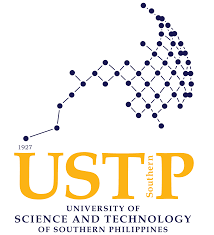
**ONE PERFORMANCE INNOVATIVE TASK**

**“Enhancing Emergency Response in Oroquieta City Public Transport: The Role of Real-Time Passenger Information Systems.”**

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In Partial Fulfillment of the Requirements in

Department of Information Technology

University of Science and Technology of Southern Philippines

Oroquieta City Campus

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**PROBLEM ANALYSIS REPORT**

**Introduction**

Public transportation is a vital part of daily life in Oroquieta City, with countless individuals depending on it to get where they need to go. At the heart of this system is the city’s transport terminal, where efficient and safe operations are essential. However, one serious issue has come to light: the lack of real-time access to passenger information. In emergencies like accidents or medical incidents knowing who’s on board and how to reach their loved ones can save lives. Unfortunately, the current system doesn’t provide this kind of critical information fast enough. This report takes a closer look at the gaps in the system, what’s causing them, and what steps could help ensure better safety for everyone who uses public transport in the city.

**Community Problem Description**

Right now, Oroquieta City’s transport terminal doesn’t have a dependable system for recording and sharing up-to-date passenger details. This creates several challenges:

* **No master list of passengers**: Most vehicles don’t keep an accessible or complete list of their passengers. During emergencies, this forces responders to gather names and information manually, which wastes precious time.
* **Missing contact information:** Even when there are passenger lists, they usually don’t include phone numbers or emergency contacts, which makes it difficult to notify families quickly.
* **Different systems, different results:** Each transport operator seems to have their own way of collecting passenger data. Without a standard process, it’s hard to share or verify information accurately.
* **Outdated or missing technology:** Many transport groups still rely on paper or basic tools, lacking the digital systems needed to track passenger data in real time or send it where it’s needed quickly.

**Relevance and Impact Assessment**

1. **Rescue delays:** Without a clear record of passengers, emergency teams may struggle to respond quickly or appropriately and possibly putting more lives at risk.
2. **Emotional toll on families**: Loved ones are often left in the dark after an incident, creating unnecessary stress and panic.
3. **Misuse of emergency resources**: Emergency services may be deployed inefficiently if there’s no clear understanding of how many people were affected or where they are.
4. **Harder investigations**: Looking into the cause of an accident or incident becomes much harder without accurate data on who was involved.
5. **Public concern**: If people don’t feel safe using public transport, they may stop relying on it—which could harm the entire system’s credibility and effectiveness.

**Conclusion and Recommendations**

Improving passenger safety and emergency response in Oroquieta City’s terminal requires real, coordinated change. The following steps can help address the problem:

1. **Create a central passenger information platform**: This system should collect and store essential details that can be accessed quickly during emergencies. Strong privacy protections should be built in.
2. **Make data collection uniform:** All transport operators should follow the same process for gathering passenger details, ensuring the information is reliable and easy to share.
3. **Upgrade technology:** Equip operators with the devices and software they need to gather and share passenger information efficiently and securely.
4. **Strengthen ties with emergency services:** Build direct, streamlined communication between the passenger database and emergency responders so they can act fast when needed.
5. **Raise awareness and offer training:** Teach transport staff how to use the new system, and help the public understand how sharing their information helps protect them during emergencies.

By making these improvements, Oroquieta City can build a safer and more reliable public transport system, one that passengers and their families can trust, no matter what happens.

**TECHNOLOGICAL SOLUTION PROPOSAL**

**Bus Passenger Management System: A Python-Based Console Application**

**I. Overview of the Proposed Solution**

This proposal outlines a Python-based console application designed for managing passenger information on a bus route. The system, named “Bus Passenger Management,” provides a basic yet functional interface for adding, viewing, and removing passenger records. This lightweight tool is suitable for educational purposes, particularly as a project for first-year BSIT students, while simultaneously addressing the need for a simple, organized passenger tracking system.

The system’s key functionalities include:

* Adding new passenger records (name, age, contact number, gender).
* Viewing a list of all registered passengers.
* Removing passenger records.

While limited to a text-based interface, the system prioritizes ease of use and data management efficiency.

**II. Algorithms and Data Structures Used**

Although the application is relatively simple, it incorporates fundamental programming logic and data structures to manage passenger data effectively.

