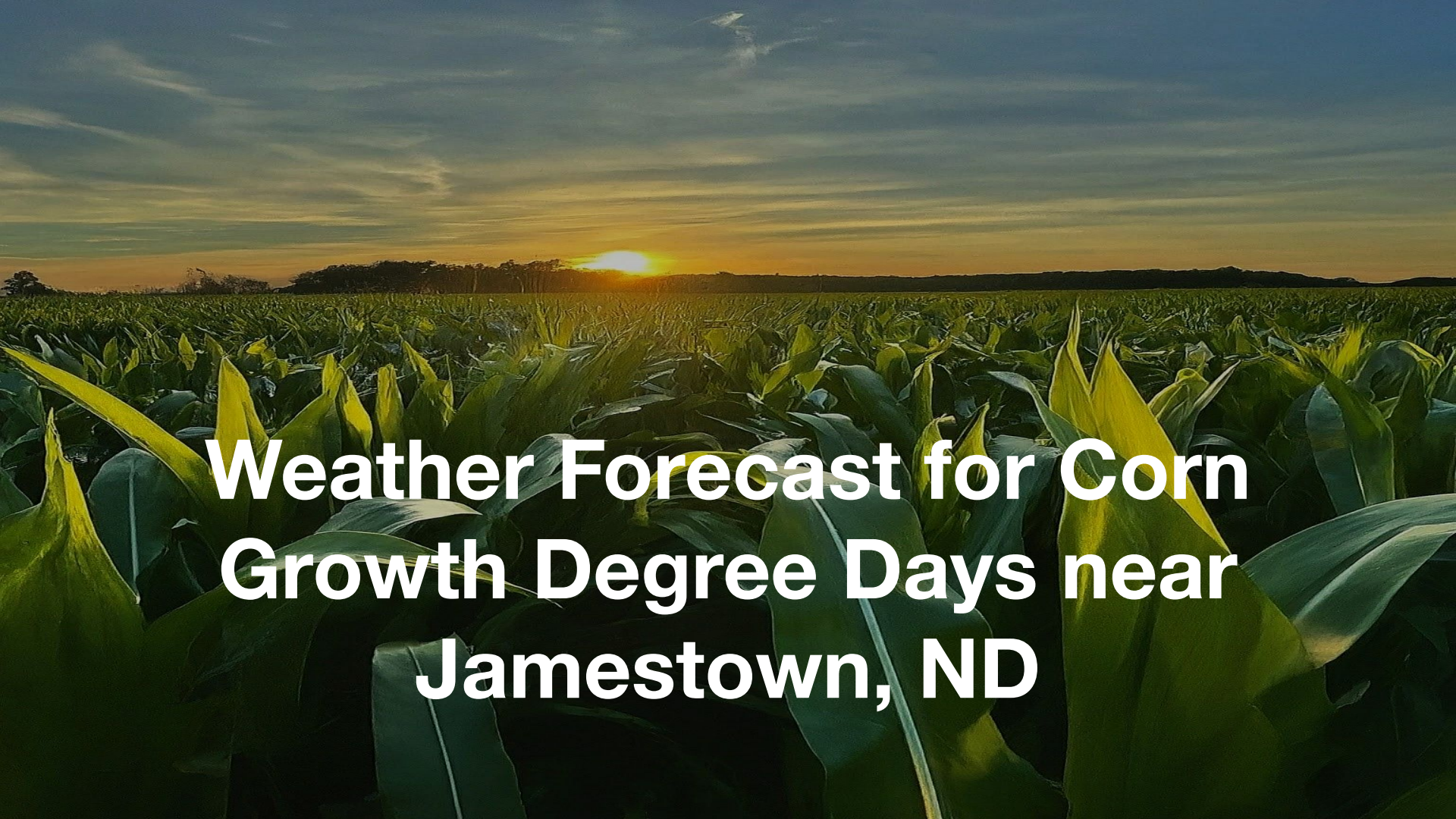

Weather Forecast for Corn Growth Degree Days near Jamestown, ND


Business Problem
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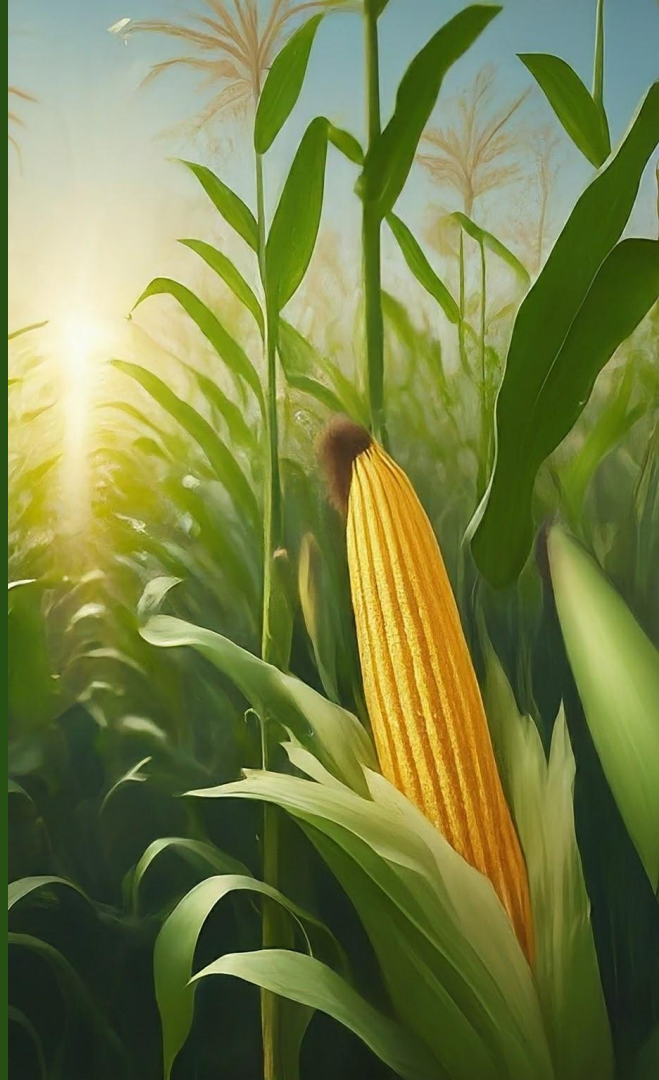
Future Steps



