ISSN: 2277 – 9043
International Journal of Advanced Research in Computer Science and Electronics Engineering (IJARCSEE)
Volume 3, Issue 1, January 2014

WFMS Based Conceptual Model For Retailing Through Process Decomposition And AD-HOC Approach

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Abstract— **This paper is composed of work flow management system (wfms) with retailing. It concentrates on flexibility of wfms .To understand how a system would react with unseen situations. For every process there will be a positive and negative situation. Positive situation where it executes successfully and gives the expected result and also a negative situation where it does not fulfill the requirement. Here we work on flexibility of wfms that how it deals with negative situation. The paper fallows data driven approach. It can be done using process templates where each process having all knowledge about its sub - process. Here a process is automatically migrating from a running process to modified process definition.**
Our approach is workflow-centric because we view information regulated system with automated operation. It should integrate applications that are necessary to accomplish task.

***IndexTerms*— Ad-hocwfms, ARIMA, Integration, Wfms, worklow .**

I. INTRODUCTION

A. Workflow

A workflow consists of a sequence of concatenated (connected) steps. Emphasis is on the flow paradigm, where each step follows the precedent without delay or gap and ends just before the subsequent step May begin. It may be seen as any abstraction of real work. For control purposes, workflow may be a view on real work under a chosen aspect, thus serving as a virtual representation of actual work. The flow being described may refer to a document or product that is being transferred from one step to another.

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The term workflow is used in computer programming to capture and develop human-to-machin interaction. It captures the record and process data about the course of process. wfms is basically the automation of a business process in a whole or
a part, during which documents, information or tasks are passed from one participant to another in a set of procedural rules. It reflects the flow of information and task to be taken in order to accomplish a process.

B. Processes

A process is a more specific notion than workflow and can apply to physical or biological processes, for instance. In the context of concepts surrounding work, a process may be distinguished from a workflow by the fact that it has well-defined inputs, outputs and purposes, while the notion of workflow may apply more generally to any systematic pattern of activity (such as all processes occurring in a machine shop).

A. Planning and scheduling

In this phase we are going to plan that how a process migrates from one process to another process to full fill the requirements without disturbing whole scenarios. A plan will give description of the logically necessary and partially ordered set of activities required to accomplish a specific goal given certain starting conditions.

II. AD-HOC WFMS

Ad-hoc workflow is based on process templates. These templates provide the procedural backbone that can fill in and varied upon to accommodate the requirement of individual cases. Each case is derived from a template process that can be modified to meet specific needs. The templates do not prescribe the detail how cases are to be handled, but allow certain degree of flexibility.

Basically ad-hoc workflow requires frequent definition and modification of process, which is an error prone activity. WFMS provide flexible environments and the infrastructure to manage business processes effectively. WFMS helps automating well defined repetitive business processes and thereby reducing the execution time significantly. It provides project managers better control over monitoring the process,

allocating the resources and getting feedback.

III. OUR APPROACH

In this paper we work on the flexibility of workflow.that how a process can be modified at the run timeand perform task according to the result.Means we are working on exception.Here in this paper we are going to pridict for the product whose record is not in our database .For prediction we use Time series analysis. A time series is a sequence of observations in ordered spaced time. Observations are collected at equally spaced time interval. As we all know in time series analysis auto regression integrated moving average (ARIMA) model is best known and authenticated model for prediction. So we are using ARIMA model to predict the sailing of existing and unexisting products.

IV. METHADOLOGY

In this paper we are going to implement ad-hoc workflow in retailing. We use flexibility model of wfms to give conceptual model for retailing using "Petri net"formalism.It can be done for all the part of retailing business but we are going to implement it on its one of the module that is for procurement process means an order place by the retailer. Here we are going to predict sales of next year by analyzing the past record of the existing product. And also we are going to handle those product whose past record is not available. We say it prediction for unexisting product. It can be done by analyzing the past records of the product. This paper deals with the situation when we don't have any record for the product means the product is new. We will do it by analyzing the new product's sub category item for that quarter and perform 'Time series analysis 'on it.

