



MARIDES: Maritime Decision Support Automation and Intelligence for Chartering Departments of Shipping Companies



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Presentation objectives

- Overall presentation of MARIDES
 - Mainly from the point of view of the functionality offered to shipping companies
- Focus on ideas for decision support
 - Extremely difficult problem
 - Objectives in the context of MARIDES
 - New possibilities with a new tool



MARIDES – introduction

- It is a comprehensive software system for the management of a chartering department in a shipping company
- Includes the basic functionality of similar systems – standard voyage calculations and estimations, database use, etc.
- Intelligent data input
- Decision support



MARIDES – objectives – 1

- Improve chartering departments' performance
- Integrated access to functionality previously accessed through a variety of programmes
 - Communication with third parties (email, fax, telex), data input, ...
 - Voyage estimation (calculation of costs, duration, etc.), distance calculation, ...
 - Data access, static (as for vessel data) or dynamic (such as weather conditions or fuel prices), ...
- User access from any location and with different “roles”



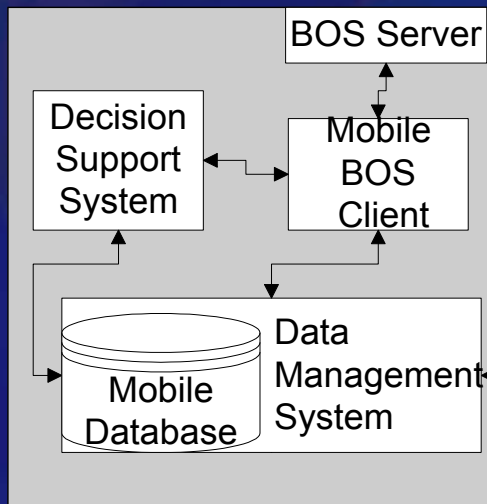
MARIDES – objectives – 2

- Automated data input
 - Many more information sources can therefore be drawn upon
- Automatic data acquisition
 - Use of the internet
- Decision support
 - Ideally, the system could automatically discover the user's best business options
 - Will be presented in most detail below

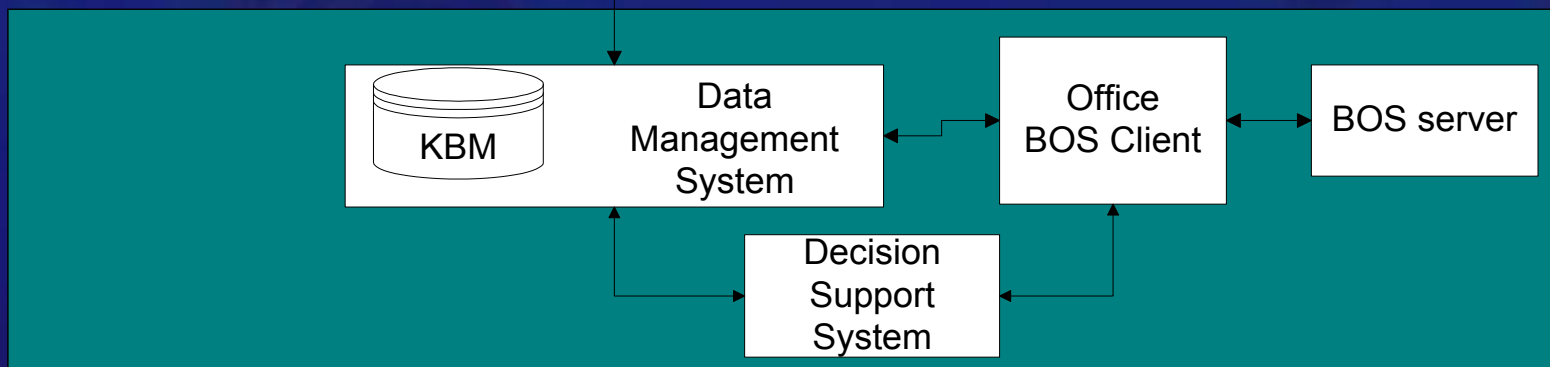
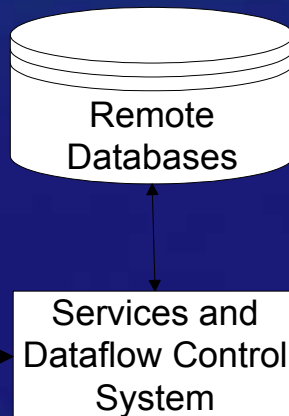
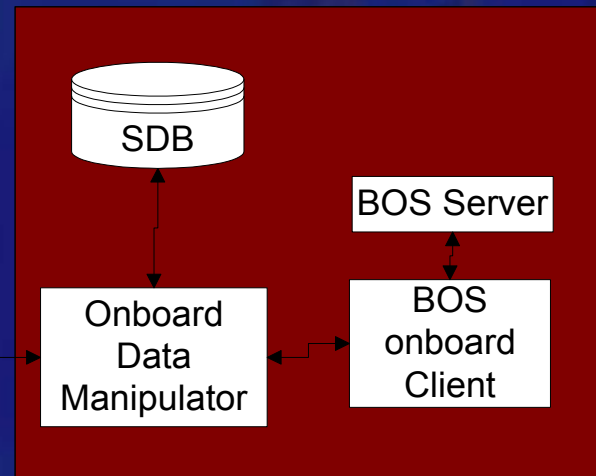