Business Problem

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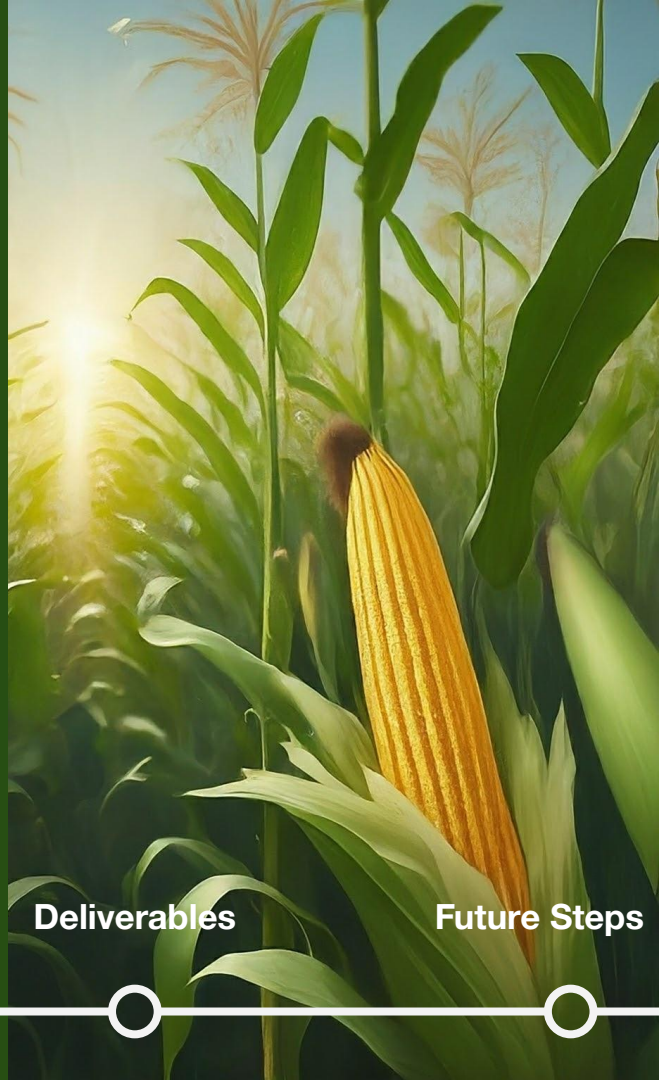
Business Problem

- Varieties of corn are optimized for different numbers of Growth Degree Days. Using weather data from NDAWN, we will produce a time series analysis that can predict weather features for growth days.



Data Overview

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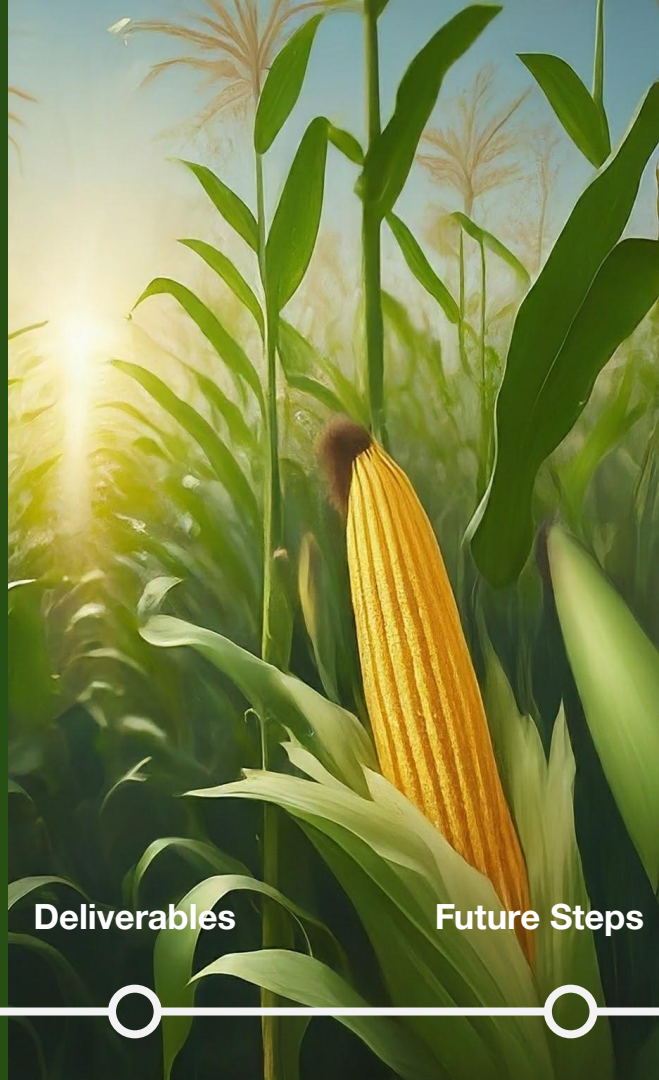
Data Overview