A. Time Series Analysis

In Time series analysis the data is collected over time weekly values,monthly values, quaterly values, yearly values etc..Here the data is collected by following some patterns for forecast.If a timeseries has a regular pattern than the value of the series should be function of previous value.If "Y" is the target value that we are going to model and pridict "Yt" is the value of Y at time t,then our goal is to create model of the form:

Yt= f(Yt-1,Yt-2,Yt-3,……,Yt-n) +et

Yt-1 is the value of Y's previous version.

In time series for forecasting we using autoregression integrated moving avearge (ARIMA) model.

B. ARIMA Model

Arima model is introduced by [Ref 5]Box and Jenkins (1976)which includes autoregressive as well as moving average parameters, and explicitly includes differencing in the formulation of the model. Mainly we have three types of parameters in the model they are: the autoregressive parameters (*p*), the number of differencing passes (*d*), and moving average parameters (*q*). In the notation introduced by Box and Jenkins, models are summarized as ARIMA (*p, d, q*); so, for example, a model described as (0, 1, 2) means that it contains 0 (zero) autoregressive (*p*) parameters and 2 moving average (*q*) parameters which were computed for the series after it was differenced once.
In this modele we have to decide that how many autoregressive (p) and moving average (q) parameters are necessary.Means that it has some parameters and has greatest number of degrees of freedom among all the models that fits the data.generally the number of parameter p or q is equal or less than 2 very raerly it is greater than 2.

a. Estimation and Forecasting

At the next step estimation of paramerters can be done.It can be done by using function minimization procedures. This estimation of the parameters are used at the last stage means during "Forecatsting" to calculate the new value of series and confidence intervals for those predicted values. This can be done on transformed (differenced) data, before forecasting,the series needed to be integrated (Integration is the opposite of differencing).So that the forecasted values are compatible with the input data.

This auotomatic Integration of data is denoted as "I" of the ARIMA methodology.(ARIMA=Auto-Regressive Integrated moving average).

In standard ARIMA model a constant is also included. The interpretition of a constant depends upon the model that is fit.Specifically,

1.If there is no autoregressive parameters in the model,then the expected value of the constant is μ,the mean of the series.

2.If there are autoregressive parameters in tha series,then the concept represents the intercept.If the series is defferenced then constant represents the mean of the defferenced series.

For example if the series is defferenced once there is no autoregressive Parameter in the model,then the constant represents the mean of the differenced series.After calculating all the values of autoregression and moving average cofficient at each lag.Now the last step is to Forecast the next value or to forecast for the product whose past record is not available.This can be done by using:

"Forecast.method"

We do all these statistical calculation in a step by step procedure that is in the form of a workflow . Initially we will make a workflow for traditional process means how it calculate for the next value.After that we will go for process modification means a situation comes when we does not get any previous data for the pridiction.

Here is the workflow for an order placed by the retailer:

Workflow A

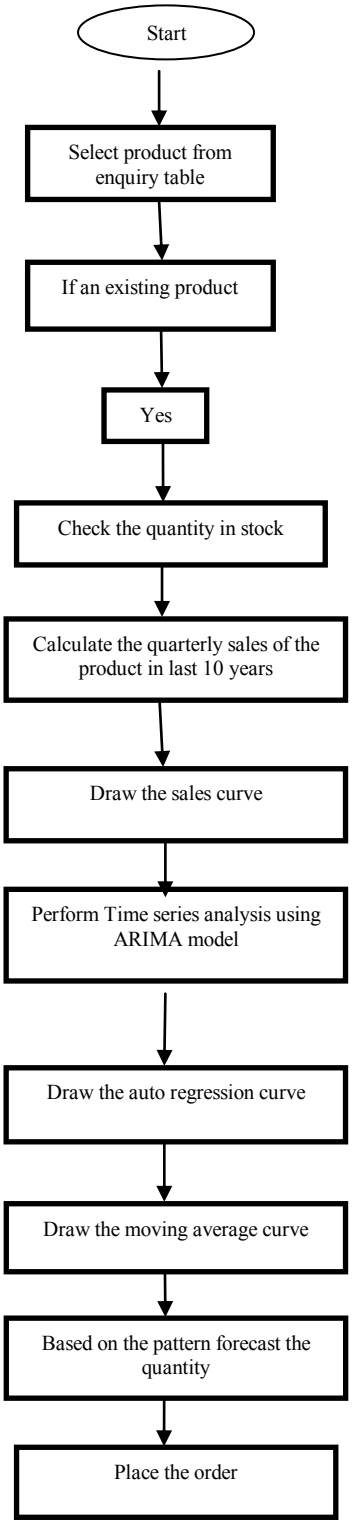

Figure 1.Original workflow

As we can see in the workflow when we have traditional forecast means we have to predict for the existing product whose previous record is present in our database. Our work is to predict for the new product whose previous record is not present .we can see our work flow better work in normal situation according to the steps but when any unseen situation come means a new product comes it splits from the original work flow make another process and work independently .After completing its steps again it integrated to the original workflow and give forecast for the new product.

Now workflow for the ad-hoc part means when the product has no entry in the data base and it has no prior data and its demand comes.At that time we deviate from the original model and perform an "And" split from the original workflow and perform som steps independently without desturbing the whole senario and again it perform join operation with our original workflow and process the data.

Workflow B

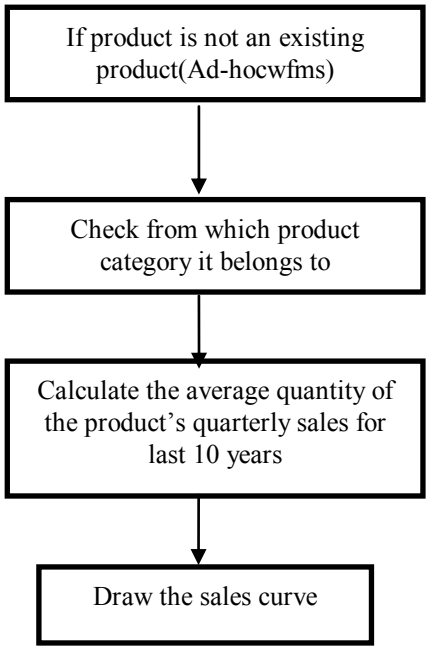

Fig. 2 which deals with the flexible part of original workflow.

After executing all these steps (steps of fig.2) by splitting from the traditional workflow (workflow A) again it integrate with original workflow for that particular process . After calculating all the value it needed to perform join operation with our traditional workflow and follow the next procedure to calculate result. It will work in this manner:

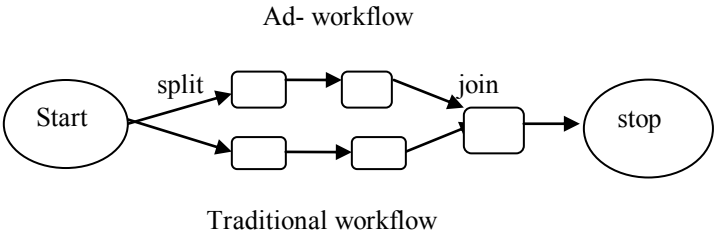

Fig. 3 shows the mechanism used.

The whole scenario will work according to the fig.3. Firstly the task can be completed in the set of some procedure by following the step. That is our traditional workflow. But when any unseen situation comes means which can't be completed through the given steps. Than after following some neccesary steps it splits from the original workflow and follow some other steps that is particular for the particular case and again it joins with the original workflow and complete the task.The particular set of steps which is used finish the paticular task is said to be flexible.

V. IMPLEMENTATION

Here is the graph of existing product where we can see that for a product whose previous record is available we calculate their autoreggresion coefficient and moving average coefficient by following steps of ARIMA model and make graph. According to that coefficient value the curve is plotted .And the forecasting can be done by the method "compute.forcast" .Acoording to that forecast value a retailer can place the next order for that particular product.

