODEL FOR COMPARISON
      - BY TAKING SEPARATE B'S AS HEALTHY AND SMOKING INDIVDUALS
        - A DECLINE IS OBSERVED
          - WHICH HELPS IN
            - PREDICTING
    - HAD A LOT OF
      - LIMITATIONS
        - ARE ERRORS IN SMALL GROUPS
          - BECAUSE OF SINGLE LINEAR MODEL
            - WITH NON-LINEAR TRANSFORMATIONG OF CHRONOLOGICAL AGE TO BIOLOGICAL AGE
              - $l^n = b_1 + b_2 \tilde{a}^n + b_3 (\tilde{a}^n)^2 + b_4 \log h^n + \eta^n,$ $\eta^n \sim \mathcal{N}(0, \Sigma_l)$.
        - ARE THAT IT CANNOT USE
          - MULTIPLE TESTS
- HAVE A BETTER APPROACH KNOWN AS
- THAT LED TO

PROBABILISTIC METHODS

- WILL BE DERIVED THROUGH
- DUE TO LARGE VARIANCE AND UNCERTAINITIES
- POSTERIOR DISTRIBUTION
  - DRAWS A CONCLUSION THAT
    - UNCERTAINITY AT YOUNG AND OLD AGE IS MORE
  - GAUSSIAN VARIABLES u_j and v_j
    - ARE USED TO ESTIMATE UNCERTAINITY

EQUATIONS

- WITH LINEAR TRANSFORMATIONG OF CHRONOLOGICAL AGE TO BIOLOGICAL AGE
  - DETERMINING RATE
    - uc slope
    - DEPICTING VALUE AT BIRTH
      - vc intercept
  - $\tilde{a}^n = a_{c^n} a^n + v_{c^n} + \epsilon^n, \epsilon^n \sim \mathcal{N}(0, \sigma_a^2),$ $a_{c^n} \sim \mathcal{N}(1, 10000), v_{c^n} \sim \mathcal{N}(0, 10000)$.
- WHAT IT ACTUALLY DOES



- SLOPE INCREASES

ITS CAUSES REFLECT THE

- A TRIGGER FOR ANALYSIS
- NORMAL CASE
  - CHRONOLOGICAL AGING
- SPECIAL CASE
  - RANDOM VARIABLES
    - SMOKING
      - ARE THE MAIN
      - PROMOTES
    - ASTHMA
    - COPD
      - HAS THE FOLLOWING COMMON SYMPTOMS
        - SHORTNESS OF BREATH
        - CHEST TIGHTNESS
        - LACK OF ENERGY

EPSILON THAT

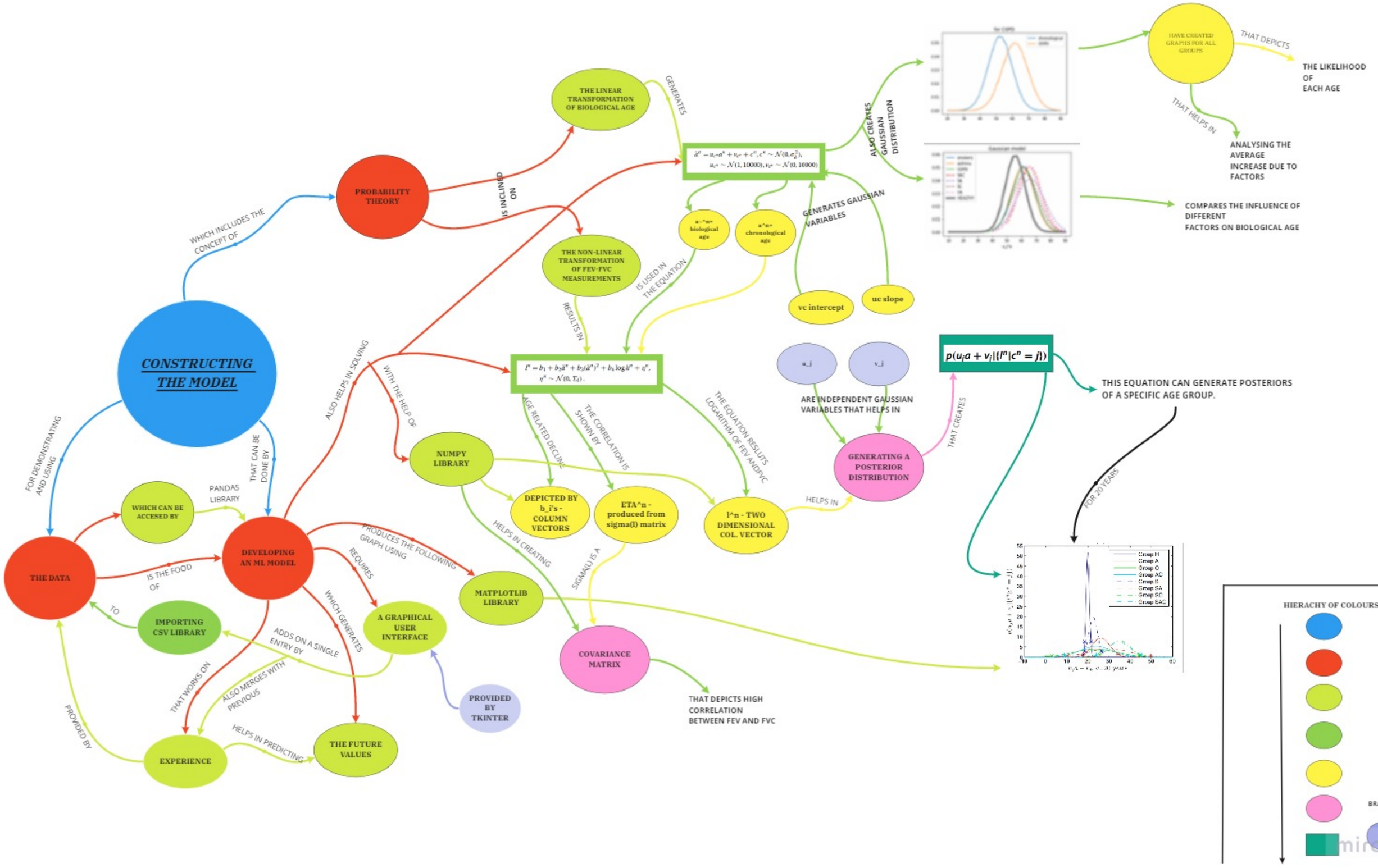
- AN EXTRA FACTOR IS
- IS USED TO INCLUDE
  - ALL EXTERNAL
    - GENETICS
    - ENVIRONMENT