Data

- ❏ NDAWN by NDSU
- ❏ 21 years of weekly Weather Data
- ❏ 13 unique factors

Limitations

- ❏ Only Jamestown, ND Weather Station
- ❏ Weekly averages soften outliers



Analysis

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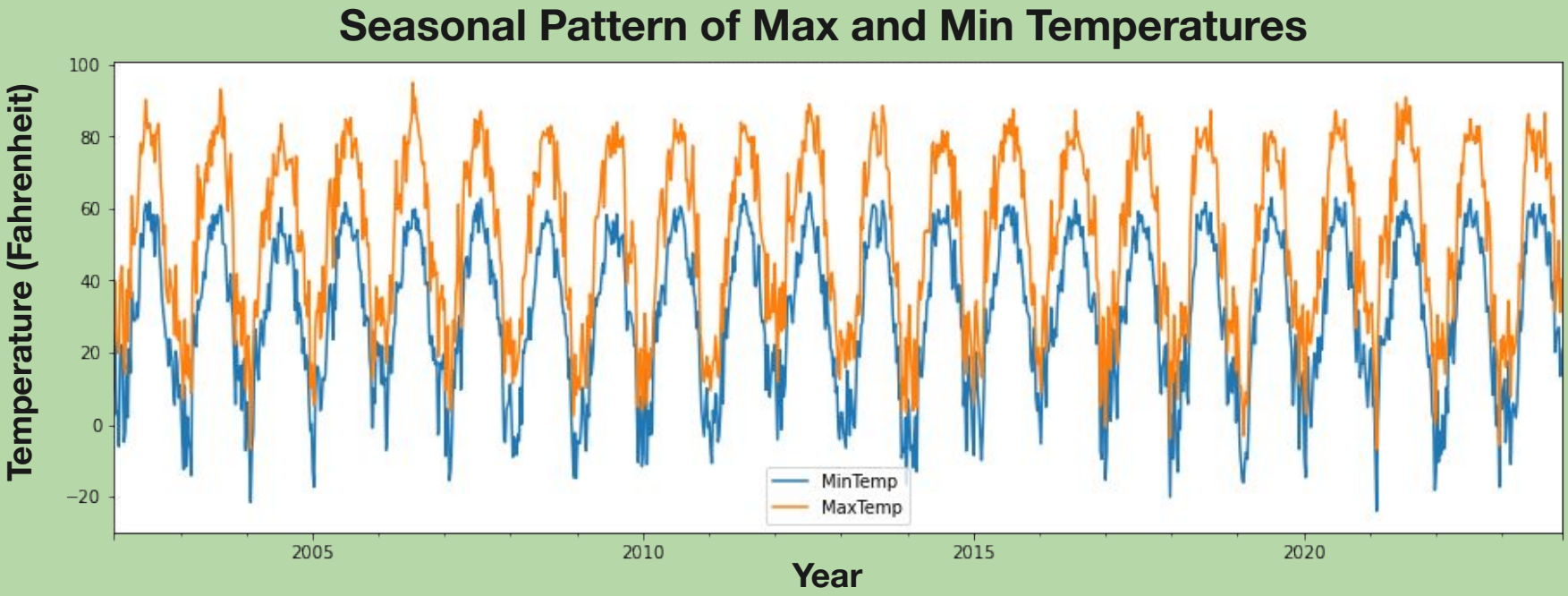
Analysis

