

CS5811 Project Proposal: Flight Delay Prediction based on Bayesian Belief Networks

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1 Project Overview

In this project we are going to develop an iPhone app which could predict a probability that a flight will be delayed or not in a specific future time. Since we do not know how difficult it will be, we first focus on the flight between Chicago and New York, and the prediction time is a day. We will extent the limitation as development continues.

We are motivated to solve this problem because flight delays are a fairly common thing and there seems to be no good source for predicting this. Flight delays are generally only announced about an hour or so before the flight is set to takeoff and they can change unreliably. Our solution can't guarantee 100% accuracy for predicting a delay, but it will attempt to better prepare passengers for any possible delays.

1.1 Problem description

I believe that almost everyone has had a bad experience with a flight being delayed, especially being delayed for something important. According to the U.S. Department of Transportation, over 20 percent of all flights arrive late.[3] It is a major problem for the airplane company and also for us, passengers.

Most of delays are caused by three reasons. First, and most important, is weather. Half of delays are actually caused by weather[2]. Second, it could be some mechanical problem, which is mostly decided by the plane features such as the make, model, age and so on. Third, it could be caused by a scheduling problem. If the last flight is delayed, this flight could be delayed also. [1]

1.2 AI techniques

Our mainly prediction is based on these three reasons above. We plan to use Bayesian Belief Networks to compute the probability of a delay.

1.3 State of the Art

2 Tasks

2.1 Platform

iPhone app, Objective-C

Database, MySQL

Model training, Matlab or write by our own (Python or Objective-c).

Experiment, check the correctness of the prediction.

2.2 Schedule

Preparation:

GUI design, Jordon.

Data collection, Liang

Main: Both

Model construction

we are still not sure to use MathLab to train model or write our own program to implement it.

Model embedded:

Let the model work well in the iPhone app.

Integrity test:

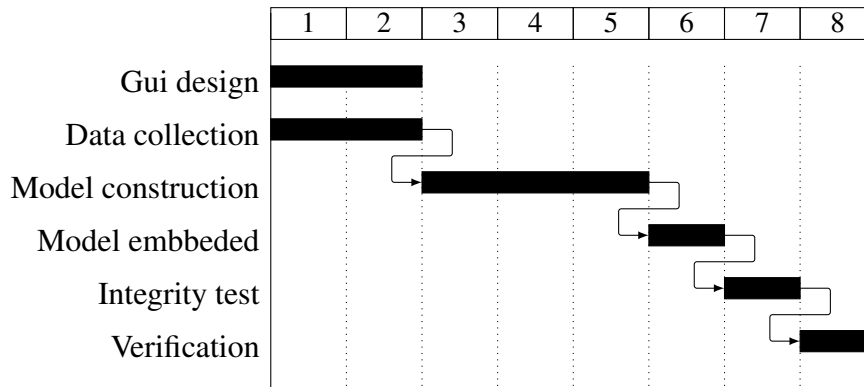
HCI improvement: Jordon

Function modification: Liang

Verification: Both

Including result analysis and report writing. The experiment is do a prediction based on the history data and check the correctness.

2.3 Arrangement



References

- [1] Sina Khanmohammadi, Chun-An Chou, Harold W. Lewis, and Doug Elias. A systems approach for scheduling aircraft landings in jfk airport. In *Fuzzy Systems (FUZZ-IEEE), 2014 IEEE International Conference on*, pages 1578–1585, July 2014.
- [2] A Klein, C. Craun, and R.S. Lee. Airport delay prediction using weather-impacted traffic index (witi) model. In *Digital Avionics Systems Conference (DASC), 2010 IEEE/AIAA 29th*, pages 2.B.1–1–2.B.1–13, Oct 2010.
- [3] Lu Zonglei, Wang Jiandong, and Zheng Guansheng. A new method to alarm large scale of flights delay based on machine learning. In *Knowledge Acquisition and Modeling, 2008. KAM '08. International Symposium on*, pages 589–592, Dec 2008.