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PIT-NE

SeasonWatch

Client Meeting 5



This past sprint...

- **Synthetic reference data**
 - Generated synthetic reference data by selecting representative observations from the set of observations for each week
 - Compared synthetic reference data to citizen observations
 - **Dataset of mean transition times and confidence intervals**
 - Developed method to generate these from citizen observations
 - Began testing and refining method
 - **Added combination charts** of percentages of observations observing an attribute and total number of observations for week
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Process

1. Data Cleaning and Preprocessing
2. Data Validation
3. Data Visualization
4. Design ML Pipeline
5. Implementing Machine Learning
6. Machine Learning Testing
7. Synthetic Reference Data
8. **Mean Transition Times Dataset** ← (We are here)
9. Clean and Organize Code
10. **Final Report**





Next Sprint

Mean Transition Times Dataset

- Constructing a dataset for mean transition times for each phenophase of each species (provided we have enough data)

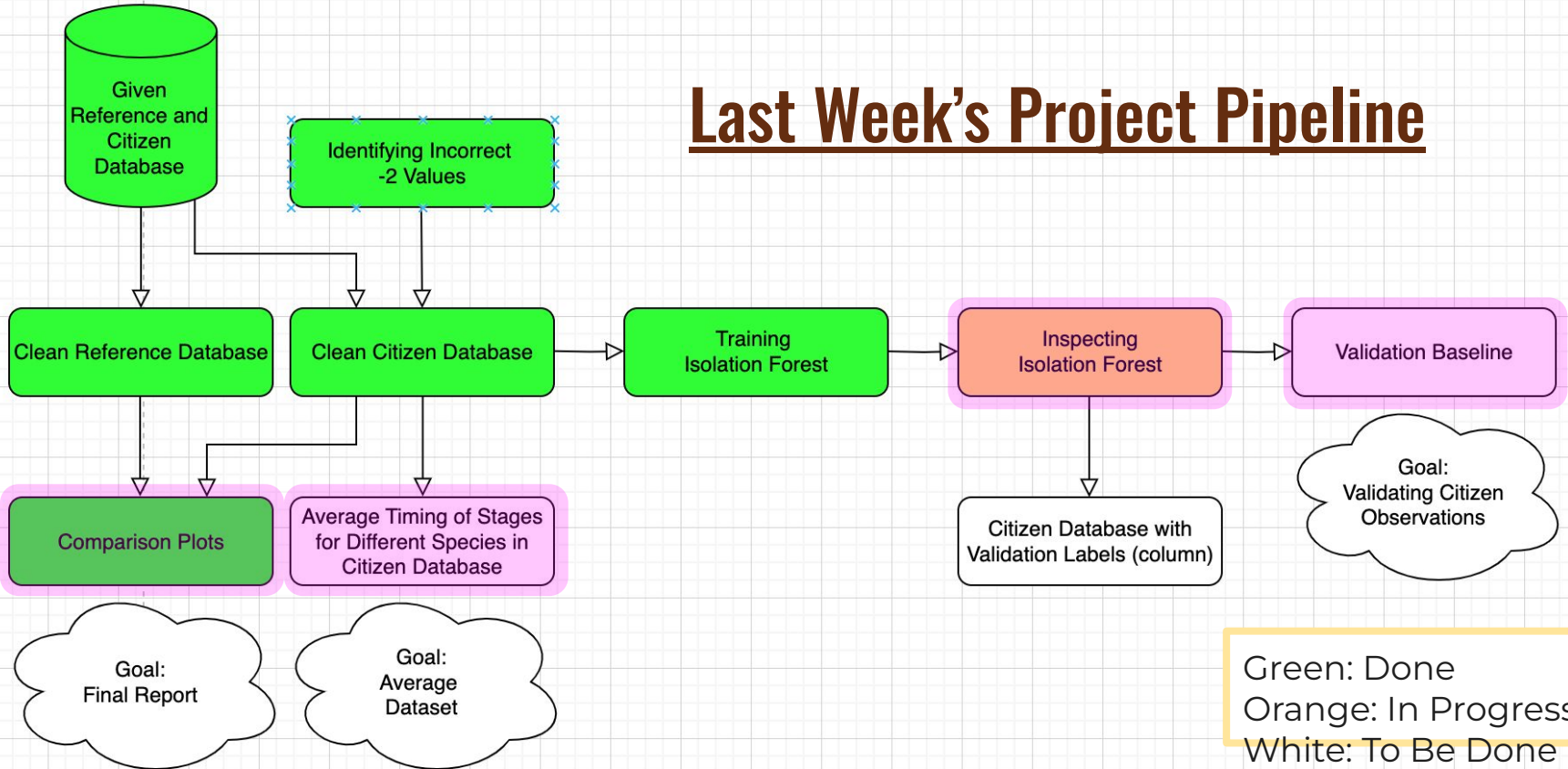
Clean and Organize Code

- Optimizing the readability and clarity of the written code, as well as providing documentation.