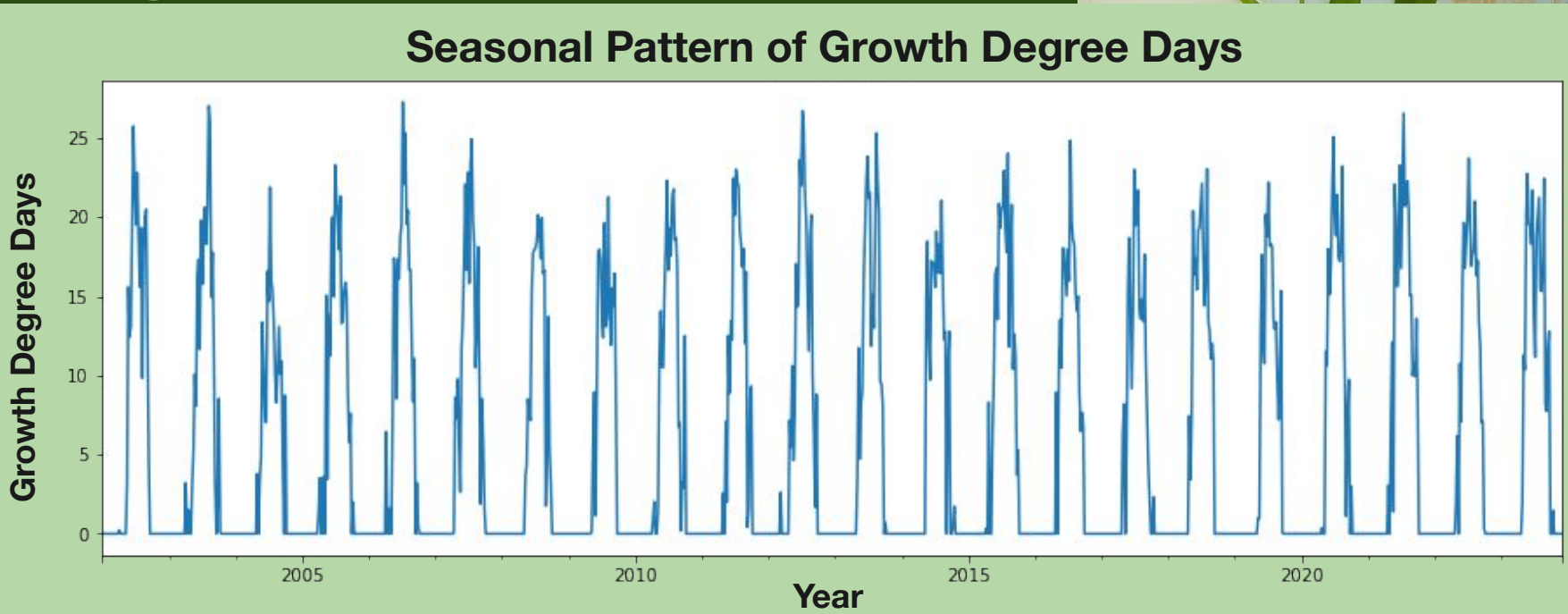

Seasonal Pattern of Max and Min Temperatures
Temperature (Fahrenheit)
100
80
60
40
20
0
−20
2005
2010
2015
2020
Year
MinTemp
MaxTemp

Analysis

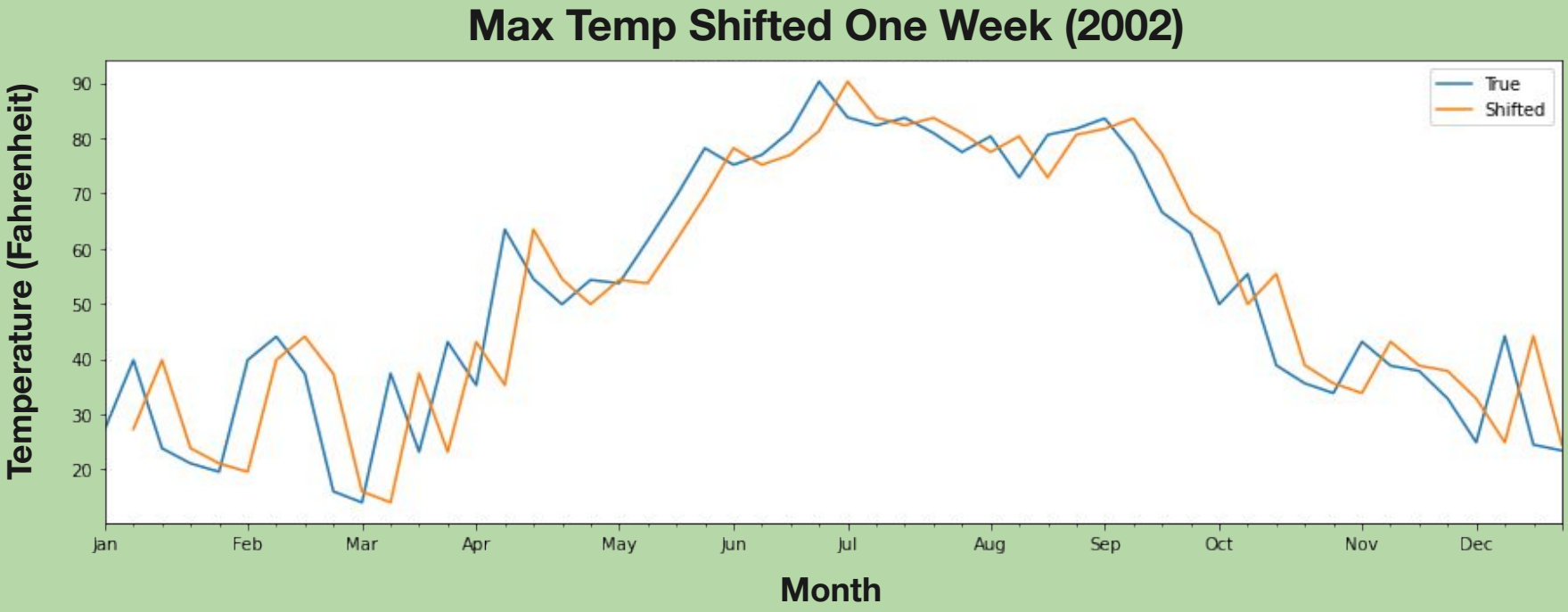
Calculation of Growth Degree Days

$$\text{Corn GDD} = \frac{\text{(Maximum temperature + minimum temperature)}}{2} - 50$$