**A. Core Features and Algorithms**

**1.** **Passenger Data Input**: The system prompts the user to enter passenger details (name, age, contact number, gender). Input validation checks ensure data integrity.

**2. Data Storage**: Passenger data is stored persistently in a text file ( Passenger.txt ) using a simple delimiter-separated format.

**3. Passenger List Management**: The system uses file I/O to read, write, and update the passenger list. A linear search is used for passenger removal.

**B. Key Data Structures**

**1. Passenger Record (String):** Each passenger is represented as a string with fields separated by a pipe ( | ) symbol:  Name|Date|Contact Number|Age|Gender

**2.** **Passenger List (List of Strings):** The passenger list is stored as a list of these strings.

**III. Minimum Viable Product (MVP) Prototype**

The following Python code implements the core functionalities of the Bus Passenger Management System:

Import os

Import datetime

PASSENGER\_FILE = “Passenger.txt”

Def clear\_screen():

Os.system(‘cls’ if os.name == ‘nt’ else ‘clear’)

Def display\_menu():

Clear\_screen()

Print(“-“ \* 30)

Print(f”{‘Bus-001’:^30}”)

Print(“-“ \* 30)

Print(“{:>15} [1] Add Passenger”.format(“”))

Print(“{:>15} [2] View Passenger List”.format(“”))

Print(“{:>15} [3] Remove Passenger”.format(“”))

Print(“{:>15} [4] Exit”.format(“”))

Print(“-“ \* 30)

Def get\_validated\_input(prompt, validator):

While True:

Value = input(prompt)

If validator(value):

Return value

Print(“Invalid input. Please try again.”)

Def is\_valid\_name(name):

Return name.strip() and not any(char.isdigit() for char in name)

Def is\_valid\_age(age\_str):

Try:

Age = int(age\_str)

Return 0 <= age <= 120

Except ValueError:

Return False

Def is\_valid\_contact(contact):

Return contact.isdigit() and len(contact) >= 7

Def add\_passenger():

Name = get\_validated\_input(“Enter passenger name: “, is\_valid\_name)

Age = get\_validated\_input(“Enter age: “, is\_valid\_age)

Contact = get\_validated\_input(“Enter contact number: “, is\_valid\_contact)

Gender = get\_validated\_input(“Enter gender (M/F/O): “, lambda x: x.upper() in (‘M’, ‘F’, ‘O’))

If gender.upper() == ‘O’:

Gender = input(“Specify other gender: “)

Else:

Gender = “Male” if gender.upper() == “M” else “Female”

Date = datetime.datetime.now().strftime(“%d-%m-%Y, %H:%M:%S”)

Passenger\_data = f”{name}|{date}|{contact}|{age}|{gender}”

With open(PASSENGER\_FILE, “a”) as f:

f.write(passenger\_data + “\n”)

print(“Passenger added successfully!”)

def view\_passengers():

try:

with open(PASSENGER\_FILE, “r”) as f:

passengers = f.readlines()

except FileNotFoundError:

print(“No passengers found.”)

return

if not passengers:

print(“No passengers found.”)

return

print(f”{‘No.’:<4} {‘Name’:<20} {‘Date’:<19} {‘Contact’:<15} {‘Age’:<5} {‘Gender’}”)

print(“-“ \* 70)

for I, p in enumerate(passengers):

name, date, contact, age, gender = p.strip().split(“|”)

print(f”{i+1:<4} {name:<20} {date:<19} {contact:<15} {age:<5} {gender}”)

print(“-“ \* 70)

def remove\_passenger():

view\_passengers()

try:

choice = int(input(“Enter passenger number to remove (0 to cancel): “)) – 1

if choice == -1:

return

with open(PASSENGER\_FILE, “r”) as f:

passengers = f.readlines()

if 0 <= choice < len(passengers):

del passengers[choice]

with open(PASSENGER\_FILE, “w”) as f:

f.writelines(passengers)

print(“Passenger removed successfully!”)

else:

print(“Invalid passenger number.”)

except ValueError:

print(“Invalid input.”)

while True:

display\_menu()

choice = input(“Enter your choice: “)

if choice == “1”:

add\_passenger()

elif choice == “2”:

view\_passengers()

elif choice == “3”:

remove\_passenger()

elif choice == “4”:

print(“Thank you for using the program!”)

break

else:

print(“Invalid choice. Please try again.”)