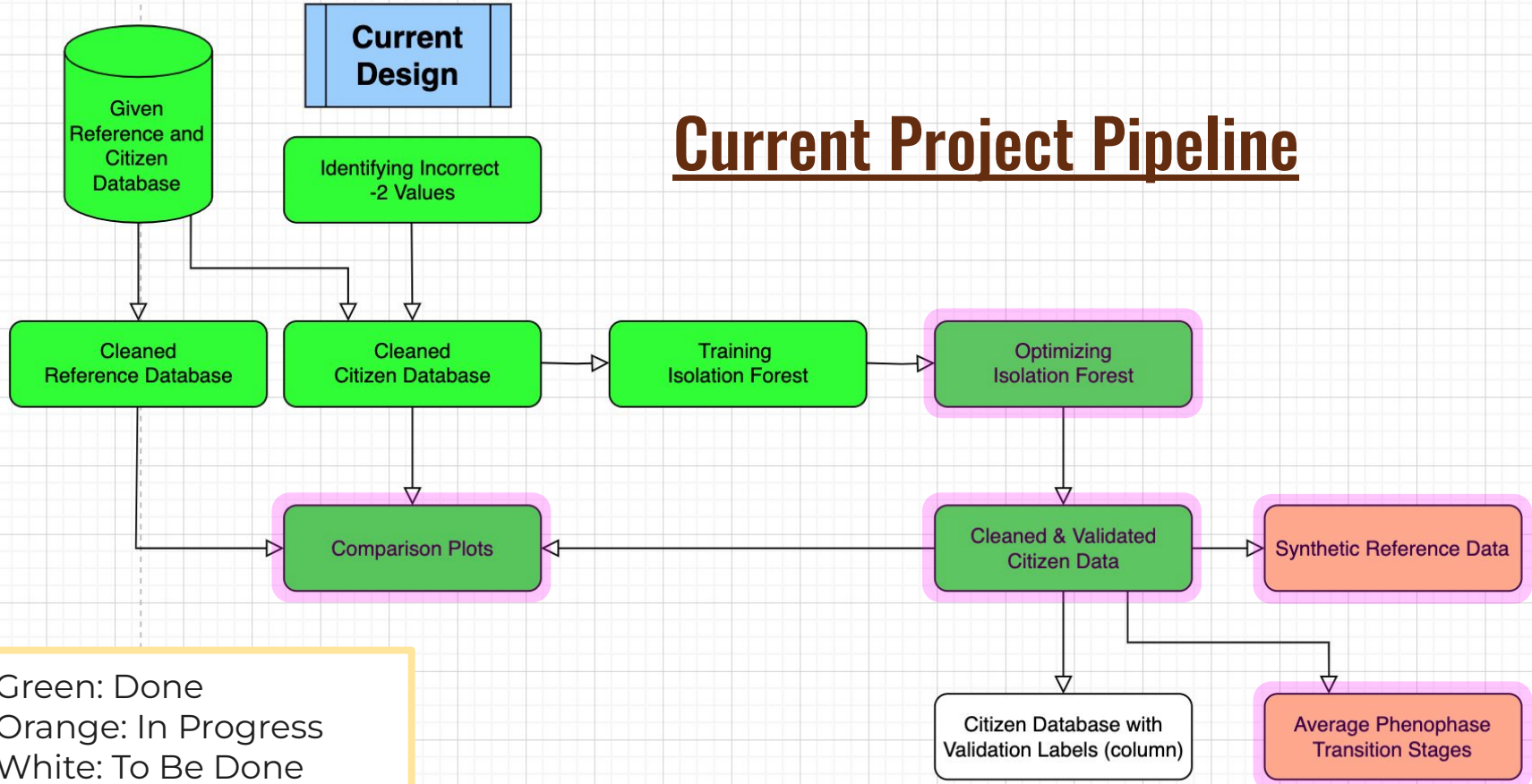
Final Report

- Writing a final report summarizing the project and detailing the methodologies used.
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Last Week's Project Pipeline



Current Project Pipeline

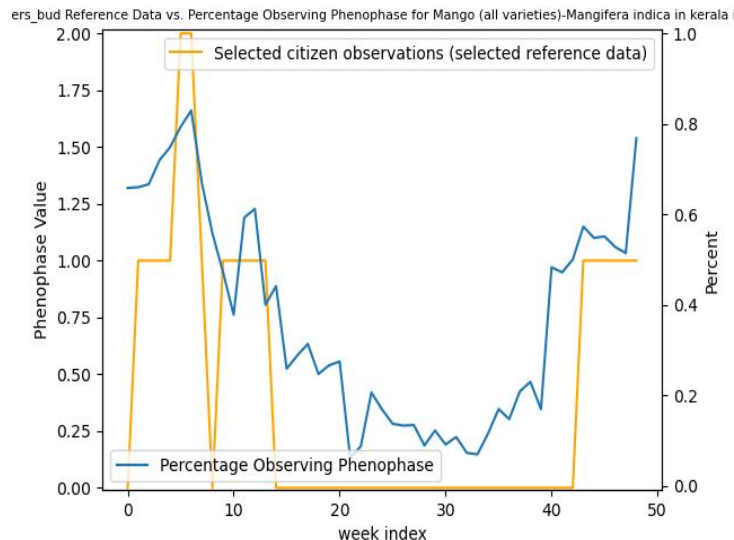


Generation of new reference data

Utilized clustering algorithms and isolation forests to generate new reference data from the citizen observations.

Compared generated reference data to cleaned and validated citizen data.

There is a high correspondence between the synthetic reference data and the citizen data.