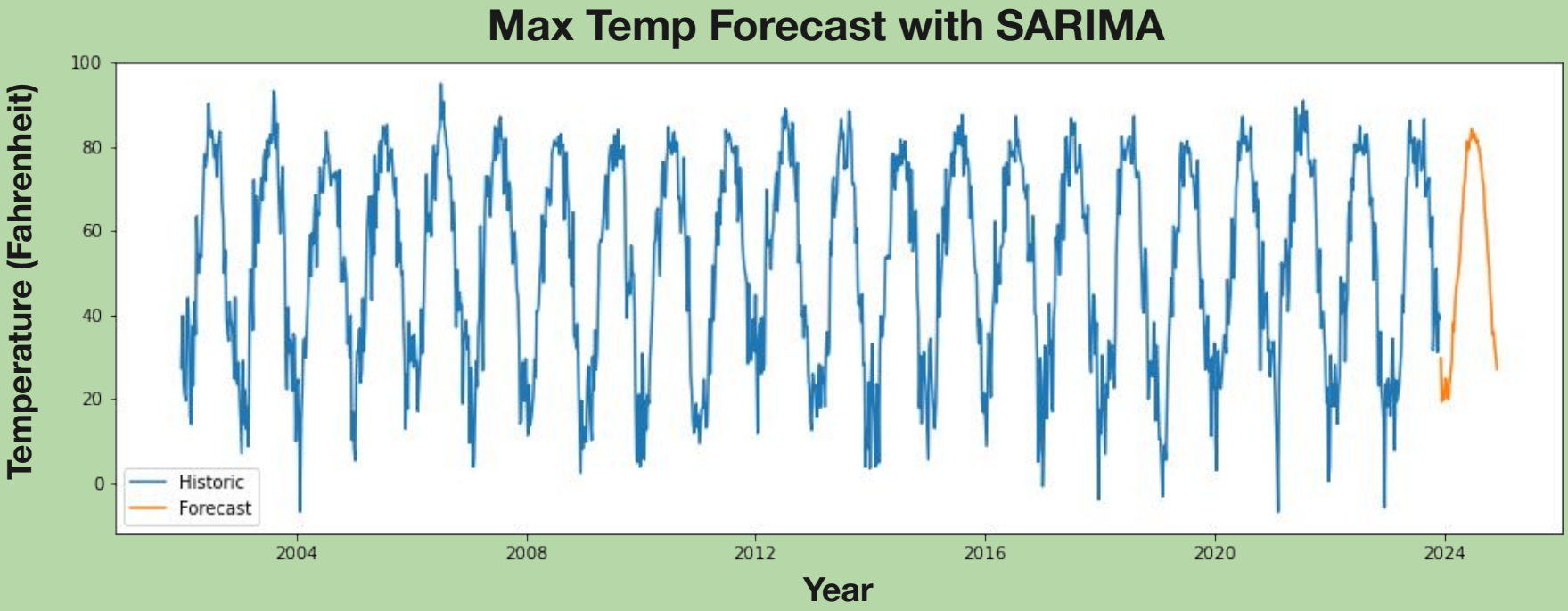
Analysis

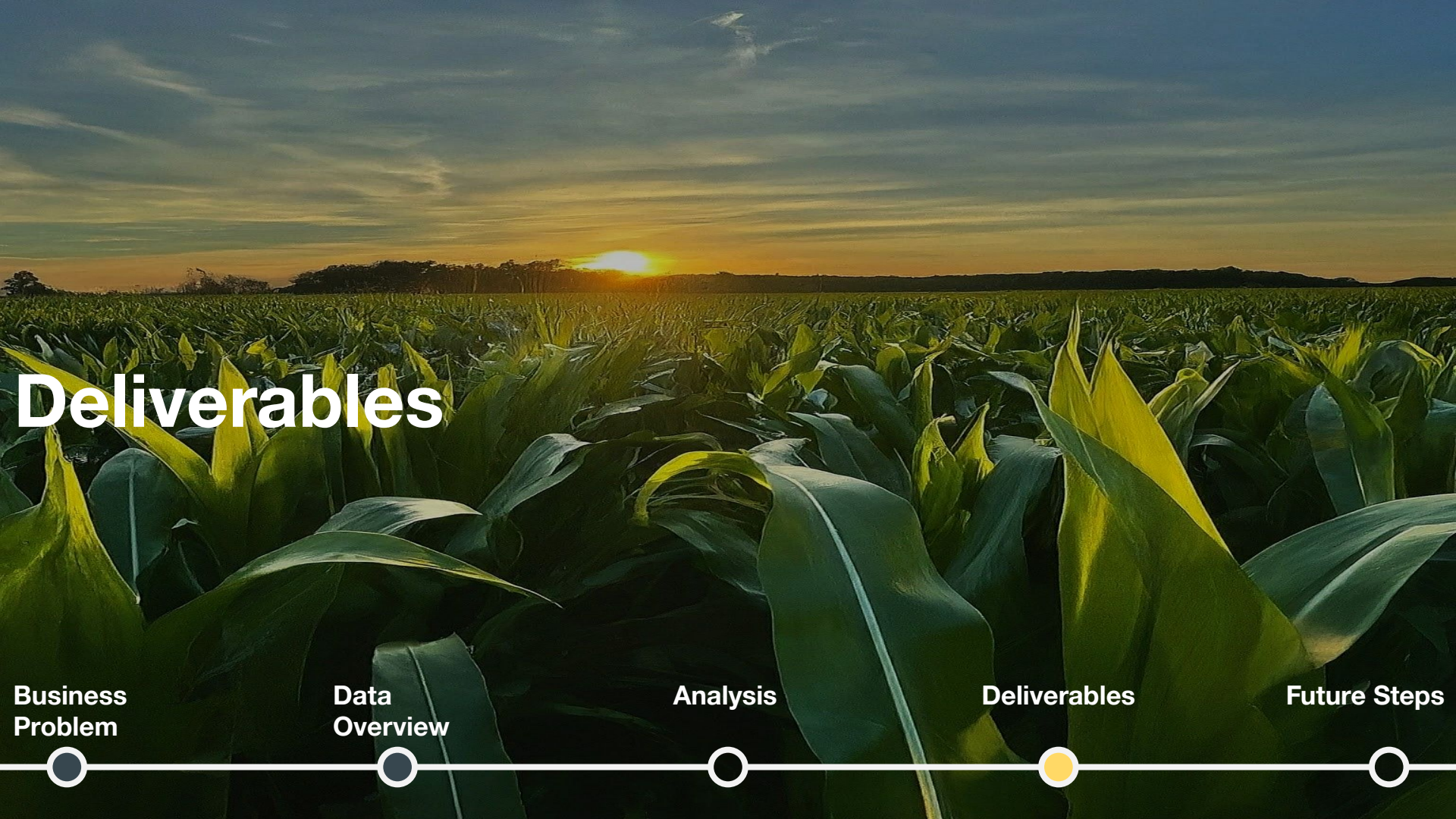

Seasonal Pattern of Growth Degree Days
Growth Degree Days
0
5
10
15
20
25
2005
2010
2015
2020
Year