Architecture based on BOS

Mobile MARIDES system



Shipboard Application



Office MARIDES system



MARIDES GUI

- BOS – Business Operating System
- All functionality is accessible through a single, integrated environment

YTD Task Assistant (Beta 0.7 testing version)

Manage Spare Parts

Part/Description	Part Number	Lead Price	Default Account Code
Oil seal	564	200	43569932
Valve seat	345	200	76324578
Cylinder	345	200	90234576
Head gasket	345	200	32456790
Quart cover	235	200	54023859
SDNY CD	123		65409101.MTS

Actions: Add Spare Part | Edit Spare Part | Delete Spare Part | Graphical View

7 Spare Parts loaded

Test User: Chief Engineer
Infolcom Systems (Manchester)

Search: Manage Spare Parts

- Manage Spares
 - Manage Spare Parts
 - Manage Inventory
 - Manage Requisitions
 - Create Requisitions
 - Create Vessel Direct Requisitions
 - Create Requisition For Spare-Stock Items
 - Create Stores And Consumables Requisitions
 - New Requisitions
 - New Unauthorized Requisitions
 - Monitor Requisitions
- Manage Quotations
 - Create Vessel Direct RFQ
 - Send Vessel Direct RFQ
 - Enter Vessel Direct Quotation
- Manage Purchase Orders
 - Create Vessel Direct Purchase Orders
 - Issue Vessel Direct Purchase Orders
 - New Purchase Orders
 - Record Purchase Order Delivery

Context Navigator

Search:

- Vessel
 - Chiquita Deutschland
 - Component
 - ENGINE
 - Cylinder Cover
 - piston Rod with Stuffing Box
 - Chiquita Nederland
 - Chiquita Belge
 - Chiquita Schweiz
 - Chiquita Italia
 - Chiquita Scandinavia
 - Chiquita France
 - Chiquita Japan
 - Chiquita Brazil
 - Chiquita Eke
 - Chiquita Joy
 - Country L
 - Equity L
 - France L
 - Chiquita Bremen
 - Chiquita Rootstock