Question About Synthetic Reference Data

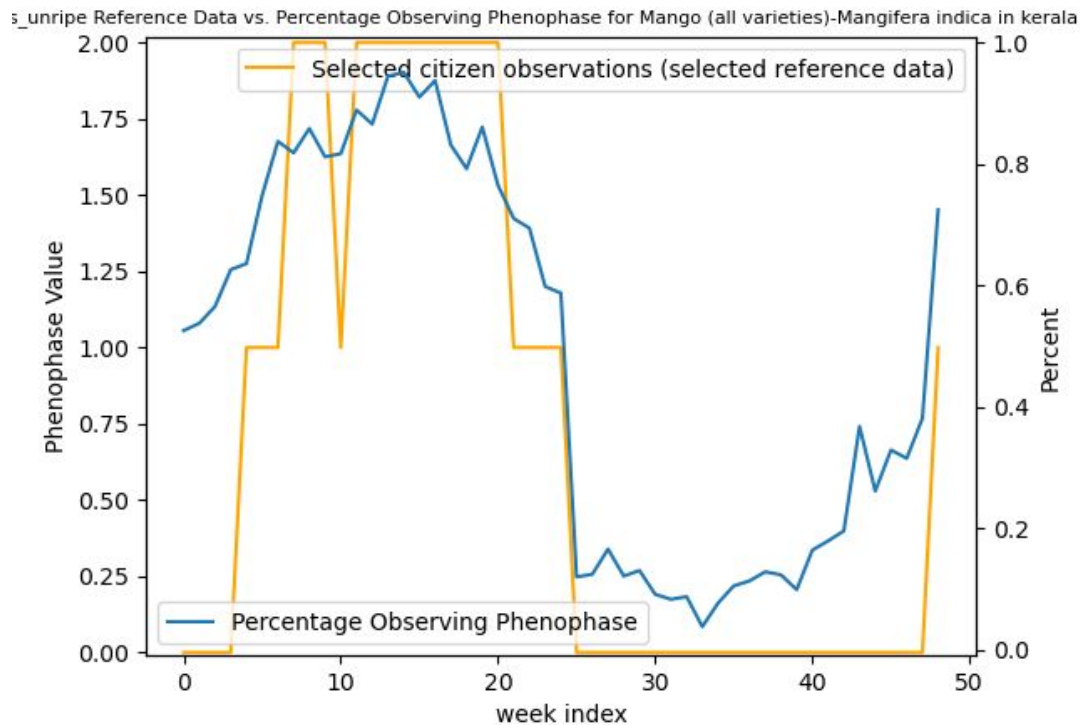
Should synthetic reference data represent the majority of what citizens see in a given week?

Or

Should synthetic reference data coincide with phenophase transition times?

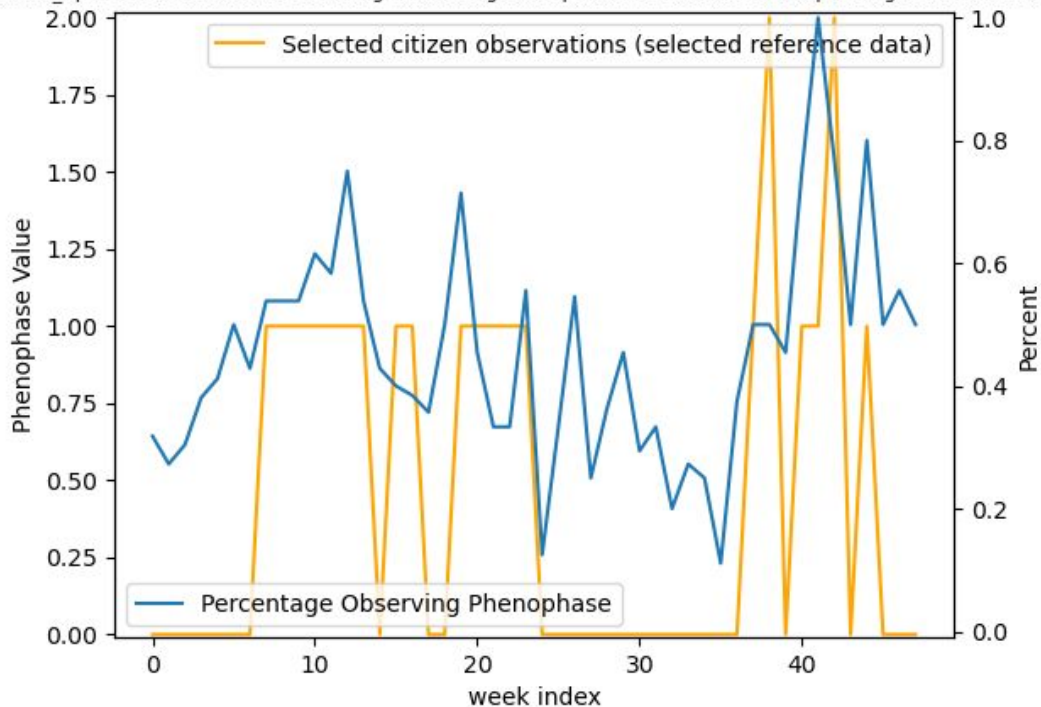
The following slides give more examples of synthetic reference data for additional context.

