

# **WHY DO FLIGHTS KEEP GETTING DELAYED? VISUALIZING THE HIDDEN PATTERNS OF U.S AIR TRAVEL.**

**AN INTERACTIVE DATA ANALYSIS OF  
FLIGHT DELAYS & CANCELLATIONS IN  
THE UNITED STATES**

**BY - PAVAN KALYAN  
MUNIYAPPAP@WIT.EDU  
DATA6100 Data Visualization  
PROFESSOR: JOHN DONOVAN  
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# SECTION A

## TARGET AUDIENCE & OBJECTIVES

**FLIGHT DELAYS AND CANCELLATIONS ARE FRUSTRATING EXPERIENCES THAT AFFECT MILLIONS OF PEOPLE EVERY YEAR. WHILE TRAVELERS OFTEN BLAME THE AIRLINE, DELAYS CAN BE CAUSED BY MANY FACTORS LIKE WEATHER, AIR TRAFFIC CONGESTION, OR EVEN ANOTHER DELAYED PLANE ARRIVING LATE. THIS PROJECT IS DESIGNED TO EXPLORE THOSE PATTERNS AND MAKE THEM EASY TO UNDERSTAND.**

### TARGET AUDIENCE:

**THE MAIN AUDIENCE FOR THIS PROJECT WILL BE:**

- **FREQUENT TRAVELERS WHO WANT TO PLAN THEIR TRIPS MORE EFFECTIVELY.**
- **AIRLINE PASSENGERS WHO WANT TO KNOW WHICH AIRLINES AND AIRPORTS ARE MORE RELIABLE.**
- **POLICY MAKERS AND AIRPORT AUTHORITIES WHO ARE INTERESTED IN REDUCING SYSTEMIC INEFFICIENCIES.**
- **JOURNALISTS AND RESEARCHERS WHO COVER TRANSPORTATION AND CONSUMER RIGHTS.**

### OBJECTIVES:

**THE PROJECT'S GOAL IS TO ANALYZE FLIGHT DELAY AND CANCELLATION DATA ACROSS U.S. AIRPORTS AND AIRLINES TO UNCOVER PATTERNS THAT ARE USUALLY HIDDEN IN RAW NUMBERS. SPECIFICALLY, THIS PROJECT WILL:**

- SHOW WHEN DELAYS ARE MOST COMMON (TIME OF DAY, DAY OF WEEK, SEASON).**
- IDENTIFY WHICH AIRPORTS AND AIRLINES EXPERIENCE THE MOST DELAYS.**
- COMPARE THE MAIN CAUSES OF DELAYS WEATHER, AIRLINE ISSUES, LATE AIRCRAFT, ETC.**

## **SECTION B**

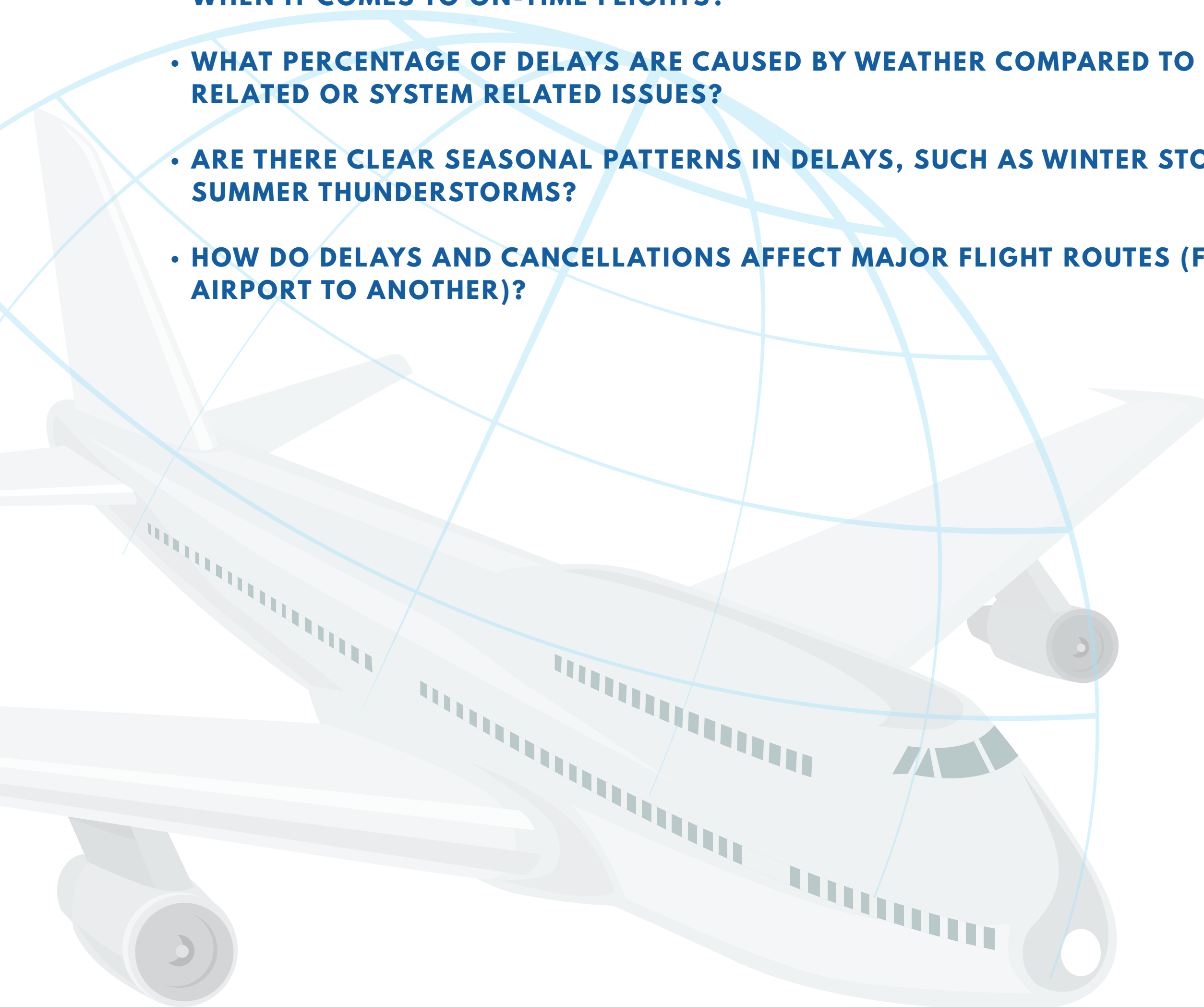
### **QUESTION AND SUPPORTING QUESTIONS**