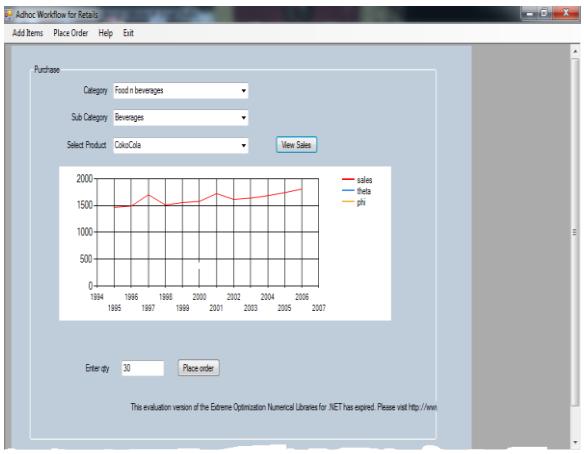

Fig. 4 shows the graph of existing product

Fig.4 is the graph for the existing product means whose previous record is available in our data base. Here in this graph we pridict the next value of the existing product by following the steps of oroginal workflow.

Now here is the graph for the new product means whose past record is not available. The new product can be differentiate by its product_ Id. If the product's product_ Id is less than Zero (0) means the product record is not in our database we provide a negtive product _id to it.after that we will search that in which category it belong and analyze its saub category result and perform action according to our work flow.on the basis of our study and calculation we present the following graph and the value to be placed by the retailer:

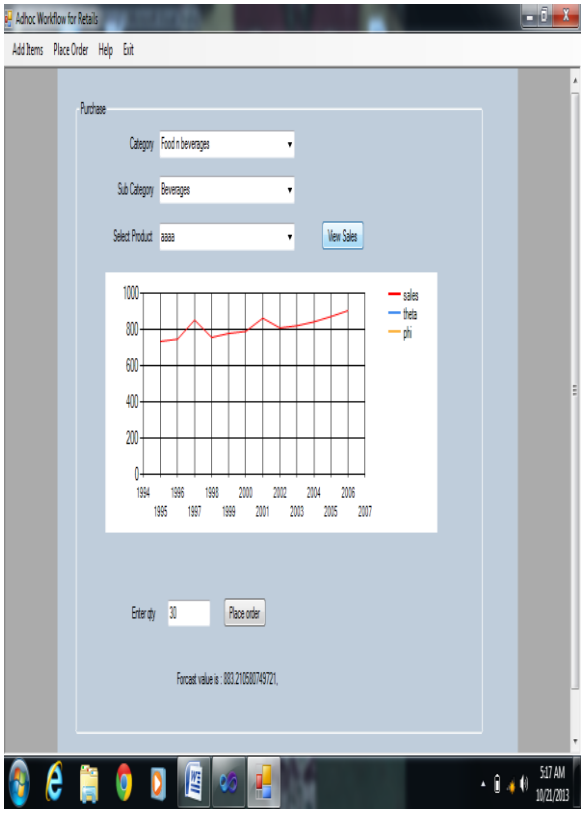

Fig.5 shows the graph for unexisting product(flexible part)

In fig. 5 we can see the graph for unexisting product suppose it is "aaa".firstly we will check in which category it belongs. Than we check its sub category products previous records and perform all the calculation and steps of **work flow B** that is Ad-hoc workflow. After that it joins with the original workflow and forecast the value for the new product that is "aaa".

VI. CONCLUSION

In this paper we present the methodology where the work can be done in steps by step by following certain rules. By following rules and the steps in ARIMA model we can easily forecast the sale for next year or for the new product whose past record is not available. By this we can also fight with any unseen situation just by making a short process. We can do and split from the original workflow and after completing the process again we can join this to the original workflow.

ACKNOWLEDGMENT

IT IS INDEED A PLEASANT OPPORTUNITY TO THANK THE ALMIGHTY GOD, MY PARENTS AND OTHERS WHO HAVE CONTRIBUTED TOWARDS THE SUCCESSFUL COMPLETION OF THIS PAPER. MY HEARTFUL THANK TO MY FRIEND ASHISH BAJPAI, WHO SUPPORTS AND ENCOURAGE ME IN ALL SITUATION.I EXTENDED MY GRATITUDE TO THOSE WHO HELPED ME IN THIS WORK AND MY FRIENDS FOR THEIR GREAT SUGGESTION IN ORDER TO MAKE IT COMPLETE SUCCESSFULLY IN TIME.

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