More Examples of Synthetic Reference Data

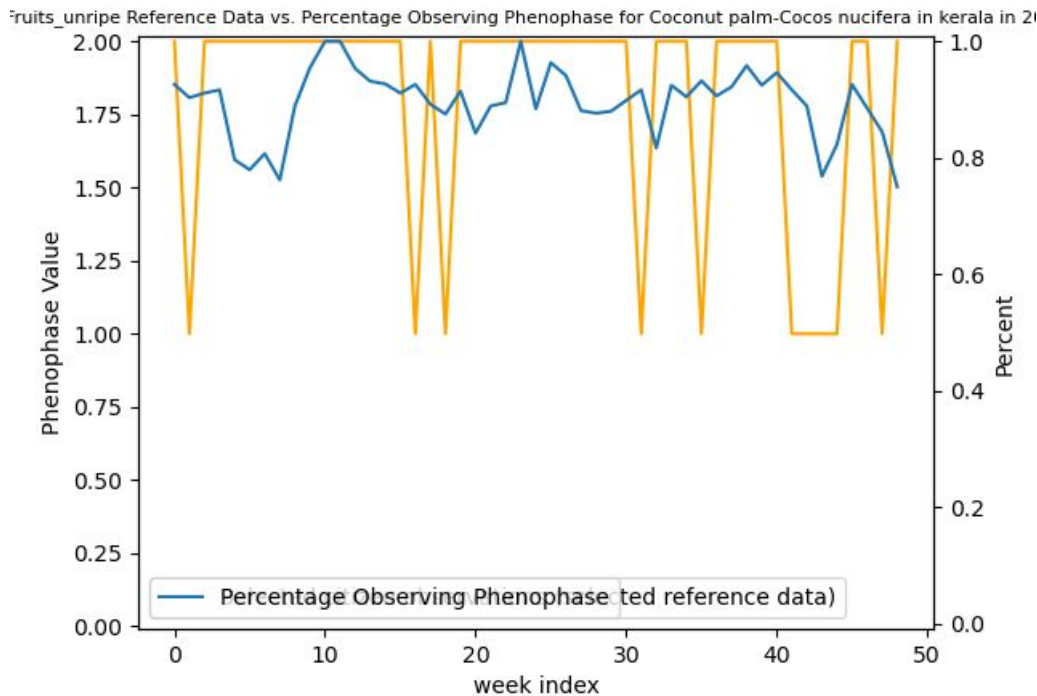


More Examples of Synthetic Reference Data

Fruits_ripe Reference Data vs. Percentage Observing Phenophase for Mulsari-Mimusops elengi in kerala in 2023

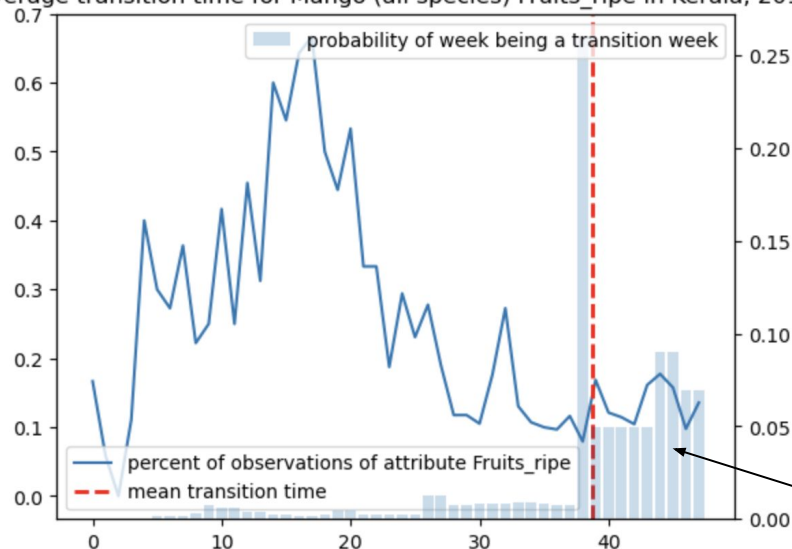


More Examples of Synthetic Reference Data



Computing Mean Transition Times

Average transition time for Mango (all species) Fruits_ripe in Kerala, 2018

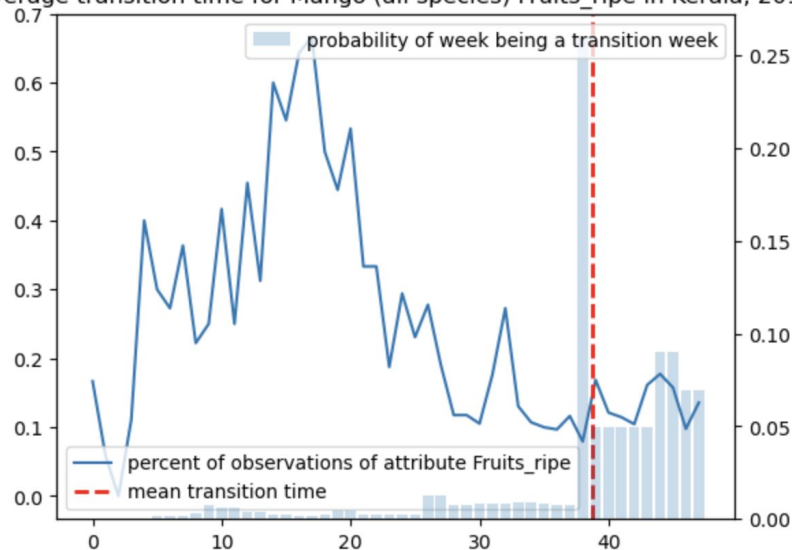


- We are currently able to estimate the transition week at the beginning of a phenophase for a species
- We assign each week a probability of being the transition week
- Weeks with little change in appearance of phenophase beforehand and a sharp increase afterwards are assigned higher probabilities