**IV. Implementation Feasibility**

**A. Technical Feasibility**

* Programming Language: Python 3.x
* Environment: Runs on any system with a Python interpreter (Windows, macOS, Linux).
* Dependencies: No external libraries are strictly required;  datetime  is used for timestamping.
* Storage: Simple file-based storage ( Passenger.txt ). No database or internet access is needed.

**B. Educational and Operational Feasibility**

* + Target Developers: First-year BSIT students learning Python programming fundamentals.
  + Ease of Use: Designed with a simple menu-driven interface and clear prompts.
  + Training and Support: Minimal training is required. Basic instructions can be included within the application or in a separate guide.

**C. Limitations**

* + No real-time updates or multi-user access.
  + Manual data entry for all passenger information.
  + Limited data visualization (text-based output only).

Despite these limitations, the application provides a functional system for managing passenger data and serves as a valuable learning experience for students.

**V. Conclusion**

The Bus Passenger Management System offers a practical and feasible solution for tracking passenger information using core Python programming concepts. Its simplicity makes it ideal for educational purposes and provides a foundation for future enhancements, such as a graphical user interface or integration with more advanced data management systems. The system addresses a real-world need for organized passenger tracking in a straightforward and accessible manner.

**STS IMPACT ASSESSMENT REPORT**

**Introduction**

Oroquieta City’s public transportation system relies heavily on its transport terminal. However, the current lack of a real-time passenger information system poses significant risks to passenger safety and efficient emergency response. This report assesses the societal, ethical, and environmental implications of implementing a centralized digital passenger information system, justifying the proposed solution from a Science, Technology, and Society (STS) perspective.

**Societal, Ethical, and Environmental Implications**

1. **Societal Implications**
   1. **Enhanced Passenger Safety:** A centralized system dramatically improves emergency response times by providing immediate access to passenger information during accidents or medical emergencies. This directly enhances passenger safety and reduces potential loss of life.
   2. **Improved Emergency Response Efficiency:**  Real-time access to passenger details allows emergency services to allocate resources more effectively, reducing response times and improving the overall efficiency of rescue operations.
   3. **Reduced Anxiety and Uncertainty for Families:** Rapid notification of families in emergencies reduces stress and uncertainty during critical situations, providing crucial emotional support.
   4. **Increased Public Trust and Confidence:** A demonstrable commitment to passenger safety through technological improvements enhances public trust and confidence in the city’s public transportation system.
2. **Ethical Implications**
   1. **Data Privacy and Security**: The system must comply with the Data Privacy Act of 2012. Robust security measures are crucial to protect passenger data from unauthorized access, misuse, or breaches. Clear and transparent data handling policies must be established and communicated to passengers.
   2. **Informed Consent:** Passengers must provide informed consent for the collection and use of their data. The system should clearly articulate the purpose of data collection and how it will be used to ensure transparency and build trust.
   3. **Data Minimization:** Only essential passenger information (name, contact information, potentially seat number) should be collected. The system should avoid collecting unnecessary or sensitive data.

1. **Environmental Implications**

**1. Reduced Paper Consumption:** The digital system eliminates the need for paper-based passenger manifests, contributing to environmental sustainability.

**Justification of the Technological Solution’s Benefits**

The proposed passenger information system offers significant benefits:

1. **Enhanced Safety:**  This is the primary driver, directly addressing the core problem of delayed and inefficient emergency response.
2. **Improved Efficiency:** Streamlined data collection and access improve operational efficiency for both transport operators and emergency services.
3. **Increased Transparency and Accountability:**  The system promotes transparency and accountability within the public transportation system.
4. **Cost Savings (Long-Term):** While initial investment is required, the system can lead to long-term cost savings through improved efficiency and reduced emergency response costs.
5. **Ethical Compliance:**  The system prioritizes data privacy and security, ensuring ethical compliance with relevant laws.
6. **Environmental Sustainability:** Reduced paper consumption contributes to environmental sustainability.

**Conclusion**

From an STS perspective, the proposed passenger information system offers substantial societal benefits, primarily by improving passenger safety and the efficiency of emergency response. Addressing ethical concerns through robust data privacy and security measures is paramount. The system represents a strategic investment in enhancing the safety and reliability of Oroquieta City’s public transportation system, fostering trust and confidence among its users.