Analysis


Max Temp Shifted One Week (2002)
Temperature (Fahrenheit)
90
80
70
60
50
40
30
20
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
Month
True
Shifted

Analysis

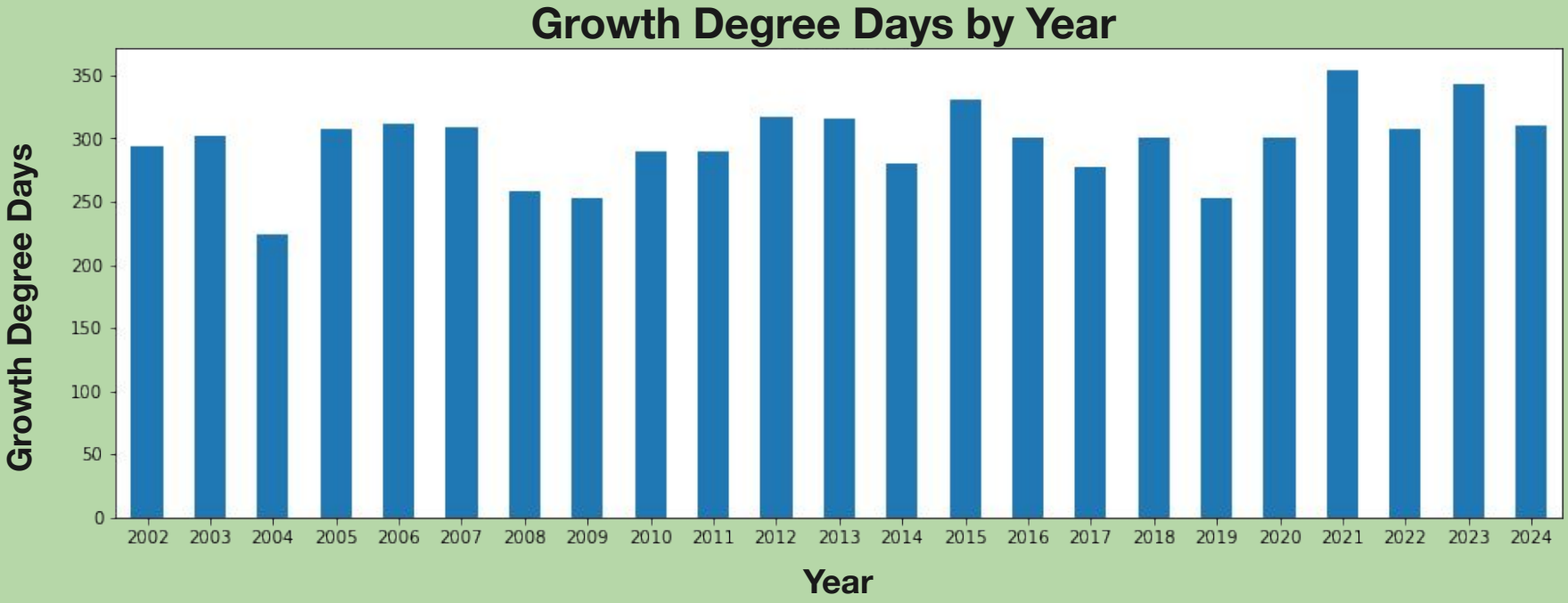

Max Temp Forecast with SARIMA
Temperature (Fahrenheit)
100
80
60
40
20
0
Historic
Forecast
2004
2008
2012
2016
2020
2024
Year



Deliverables

Business Problem | Data Overview | Analysis | Deliverables | Future Steps

Deliverables



Future Steps

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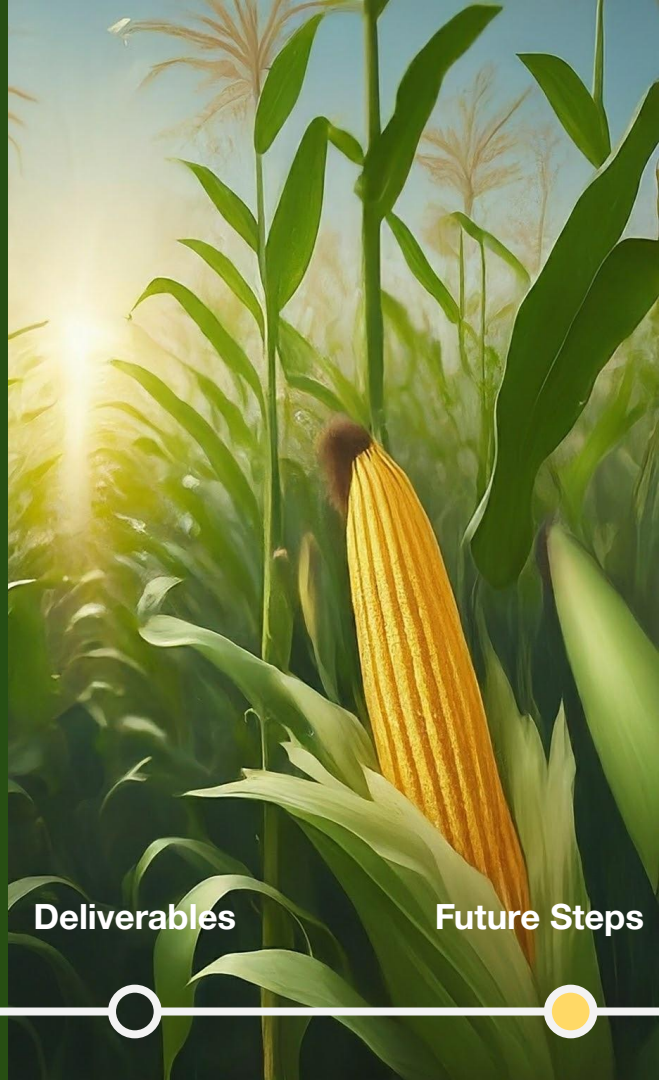
Future Steps