#### **MAIN FOCUS QUESTION:**

- **WHAT ARE THE KEY FACTORS DRIVING FLIGHT DELAYS AND CANCELLATIONS IN THE U.S., AND HOW DO THEY VARY ACROSS TIME, LOCATION, AND AIRLINE?**

#### **SUPPORTING QUESTIONS:**

- **WHICH AIRPORTS IN THE U.S. HAVE THE HIGHEST RATES OF DELAYS AND CANCELLATIONS?**
- **HOW DO DELAYS VARY BY TIME OF DAY AND DAY OF THE WEEK?**
- **WHICH AIRLINES CONSISTENTLY PERFORM BEST, AND WHICH PERFORM WORST, WHEN IT COMES TO ON-TIME FLIGHTS?**
- **WHAT PERCENTAGE OF DELAYS ARE CAUSED BY WEATHER COMPARED TO AIRLINE RELATED OR SYSTEM RELATED ISSUES?**
- **ARE THERE CLEAR SEASONAL PATTERNS IN DELAYS, SUCH AS WINTER STORMS OR SUMMER THUNDERSTORMS?**
- **HOW DO DELAYS AND CANCELLATIONS AFFECT MAJOR FLIGHT ROUTES (FROM ONE AIRPORT TO ANOTHER)?**



# SECTION C

## DATA NEEDS AND SOURCES

### I WILL NEED DETAILED FLIGHT-LEVEL DATA THAT INCLUDES:

- SCHEDULED AND ACTUAL DEPARTURE AND ARRIVAL TIMES.
- DELAY LENGTH IN MINUTES.
- REASONS FOR DELAY (WEATHER, CARRIER, NAS, SECURITY, LATE AIRCRAFT).
- CANCELLATIONS AND DIVERSIONS.
- FLIGHT ORIGIN AND DESTINATION AIRPORTS (WITH LOCATION AND STATE).

### DATA SOURCES:

**1 = BUREAU OF TRANSPORTATION STATISTICS (BTS) ON TIME PERFORMANCE DATA**

- THIS IS THE OFFICIAL GOVERNMENT SOURCE FOR U.S. FLIGHT DATA.
- DATASET INCLUDES DELAY CAUSES AND CANCELLATION CODES.
- BTS ON-TIME PERFORMANCE DATA

**LINK - [DATA LINK](#)**

**2 = KAGGLE MIRROR DATASETS**

- US FLIGHT DELAYS DATASET (2015)
- FLIGHT DELAYS & CANCELLATIONS 2019–2023

**LINK- [US FLIGHT DELAYS DATASET \(2015\) DATA LINK](#)**

**LINK - [FLIGHT DELAYS & CANCELLATIONS 2019–2023 DATA LINK](#)**



# SECTION D

## PROJECT SUMMARY

**THIS PROJECT WILL EXPLORE THE PATTERNS AND CAUSES OF U.S. FLIGHT DELAYS AND CANCELLATIONS BY ANALYZING LARGE SCALE FEDERAL AVIATION DATASETS. MY GOAL IS TO TRANSLATE COMPLEX DATA INTO CLEAR, ENGAGING VISUALIZATIONS THAT REVEAL WHEN AND WHERE DELAYS ARE MOST LIKELY TO OCCUR, WHICH AIRLINES AND AIRPORTS STRUGGLE THE MOST, AND WHAT ROLE WEATHER OR OPERATIONAL ISSUES PLAY IN THE PROBLEM. THE PRIMARY AUDIENCE FOR THIS PROJECT WILL BE EVERYDAY TRAVELERS WHO WANT TO MAKE SMARTER CHOICES WHEN BOOKING FLIGHTS, AS WELL AS POLICYMAKERS AND AIRPORT AUTHORITIES WHO NEED RELIABLE INSIGHTS TO IMPROVE EFFICIENCY IN THE AIR TRAVEL SYSTEM. BY PROVIDING THIS INFORMATION IN A SIMPLE, VISUAL FORMAT, THE PROJECT AIMS TO REDUCE CONFUSION, EMPOWER TRAVELERS WITH KNOWLEDGE, AND SUPPORT DECISION MAKERS IN MAKING CHANGES THAT LEAD TO A SMOOTHER TRAVEL EXPERIENCE.**

- **WHAT: ANALYZING U.S. FLIGHT DELAYS & CANCELLATIONS.**
- **WHO: TRAVELERS + POLICYMAKERS.**
- **WHY: TO IMPROVE TRAVEL PLANNING AND SYSTEM EFFICIENCY.**