VESSEL PARTICULARS

Name: _____

Built Date: _____

Inspection Date: _____

Ex Name: _____

DWT: _____

Port of registry: _____

Flag: _____

Maximum Speed: _____

Ballast Speed: _____

Loaded Speed: _____

Ballast Consumption: _____

Loaded Consumption: _____

Cubic Capacity (Grain): _____

Cubic Capacity (Bale): _____

LDA: _____

LBP: _____

Depth: _____

Running Cost: _____

Telex: _____

Tel: _____

E-Mail: _____

Remaining Fuel: _____

Survey Date: _____

Survey Frequency: _____

Dry Docking: _____

Type: _____

Add | Update | Delete | Close

PERFORMANCE REPORT

Date of Transaction: _____

Steaming Hours: _____

Latitude: _____

Longitude: _____

Next Port: _____

Remaining Miles: _____

Average Speed: _____

Average RPM: _____

Average Slip: _____

Course: _____

Covered Miles: _____

Wind Direction: _____

Wind Force: _____

Sea Direction: _____

Sea Height: _____

Swell: _____

Total Miles: _____

Total Average Speed: _____

Total Average RPM: _____

Total Average Slip: _____

ETA: _____

Send

Add | Update | Delete | Close

Actual Voyage Form

Company Name: _____

Departure Port: _____

Destination Port: _____

Ballast Days at Sea: _____

Loaded Days at Sea: _____

Total Days at Sea: _____

Loading Days: _____

Discharging Days: _____

Total Days at Port: _____

Total Voyage Days: _____

Total Freight: _____

Total Voyage Cost: _____

Break Even Rate: _____

Profit Loss per Tonn: _____

Net Profit/Loss: _____

Equivalent T/C: _____

Comments: _____

Ship Name: _____

Ballast Diesel Oil Consumption: _____

Loaded Diesel Oil Consumption: _____

DO Consumption in Sea: _____

Total DO Consumption: _____

Ballast FO Consumption: _____

Loaded FO Consumption: _____

Total FO Consumption: _____

Total DO Cost: _____

Total Operating Costs: _____

Total Canal Expense: _____

Comission Value: _____

Taxes Value: _____

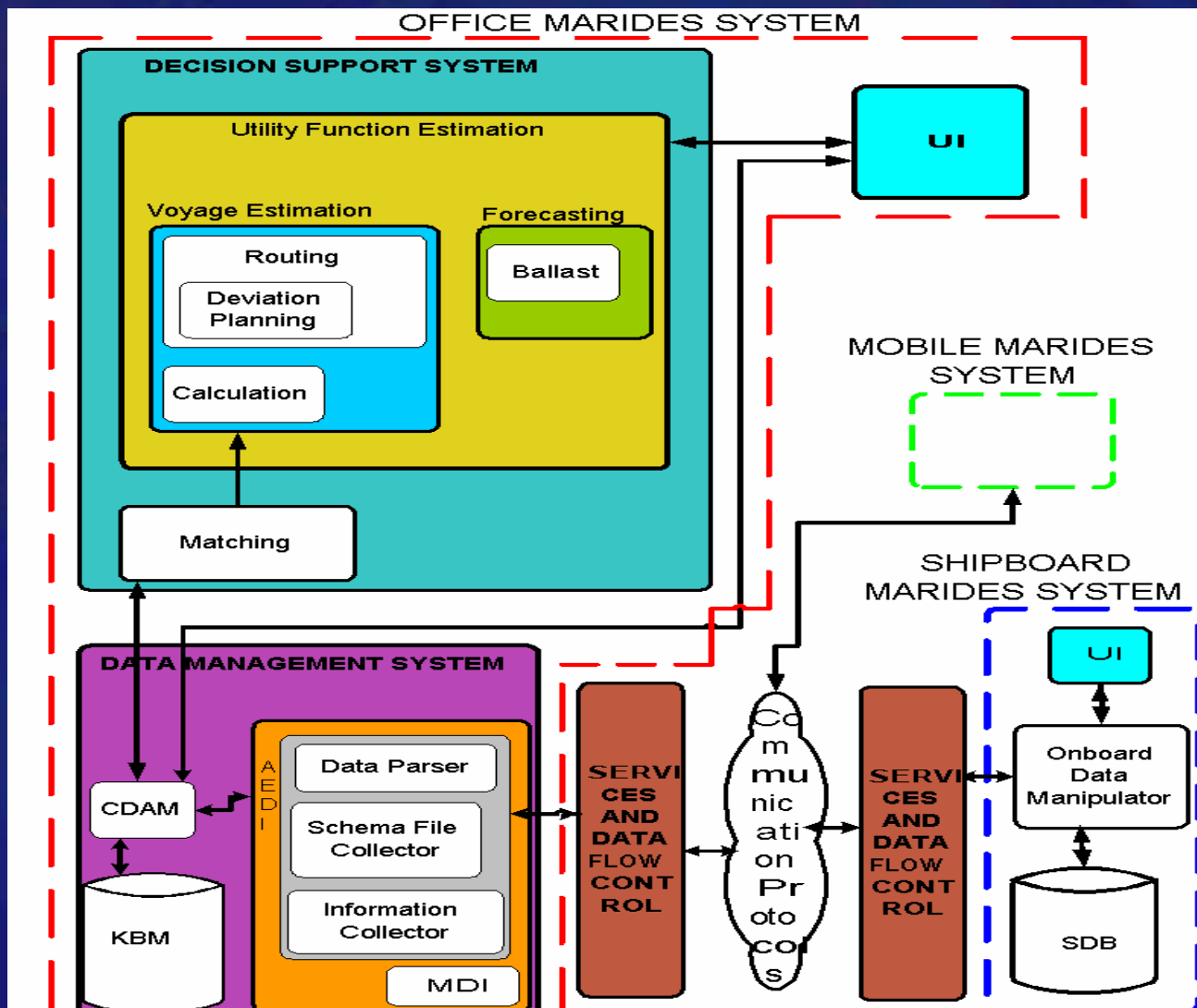
Update | Estimation | Edit

OK | Cancel | Send



Architecture

functional modules





Automatic data input

- Automatic and optionally transparent function
- Information from the internet
 - Involves creating a wrapper for each useful sight
