

A Review on Intelligent Distribution for Passenger Service Resources in Airport Terminal Building

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Abstract: Airport terminal is a kind of important resource. It plays an vital role in transportation for people and goods. Ensuring scheduled flight security and punctual is a basic requirement of civil aviation. In the premise that existing service resources unchanged, intelligent distribution and dispatch for passenger service resources in airport terminal building is an effective way to solve problems of delays for passengers. To study passenger departure processes in airport terminals, improve the operation efficiency, service quality and reduce delay, a research on intelligent distribution for passenger service resources is developed using data integration methods, flow prediction method and intelligent simulation optimization algorithm.

1. Introduction:

Air travel has increased considerably in recent years, the number of passengers of China civil aviation has broken through 260 million, China has become second air transport power country because of the increase of passenger flow, To guarantee scheduled flight safe and punctual is the basic requirement of civil aviation transportation. passengers often strand for a long time in security area and check-in area. It is easy to trigger group events and bring a lot of negative effects to civil aviation transportation. Intelligent distribution for passenger service resources is the focus of the problem. The United States has started research of related theory for terminal building intelligence of distribution and scheduling. the domestic research has just started⁰⁰. At present domestic terminal mainly use vulgar methods based on the resource distribution density of flight⁰. The disadvantage of this method is Lack of accurate grasp toward passenger flow change real-time and the necessary distribution and scheduling resources scientific basis and technology. The specific performance is:

- (1) Without Allocated resources and scheduling policy decision analysis for air ticket reservation, flight scheduling, check-in, security check, boarding scheduling, baggage processing system information
- (2) Lack of methods of passengers flow quantitatively forecasting, it is difficult to distribute and schedule passenger terminal building service resources according to the change of the passenger flow.

(3) Lack of complete theoretical system for passenger terminal building service resources allocation and scheduling, it is difficult to Realize the terminal passenger services resources allocation and the intelligent scheduling

To solve above problems, describe the logical relation, information flow, resource allocation and scheduling plan between activities of passenger terminal building service process, research the coordination mechanism between passengers flow process and baggage flow process on the basis of dyeing time Petri nets; Use the three-stage activities scanning simulation strategy to establish the simulation algorithm for discrete event of passenger service process. Then use genetic algorithm to optimize the allocation of resources and scheduling plan.

2. Experimental Section

The solution process and assumptions:

Study passenger departure processes in airport terminals, model passenger service process. Fig 1 shows flow of departure passenger at airport terminal

- (1) Simulation on the logical relation, information flow, resource allocation and scheduling plan between business activities of passenger terminal building service process.
- (2) Using the genetic algorithm to optimize the allocation of resources operation time and scheduling plan.

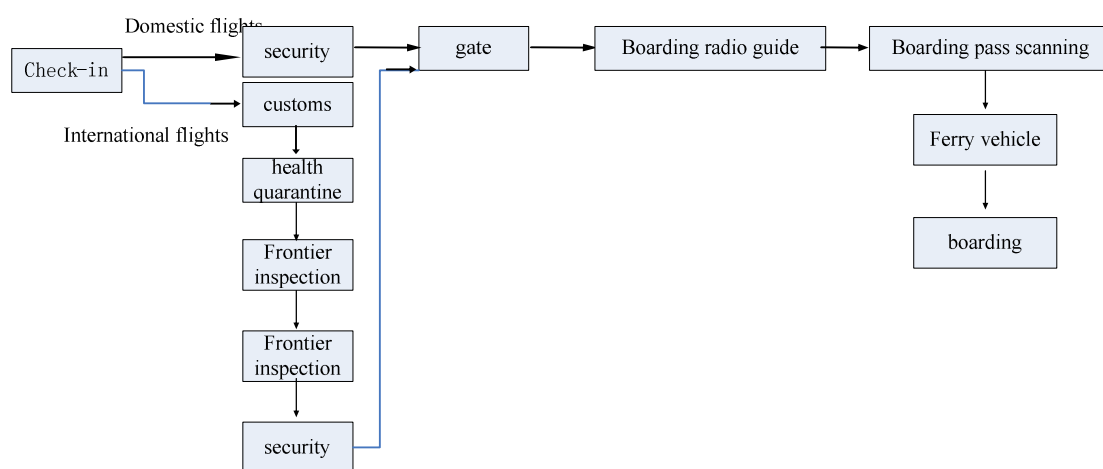


Fig 1 Flow of departure passenger at airport terminal

There are some researches worthy to study0:

H. Van Landeghem , A. Beuselinck from Department of Industrial Management, Ghent University do some research in reducing passenger boarding time in airplanes than allowed, but up to now has been largely neglected in reengineering projects. Their paper investigates dierent boarding patterns, in order to detect to what extent boarding time can be reduced. Findings indicate quite some discrepancy between current practices and optimal patterns. The results are analyzed with regard to airline objectives as well as to customer objectives, and implementation issues are considered.

Shangyao Yan, Ching-Hui Tang in Department of Civil Engineering, National Central University do some research in heuristic approach for airport gate assignments for stochastic flight delays. Their framework includes three components, a stochastic gate assignment model, a real-time assignment rule, and two penalty adjustment methods. The test results are based on data supplied by a Taiwan international airport, and show that the proposed framework performs better than the current manual assignment process and the traditional deterministic model.

Wonkyu Kim, Yonghwa Park,, Byung Jong Kim in School of Air Transport, Transportation and Logistics, Hankuk Aviation University do some research in estimating hourly variations in passenger volume at airports using dwelling time distributions. They use a mathematical model using a probability density function of the terminal dwelling time distribution is developed to estimate the number of passengers arriving at an airport terminal at various times. A two-way ANOVA that tests the effects on different airports and access time durations were carried out, and the results showed a significant difference between terminal dwelling times among airports. The paper also provides some insight into airport terminal operation when there are significant changes to flight schedules and the introduction of new airlines.

3. Summary:

In this research, We focus on solving terminal passenger services resources allocation and scheduling of the basic theory of intelligent, through the research of intelligent terminal passenger service resources allocation and scheduling of data integration, the passenger flow forecast method The passenger terminal building service resources allocation and scheduling of intelligent simulation optimization algorithm , construct theory system on the basis on airport data integration, With the core technology of passenger flow forecast and terminal services process intelligent simulation optimization, and provide theoretical support for realizing the terminal passenger services intelligent distribution and scheduling system resources.

4. Conclusions:

- (1) Establish the Passenger service resources distribution terminal intelligent and scheduling theory system melting passenger services resources data integration methods, allocation and the intelligent scheduling, passenger flow forecast method, Passenger service process intelligent simulation optimization method.
- (2) Make passenger service resources to terminal intelligent distribution and dispatching data integration as the foundation, put forward the passenger flow terminal real-time prediction methods.
- (3) Based on the evolutionary computation theory and process simulation optimization technique, Put forward the passenger terminal building service resources allocation and the simulation of intelligent scheduling optimization algorithm.

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