- ❑ Add more Weather Stations
- ❑ Compare with USDA Corn Yields
- ❑ Integrate other weather features



Questions?

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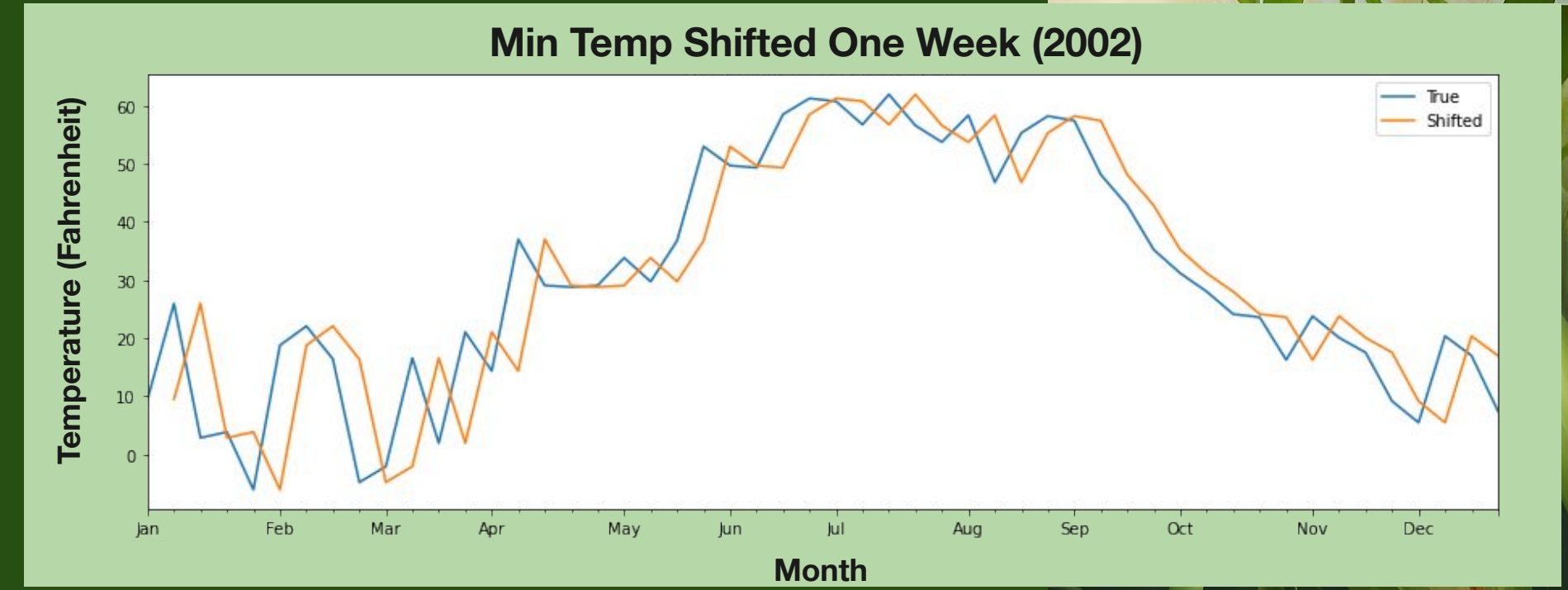
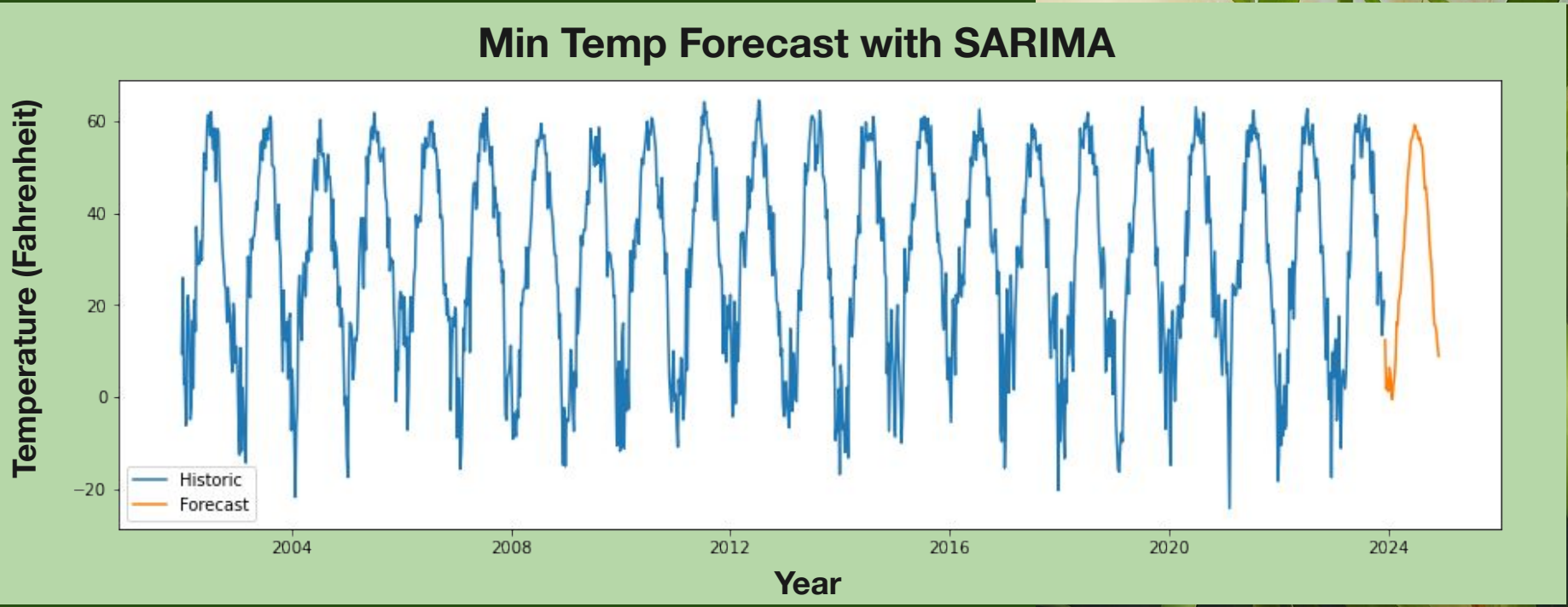
Email: jtbpilgrim@gmail.com