- Information from communications: email, (OCR...)
 - Fundamentally an issue of information extraction from documents which have been composed by humans
 - Use of appropriate heuristics and statistical methods based on NLP techniques
 - Optional confirmation (examination) by user

NY CLOSING 8/2

AT OUR OPENING

KELCO	80000	N.HAWAII/INDO/SPORE	19/20/2	MS	170		
BUNGA MELAMA 4	80000	DUMAI/JFM-SK	23/2	MS	247.5		
SILVER IRIS	80000	JAMBAGAR/SPORE	20/2	MS	RNR		
PACIFIC VIRGO	80000	INDO/SKOREA	15/2	MS	RNR		
LOMBARDIA	80000	VINGATO/JAPAN	17/2	MS	225		
ELBE	80000	S.PAPAN/SKOREA	19/2	MS	237.5		
ASTRO GARHA	280000	CETHAN/USG	14/2	MS	RNR		RNR

I POSTED USD/BBL 28.50 (+) USD/EUR 0.919
 E BRENT USD/BBL 29.84 (-) YEN/EUR 107.140
 ENT APR 01 USD/BBL 28.75 (+)

PA	265000	AG/JAPAN	27/2	WS	90	FLD	EXX
NACOM TBM	80000	AG/EAST	20/2	WS	137.5		VIT
LARGE BOSS REPORTED ON SUBS EX AG NO DETS							
IENTAL OPAL	130000	SKOREA/SPORE-INDO	5/3	USD	RNR		C
ILLA SPIRIT	90000	DUMAI+INDO/SKOREA	10/2	WS	231	REPL	SK CO
...

- Various types of info. appearing, systematically or at random
 - Fitting of various patterns to each line, producing a confidence level
- Info in combinations of terms, and combinations of combinations
 - A grammar is needed, which can also handle "synonyms"
- It is common for terms which cannot be understood to appear
 - Must ignore single terms or even whole lines, but not more than is necessary
- An "easy" line could be making reference to unknown data
 - Such a well structured line can be used to enrich the system database





Automatic data input and acquisition

- Can replace human data entry for well-structured data
- Tradeoff for harder data:
 - Correctly read information saves effort
 - Mistakes require correction
- Offers more material to the Decision Support module



Decision support - 1

- *Competition monitoring*: Statistical (historic), current or even future information (position, characteristics, contracts etc. for competing vessels)
 - Possibility of automatic competitor selection based on a comparison with the user's fleet
- *Market monitoring*: Market statistics organised and presented (prices, indices, etc.)