Blue bars represent the probability that a week is a transition week

Computing Mean Transition Times

Average transition time for Mango (all species) Fruits_ripe in Kerala, 2018



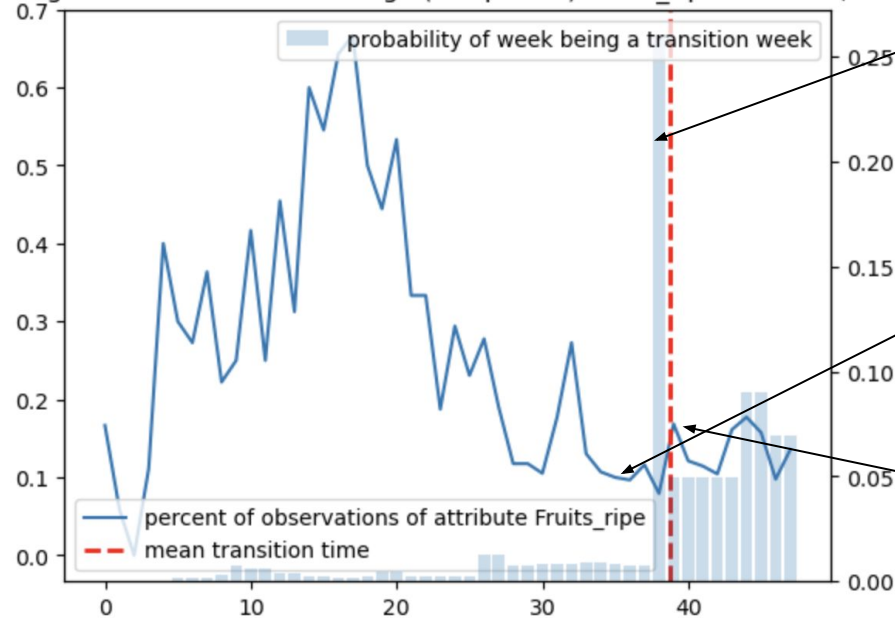
Mean transition time is calculated using the following formula:

$$E(w) = \sum_i w_i * p(w_i)$$

where w_i is the i th week and $p(w_i)$ is the probability of that week

Breaking down the plot

Average transition time for Mango (all species) Fruits_ripe in Kerala, 2018



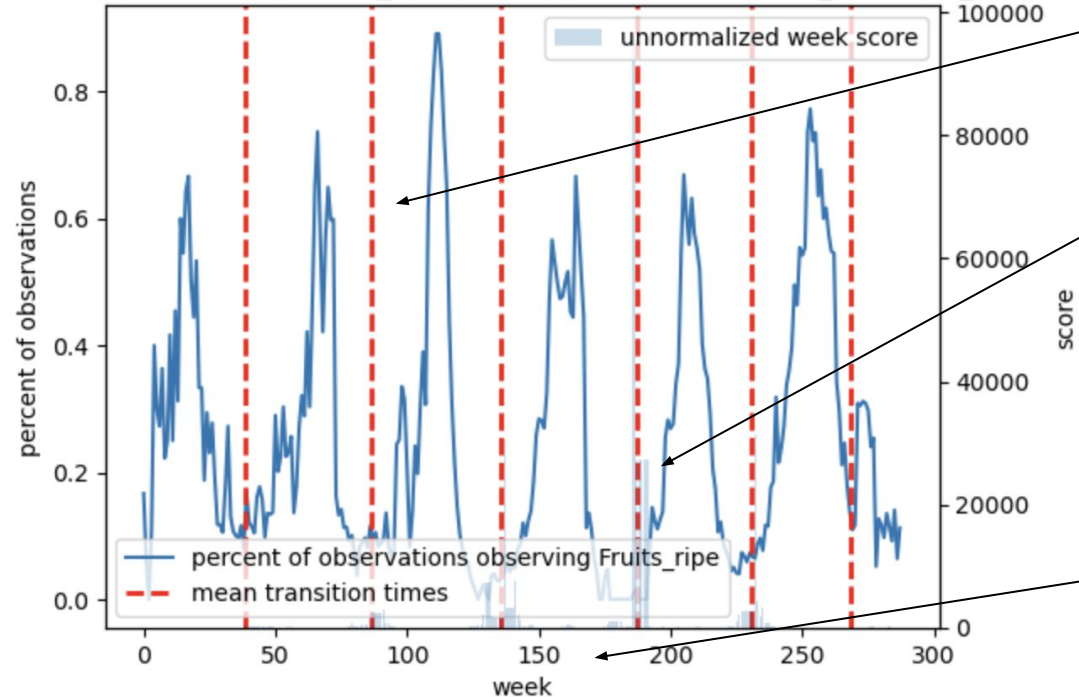
Week 38 has the highest probability

Plateau in graph of percentage of observations of ripe mango fruits directly before week 38