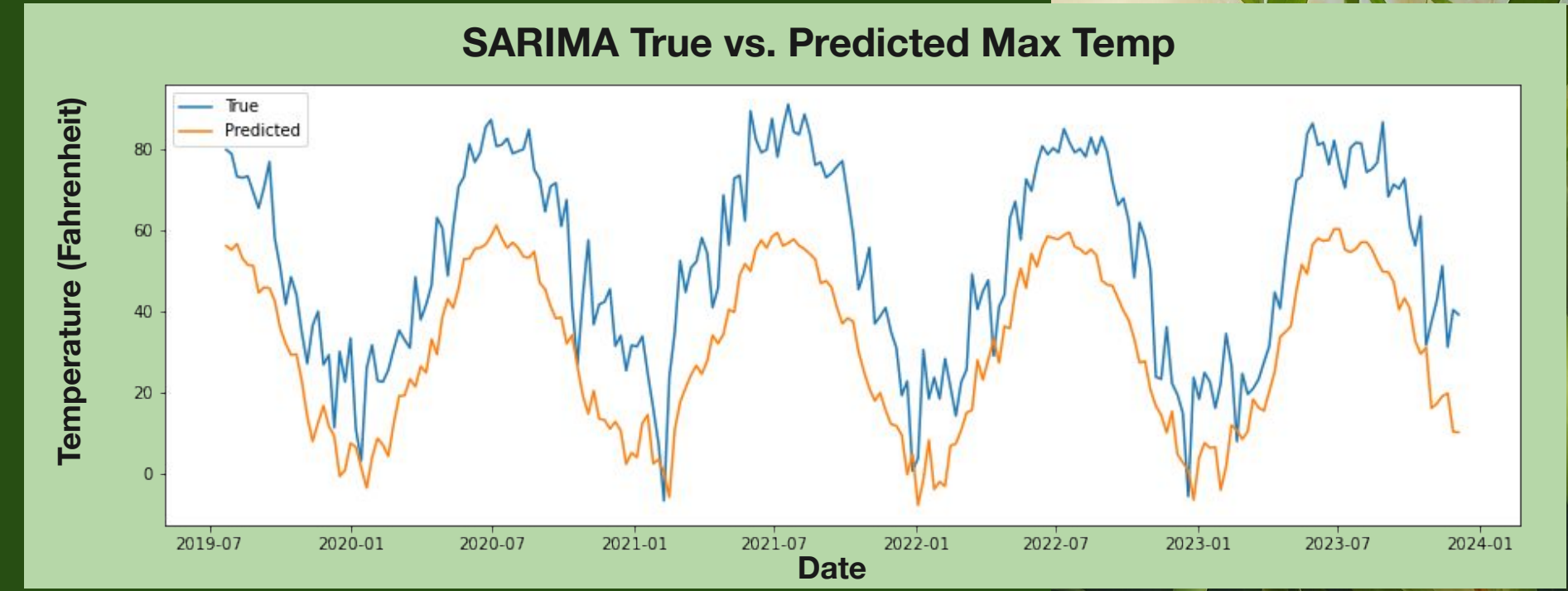
Appendix


Min Temp Shifted One Week (2002)
Temperature (Fahrenheit)
60
50
40
30
20
10
0
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
Month
True
Shifted

Appendix


Min Temp Forecast with SARIMA
Temperature (Fahrenheit)
60
40
20
0
−20
Historic
Forecast
2004
2008
2012
2016
2020
2024
Year

Appendix


SARIMA True vs. Predicted Max Temp
True
Predicted
Temperature (Fahrenheit)
80
60
40
20
0
2019-07
2020-01
2020-07
2021-01
2021-07
2022-01
2022-07
2023-01
2023-07
2024-01
Date