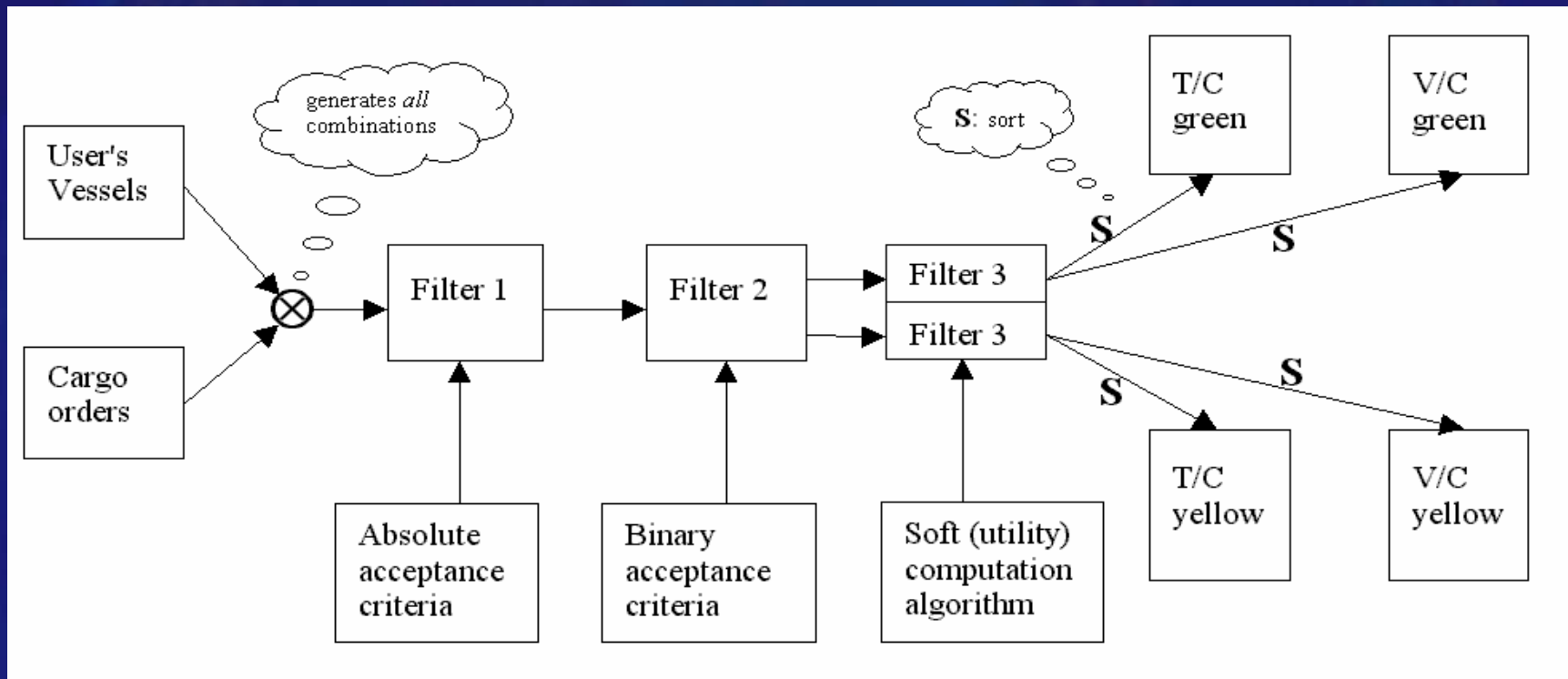


Decision support – 2

- Voyage estimation: Classic (and simple) method to estimate voyage parameters, with the added possibility of automatic ship and cargo matching
- Evaluation of cargo orders: “towards” automatic determination of the best possible option
 - Ideally, all parameters would be expressed in terms of “money” as the result of the analysis



Evaluation of cargo orders



- Combination of vessels with cargo orders
- Fully undesirable or impossible combinations discarded
- Problematic but possible combinations separated from the rest
- Calculation of monetary value of each combination
- Sorting based on value within groups of comparable cases



Utility function

- A voyage's destination is obviously a very important parameter and affects its real value
- The size of a ballast voyage starting from the destination of a given charter directly affects its value – it represents specific future costs
- Furthermore, it characterises parameters such as:
 - Market trends
 - Cargo availability (permanent or seasonal)
 - Constant patterns in chosen itineraries
 - Choices which were made in the past by experts
- It would not be possible to directly model and calculate the influence of such parameters