HIERACHY OF COLOURS

BRANCH

miro

FINAL MODEL


CONSTRUCTING THE MODEL
WHICH INCLUDES THE CONCEPT OF
PROBABILITY THEORY
IS INCLINED ON
THE LINEAR TRANSFORMATION OF BIOLOGICAL AGE
GENERATES
THE NON-LINEAR TRANSFORMATION OF FEV-FVC MEASUREMENTS
RESULTS IN
IS USED IN THE EQUATION
ALSO HELPS IN SOLVING
WITH THE HELP OF
FOR DEMONSTRATING AND USING
THAT CAN BE DONE BY
THE DATA
WHICH CAN BE ACCESED BY
PANDAS LIBRARY
DEVELOPING AN ML MODEL
IS THE FOOD OF
TO
IMPORTING CSV LIBRARY
PRODUCES THE FOLLOWING GRAPH USING
REQUIRES
WHICH GENERATES
A GRAPHICAL USER INTERFACE
ADDS ON A SINGLE ENTRY BY
THAT WORKS ON
ALSO MERGES WITH PREVIOUS
PROVIDED BY TKINTER
PROVIDED BY
EXPERIENCE
HELPS IN PREDICTING
THE FUTURE VALUES
NUMPY LIBRARY
MATPLOTLIB LIBRARY
HELPS IN CREATING
DEPICTED BY b_i's - COLUMN VECTORS
ETA^n - produced from sigma(l) matrix
SIGMA(L) IS A
COVARIANCE MATRIX
THAT DEPICTS HIGH CORRELATION BETWEEN FEV AND FVC
AGE RELATED DECLINE
THE CORRELATION IS SHOWN BY
THE EQUATION RESULTS LOGARITHM OF FEV AND FVC
l^n - TWO DIMENSIONAL COL. VECTOR
HELPS IN
GENERATING A POSTERIOR DISTRIBUTION
THAT CREATES
u_i
v_i
ARE INDEPENDENT GAUSSIAN VARIABLES THAT HELPS IN
vc intercept
uc slope
GENERATES GAUSSIAN VARIABLES
ALSO CREATES GAUSSIAN DISTRIBUTION
HAVE CREATED GRAPHS FOR ALL GROUPS
THAT DEPICTS
THE LIKELIHOOD OF EACH AGE
THAT HELPS IN
ANALYSING THE AVERAGE INCREASE DUE TO FACTORS
COMPARES THE INFLUENCE OF DIFFERENT FACTORS ON BIOLOGICAL AGE
THIS EQUATION CAN GENERATE POSTERIORS OF A SPECIFIC AGE GROUP.
FOR 20 YEARS
HIERACHY OF COLOURS
BRANCH