Increase in percentage of observations of ripe mango fruits in week 39

Mean Transition Times for Each Year

Mango (all species), Fruits_ripe probs / pcts, L=5, M=3, w_1=0.1, w_2=1



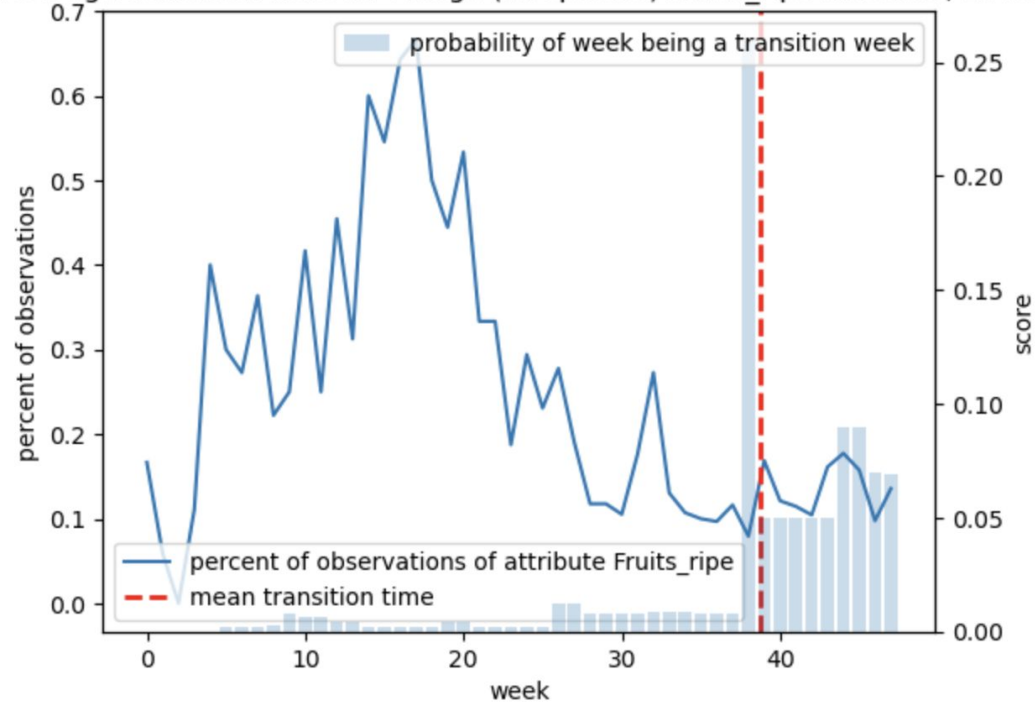
Vertical red lines are mean transition times for each year