Utility function

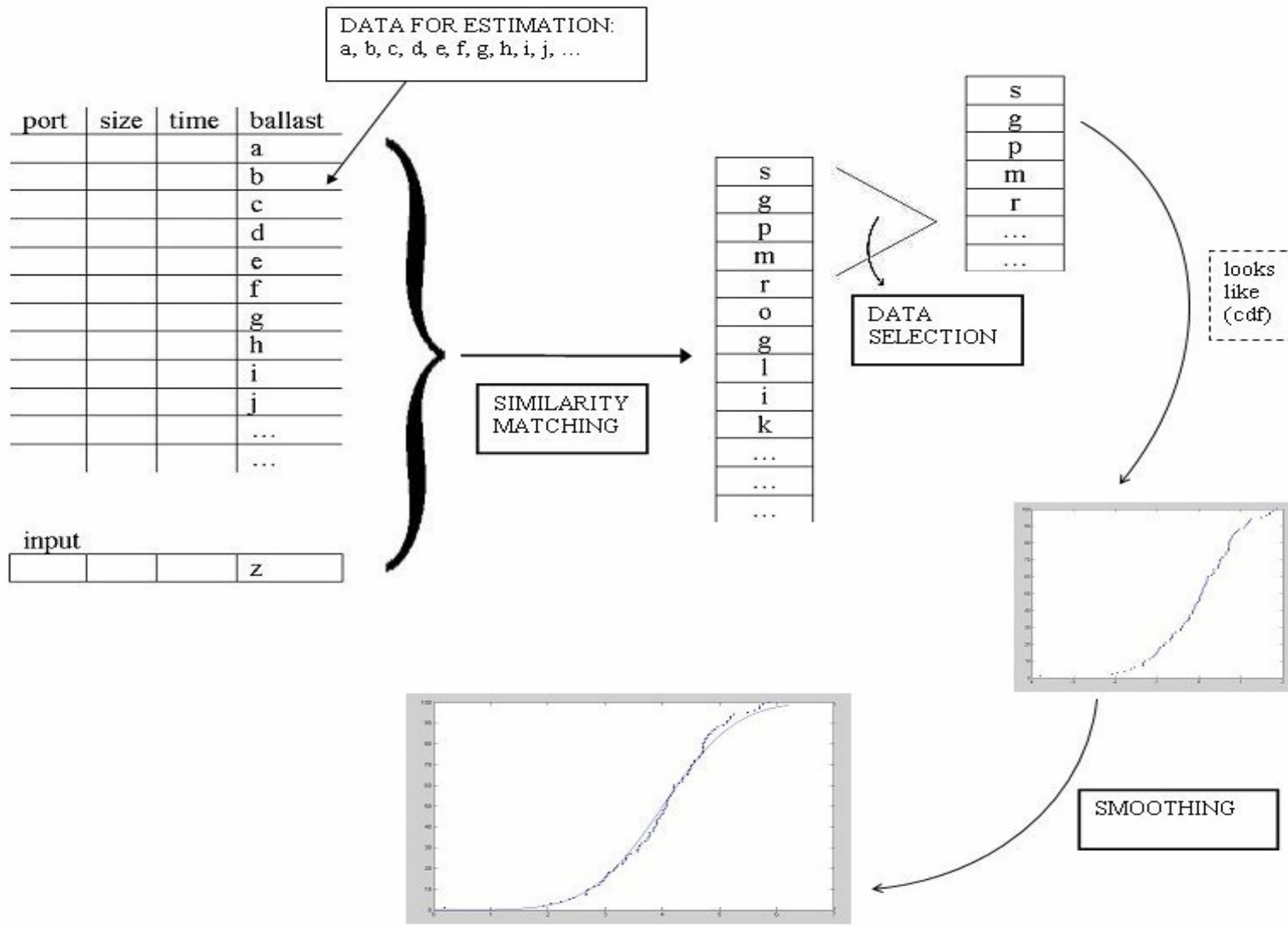
- Gives the subjective value of a chartering opportunity for a ship-owner, incorporating the quality-of-destination criterion through prediction of the next ballast voyage

$$f(\text{voyage}) = \int_{-\infty}^{\infty} u(\text{TCE} | n\text{Bal}) p(n\text{Bal}) dn\text{Bal}$$

- $P(n\text{Bal})$ is the probability that the given prediction for the next-voyage ballast is correct
- TCE: time charter equivalent, given estimated fees
- $u(x) = \sqrt{(x+A)}$, monetary utility
- Parameters influencing $n\text{Bal}$ are: trading area, ship type, ports, ship size, season



Ballast prediction statistics flow-diagram





Value of cargo order evaluation - 1

- The idea that a computational method could approximate human judgment is unrealistic
 - It would be necessary to predict and/or evaluate a vast mass of parameters, many of which are never recorded and/or consist purely of experts' intuition
- The system may still offer useful hints
 - For example when it totally disagrees with the user
 - Could also help out apprentices



Value of cargo order evaluation - 2

- However, the current reality is that a chartering manager only ever considers very few options
 - These are usually suggested by brokers or concern regular customers
 - In full contrast, the internet offers a source of huge numbers of possibilities, by far the most of which are entirely worthless
- Decision Support can plough through vast quantities of data mostly consisting of junk, e.g.:
 - User considers 4 good options suggested by brokers
 - System examines 220 options suggesting 3 more to be worth detailed, manual assessment by the user



Thanks