For evolving populations the training data and the test data need not follow the same distribution. Thus,
the performance of a prediction model will deteriorate over the course of time. This requires the re-estimation of the prediction model after some time. However, in many application e.g. credit scoring
new labelled data for a re-estimation are not available due to verification latency, i.e. label delay. This makes methods highly desirable that allow for adapting a prediction model to the occurred distributional changes by using only unlabelled data.

Thus, a shift adaptation method for binary classification is presented here. The model is based on

mixture distributions where the conditional feature distribution is determined at the time where labelled
data are available, and of the unconditional feature distribution at the time where new unlabelled data
are accessible. These mixture distributions give information on the old and the new positions of subpopulations. A transition model then describes how the subpopulations of each class drifted to form the
new unconditional feature distribution. Assuming that the conditional distributions are reorganised at a
minimum of energy yields a two-step estimation procedure. First, for a given class prior distribution the
transfer of probability mass is estimated such that the energy required to obtain the new unconditional distribution by a local transfer of the old conditional distributions is a minimum. Since the optimal
solution of the resulting transportation problem measures the distance between the old and the new distributions, the change of the class prior distribution is found in a second step by solving the transportation
problem for varying class prior distributions and selecting the value for which the objective function is a minimun. Using the solution of the transportation problem, the unconditional feature distribution can be

decomposed into the conditional feature distributions, which allows a shift-adaptation of the classification
rule.

The performance of the proposed model is investigated using artificial data and a large real-world

dataset on default rates in Danish companies. The results show that the shift adaptation improves

classification results.