Blue bars are unnormalized scores, which are converted into probabilities

All weeks from 2018-2023 concatenated into one plot

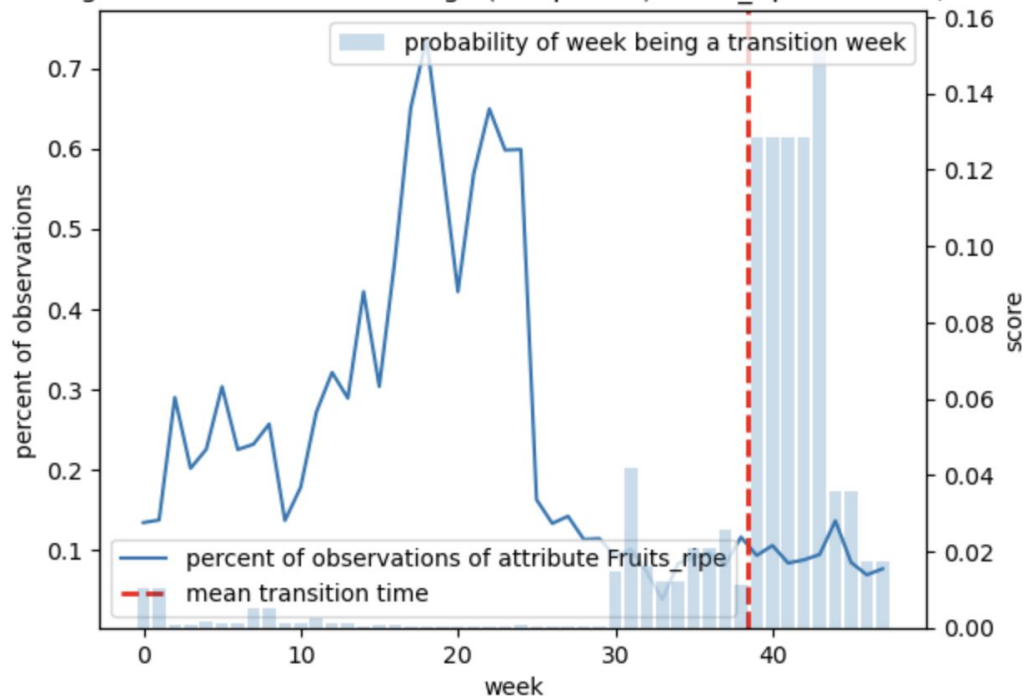
Mean Transition Time for 2018

Average transition time for Mango (all species) Fruits_ripe in Kerala, 2018



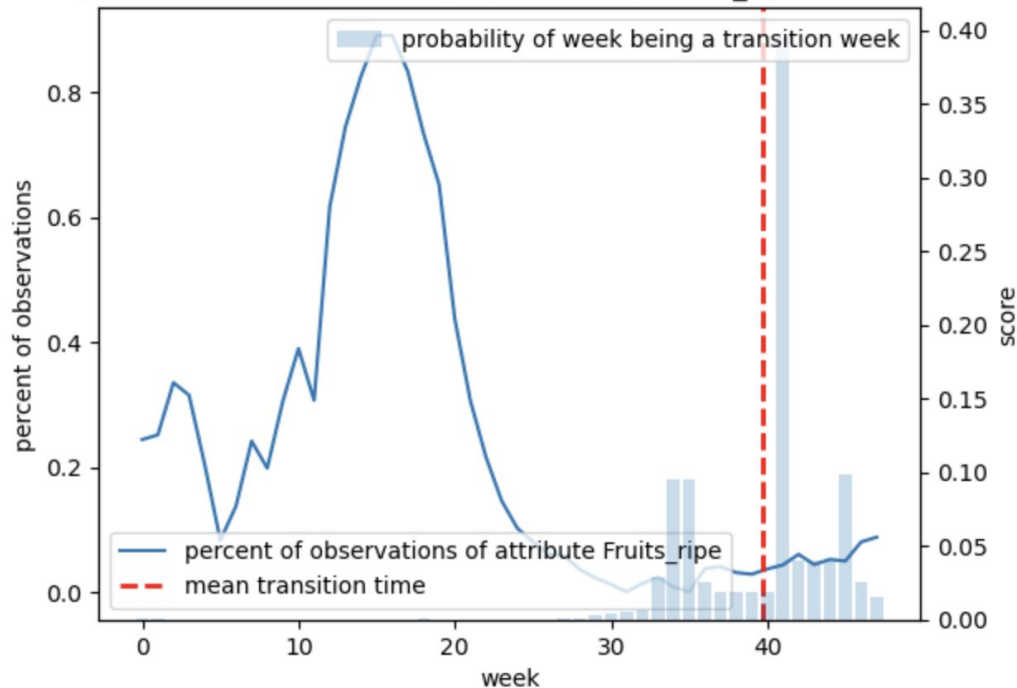
Mean Transition Times for 2019

Average transition time for Mango (all species) Fruits_ripe in Kerala, 2019



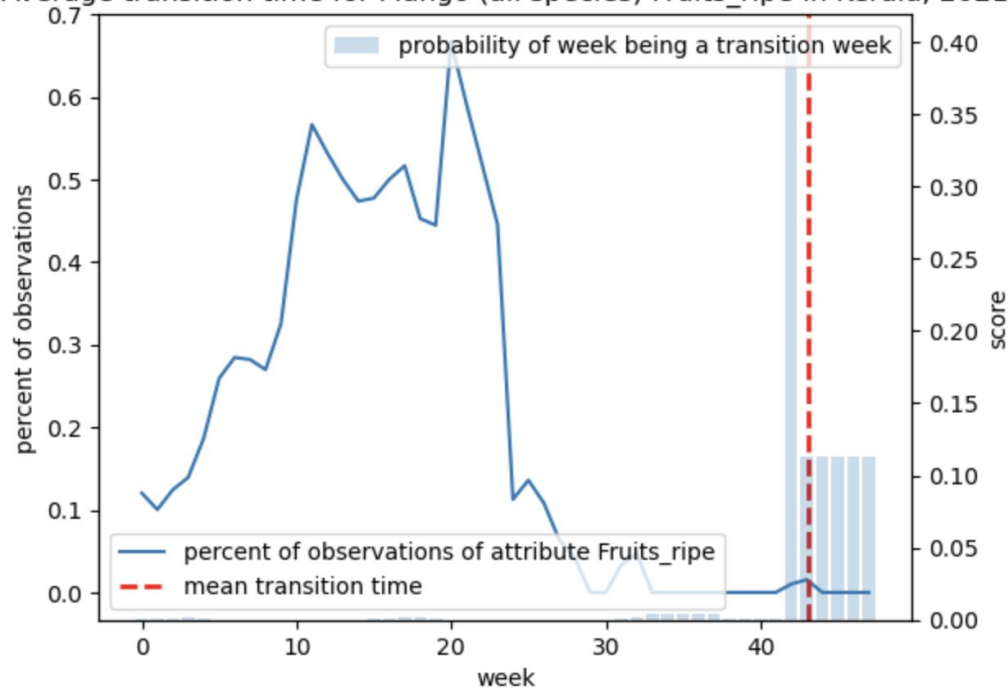
Mean Transition Times for 2020

Average transition time for Mango (all species) Fruits_ripe in Kerala, 2020



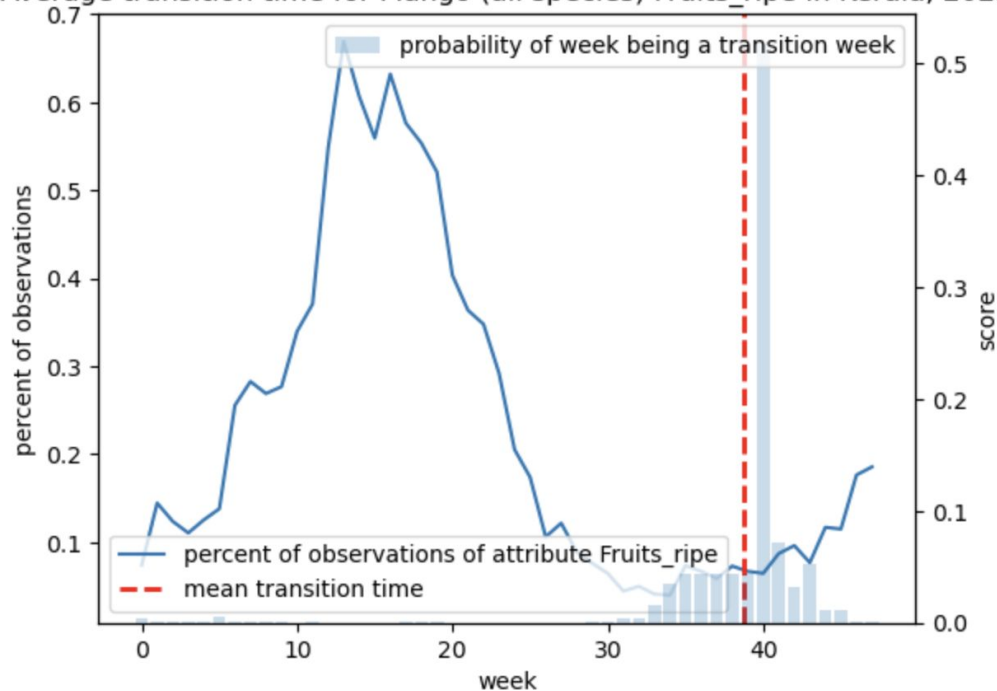
Mean Transition Times for 2021

Average transition time for Mango (all species) Fruits_ripe in Kerala, 2021



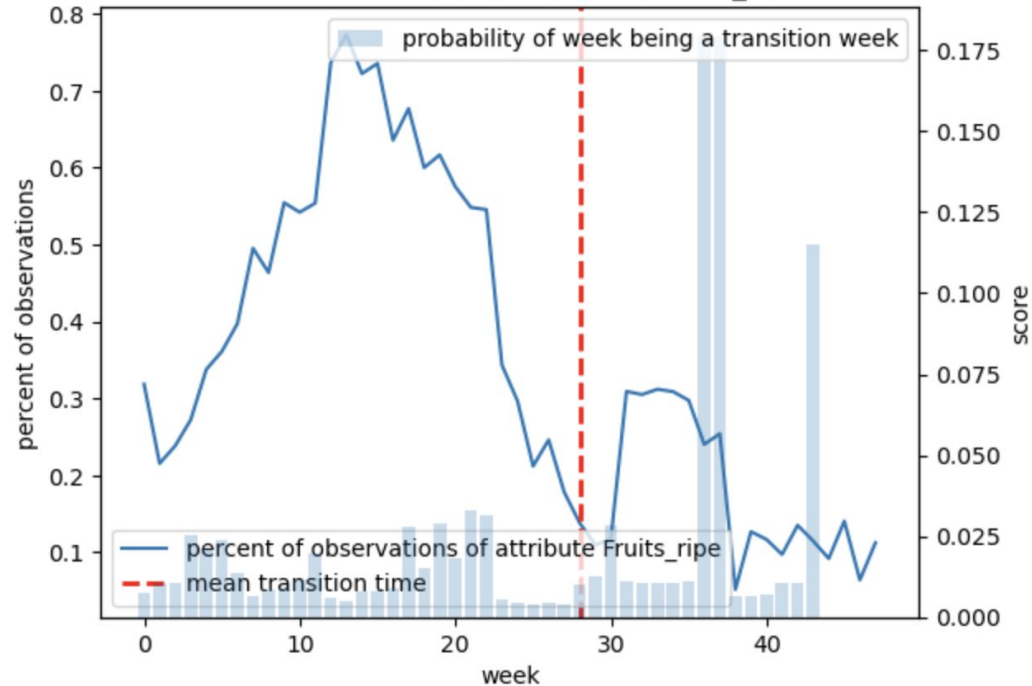
Mean Transition Times for 2022

Average transition time for Mango (all species) Fruits_ripe in Kerala, 2022



Mean Transition Times for 2023

Average transition time for Mango (all species) Fruits_ripe in Kerala, 2023



Questions about Transition Times

- Do the mean transition times for each year make sense?
- Do the probability distributions for transition weeks make sense (should some weeks have higher / lower probabilities)?
- Another option we have is to create a dataset of maximum likelihood transition weeks, by selecting weeks with the highest probabilities. Would you want a dataset like this in addition to the dataset of mean transition times?

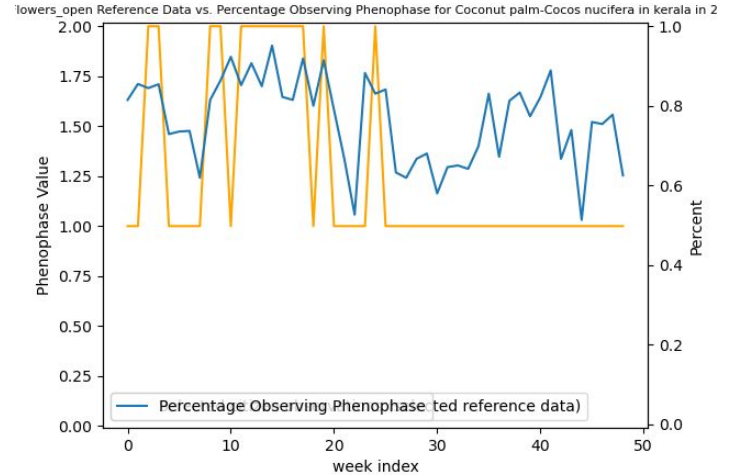
Questions about Transition Times

In your email earlier this week you identified the transition time as being from when 1% of the population has flowers through the time it continues to have 1% flowers.

Our team realized this may not work with all phenophases or species.

For example, in some species like Coconut Palms at least 50% of the population has flowers throughout the entire year.

How should we address these situations?



Questions about Transition Times

In our approach to identifying transition times, we check if there's been a sudden spike in the growth of a phenophase after a period of stagnation.

Does this approach seem effective?

Or

Is it necessary to work with the definition you provided in your email earlier this week?

Questions for us?

Thank you for your time!

Feel free to reach out with any questions or concerns through email.

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